

# Federal Reserve Bank of New York

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*The Quarterly Review is published by the Research and Statistics Function of the Federal Reserve Bank of New York. Remarks of ANTHONY M. SOLOMON, President of the Bank, on banking deregulation and the direction for the future begin on page 1. Among the members of the staff who contributed to this issue are JOHN WENNINGER (on the M1-GNP Relationship, page 6); KAUSAR HAMDANI (on CRR and Excess Reserves, page 16).*

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# Banking Deregulation— Where Do We Go From Here?

Earlier this month, we witnessed a chaotic winding up of the Congressional session, with action on only those bills for which there was a compelling need and a reasonable prospect for passage. Among the many casualties was a generally constructive banking bill, which had been passed by an overwhelming majority in the Senate. As a result, we are left with a familiar sense of frustration and uncertainty over the outlook for further reforms to the nation's banking laws.

Why has it proven so difficult to reach a consensus on banking legislation? One problem, of course, is the very divisive nature of the competing private sector interests in the particulars of any such legislation. But that is certainly not new. What stalled legislation this time was an unusual degree of disagreement on three broad points. The first is the readiness of our financial institutions to cope with another wave of more intense competition. Specifically, is our financial system strong enough to continue with deregulation? The second relates to priorities for further change. Namely, which new powers, how to deal with interstate banking, and how much scope should be given to state governments on these issues. The third concerns how best to provide discipline and safeguards against imprudent behavior in a less regulated financial system.

Certainly, these are complex issues, where strong differences of view are to be expected. Many involve controversy over protected turf, making them even more difficult to resolve. But it is a serious mistake to think

we can afford an extended period of legislative inaction, in the face of rapid change in our financial system. So a consensus must be reached on these broad points. Let's consider the key issues.

The fact that there are Congressional concerns over the readiness of our financial institutions to adapt to further deregulation is understandable enough. After all, the debate over banking reform has been against a financial background that has been anything but calm. The problems in the industry have been well publicized: the weaknesses in LDC loans, high failure rates among banks and thrifts, the deterioration in energy credits, the debacles of Drysdale and Penn Square and, most recently, the downfall of Continental Illinois. Each of these problems hit the financial system with force, triggering shock waves that threatened to cause further distress. The net result has been nagging fears that our depository institutions have become too risk-prone for their own good, and that the safety nets which protect depositors and backstop these institutions have encouraged risk taking, by bailing out problem banks and thrifts.

Despite all the turmoil caused by these shocks, our financial markets have shown considerable resiliency. And the authorities have demonstrated both a capacity and willingness to contain the fallout from them, generally in ways which have imposed costs on those most responsible for the problems. There also are a number of positive signs indicative of efforts to further strengthen the system.

For one, nonperforming loan ratios at the major U.S. banks are still lower, and problem sectors less widespread, than in the mid-1970s, when banks were hurt

Remarks of Anthony M. Solomon, President of the Federal Reserve Bank of New York, at the National Bankers Association on Wednesday, October 17, 1984.

by REIT loans and the fallout from that severe recession. It is true, of course, that these ratios generally don't reflect large portions of restructured debt to Latin American governments. But it is also true that very considerable progress has been made toward a constructive, long-term approach for dealing with the LDC debt problem. Indeed, despite some remaining trouble spots, there is a better overall tone to debt renegotiations than at anytime in the past two years.

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**What stalled legislation was disagreement on three broad points: the readiness of our financial institutions to cope with another wave of more intense competition; priorities for further change; and how best to provide discipline and safeguards against imprudent behavior.**

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Moreover, virtually all major U.S. banks have significantly bolstered their capital positions, including their loan loss reserves. In the process, bankers have recently shown an increased willingness to face up to the problems in their portfolios and to take remedial actions. And in the one area in which deregulation has been very extensive—that is, rate deregulation—most banks have adapted very well to the transition to more aggressive competition.

Still, there are some disturbing signs which can't be ignored. Although nearly two years into the recovery, we have yet to detect clear indications of a long-awaited improvement in bank asset quality. Instead, the key indicators show continued slippage. There is also growing unease with the risks banks have taken on through creative lending arrangements, such as in leveraged buyouts. Moreover, nonfinancial corporations have been increasing their reliance on short-term debt to new record levels. And, there is still a long road to recovery for the major debtor nations. So, the banking industry has a greater than normal stake in the U.S. achieving continued steady economic growth and declining interest rates.

But difficulties haven't been confined to banks. Major players in the insurance and securities sectors have also had their share of performance problems. The more intense competitive pressures have taken a toll on margins in these businesses, just as in banking. As a result, there is now less room for error in management decisions to expand product lines or enter new markets. Moreover, conditions in the thrift industry remain very weak, with some form of continued Federal capital assistance for the thrifts inevitable.

Finally, there is the disturbing evidence of the Continental Illinois case, where the initial assurance from

the FDIC proved insufficient to stem the deposit flight. This sent a chilling message. Namely, once funding fears develop, not only does management have very limited options to contain the problem, but so do the authorities. This fact, together with the heavy dependence of some major U.S. banks on volatile funding sources, has contributed to a perception of financial vulnerability at this time.

From the standpoint of public policy, these developments offer ample reason to place extra weight on safety considerations when evaluating various paths along which to channel further changes in our financial system. And they underscore the need to upgrade financial standards to ensure that our institutions can deal with unforeseen problems, especially during what could be a difficult transition period. But, in my opinion, they do not warrant closing off avenues for further change in our financial system. Indeed, that is not even a realistic option.

The fact is the blurring of distinctions among commercial banks, thrifts, securities firms, and insurance companies is unleashing waves of new competition. These waves are swamping a regulatory structure designed to preserve comfortable distinctions among them. As a result, the nation's banking and securities laws have become constant targets for evasion. Various states are also trying to outdo one another in efforts to attract new jobs via liberalized banking laws. And our financial landscape is becoming cluttered with products and institutions that have been contrived to exploit regulatory loop holes. The most offensive example is the so-called "nonbank bank", which can be used by any type of firm to provide banking services anywhere in the country. These trends rule out a stand pat approach to banking legislation. Congress has recognized the need for a new base on which to build future financial change, but has been stymied on the question of the priorities.

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**The legislative framework should rest on four legs: a reaffirmation of the boundary between banking and commerce; a selective expansion of financial powers for banking organizations; a phase-in of nationwide banking; and a reasonable set of limits on the authority of states to experiment with new banking powers.**

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As I see it, that legislative base should rest on four legs: a reaffirmation of the boundary between banking and commerce; a selective expansion of financial powers for banking organizations; a phase-in of nationwide banking; and a reasonable set of limits on



the authority of states to experiment with new banking powers. Let me focus on the powers and interstate banking issues.

Few would argue against the desirability of limiting our banking organizations to activities of a financial nature and of prohibiting nonfinancial firms from operating banks. What is more controversial is to determine where, along the spectrum of financial activities, a line should be redrawn to separate depository institutions, on the one hand, from securities firms and insurance companies, on the other. Not everyone agrees that a continued separation is necessary today. For example, the more aggressive bankers maintain that banks today enjoy no unique advantage over other profit making financial firms. They argue that banks should not be restricted from offering as full a range of financial services as can be provided by some of their nonbank financial competitors.

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**Regarding the line between banking and other financial services I would suggest three guiding principles: new activities should represent natural extensions of the types of financial services banks now provide to household and corporate customers; they must be acceptable from the standpoint of prudential and conflict of interest concerns; and they should contribute to the banking industry's need to broaden earnings capacity through new services.**

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From a strictly competitive standpoint, this argument is not without merit. Nonetheless, if you believe that depository institutions play a special role in our financial system, and that there is a strong public interest in maintaining a sound banking system, then you cannot simply dismiss the need to retain some separation. Yet you must also ask how long banks can afford to be special, if that means laboring under extensive competitive restraints.

There are many practical difficulties in determining where, in today's economic world, one should redraw the line between banking and other financial services. In fact, given the speed with which changes are taking place in our financial system, I don't consider it desirable to be too rigid or precise in setting new boundaries. So rather than dwell on details, let's consider, in broad terms, what would be a logical basis on which to draw such a line, if one were starting with a clean slate. In so doing, I would suggest three guiding principles: new activities should represent natural extensions of the types of financial services banks now provide to household and corporate customers; they must be

acceptable from the standpoint of prudential and conflict of interest concerns; and they should contribute to the banking industry's need to broaden earnings capacity through new services.

When viewed on this basis, there's little reason to prevent banking organizations from offering the household sector brokerage, agency, and advisory services for securities, insurance, and perhaps real estate needs. What limited concerns these raise, in terms of potential conflicts of interest, hardly seem to warrant outright prohibitions on bank entry. Nor would such offerings to individual consumers have to be through affiliated companies. In some instances, franchise or agency relationships may provide a sufficient foothold. Moreover, there is also a basis for allowing banks to offer consumers a full line of insurance and securities services, since the level of risks associated with providing these services to households is generally quite manageable.

The more difficult judgments arise in the case of financial services for corporate and other institutional customers. Certainly, there are significant risks associated with corporate securities underwriting, commercial risk insurance, and real estate investment. And there are also more apparent opportunities for conflicts of interest to develop between the role of commercial lender and that of equity investor or underwriter. At the same time, many types of securities underwriting, including commercial paper, municipal revenue bonds and mortgage backed securities, are obviously very closely related to what banks now do, and without noticeable problems in terms of excessive exposure to risk or conflict situations. And there are also close business connections between real estate financing services banks now provide and the authority to take passive equity positions in those same projects, as is often done by their insurance company competitors.

On balance, I would conclude that these concerns warrant significant prudential limitations on bank involvement in real estate investment activities; and, in the case of corporate securities underwriting, continued exclusion, at least for the present. As more experience is gained through selective expansions into related areas of securities underwriting, the need for such prohibitions can always be reassessed.

In sum, this suggests broad latitude for expanding banking powers at both the retail and wholesale level. In time, that may well be how our financial system evolves. But it is unlikely to get there anytime soon, since Congress appears to have a far more selective appetite for expanded bank powers. And where it has shown such an appetite, it has typically been based on more concrete linkages between those new powers and expected public benefits, as for example, the type of benefits which would flow to municipalities and the

housing sector by broadening the market for revenue bonds and mortgage backed securities. I suspect it will take similar concrete linkages to consumer and community benefits in order to achieve a more significant expansion of banking powers.

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**Public policy concerns require a Federally sanctioned approach to interstate banking that is free from permanent regional restrictions and that provides upfront for an orderly transition to full nationwide banking.**

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The other major point of controversy on which a consensus needs to be reached is the issue of nationwide banking. It is encouraging to see that this issue, which for too long has taken a back seat to the powers question, has finally moved to the forefront on many legislative agendas. Still, Congress seems inclined to toss the issue back to the states, where there is a ground swell of interest in forming regionally restrictive compacts. The hallmark of all such compacts is that they exclude those states which are home to the nation's largest banks.

There may be some scope for considering regional banking arrangements as a limited transitional device to a broader form of nationwide banking. However, we should not ignore the dangers of these restrictive agreements, particularly among participants who are unwilling to build in provisions for an eventual opening of their markets. Once compacts are established, the larger banking organizations that form in the regions will have little incentive to consider permitting new competition. They could well grow dependent on continued protection, to the detriment of the markets they serve. Nor should we expect the uninvited outsiders to be idle observers as the nation's more attractive markets are parceled out. Instead, the likely response would be renewed efforts to exploit ways to evade restrictive state laws and to concentrate nonbank expansion in these same markets. This will lead to counter actions to further limit available entry vehicles. The net result is bound to be extensive litigation, the beginnings of which have already surfaced, and a misallocation of capital and managerial resources as competing banks jockey for position.

I believe public policy concerns require a Federally sanctioned approach to interstate banking that is free from permanent regional restrictions and that provides upfront for an orderly transition to full nationwide banking. The transition period would allow efficient community and regional banks to strengthen themselves in the local markets which they serve. There can also

be safeguards put in place to ensure that banks which embark on expansion programs have the needed financial and managerial depth.

I'm well aware that the prospect of interstate banking has long been viewed by many independent, community banks as a threat to their future. Many felt much the same way about the prospect of statewide branching. Yet, the evidence in New York, California and elsewhere showed that well-run community banks can compete very effectively alongside money center organizations. And, if anything, when large banks enter into new states it will be focused on markets in population centers, presently served by the larger regional banks, rather than the community organizations. So I don't view interstate banking as posing a significant threat to the role of community bankers in local markets.

The final broad policy issue on which I'd like to touch is how to maintain discipline within our banking system in a less regulated financial environment.

Some would have us believe that we can rely to a much greater extent than presently on what is loosely described as "market discipline" to keep banking institutions strong. What does this entail? Market discipline is administered through price differentials on bank liabilities and equity and, ultimately, through an unwillingness to provide funding. It depends on the ability of market participants to detect and price differences in risk; on the responsiveness of bank management to early signals of market concern; and, ultimately, on the willingness of regulators to countenance the failure and liquidation of banks. To rely more heavily on this type of discipline would require even broader market access to detailed information about a bank's condition. And a further, logical extension would be to cut back significantly on the extensive Federal insurance protection now provided to bank depositors.

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**The overriding concern with heavy reliance on market discipline, is that it will lead to further instability in our financial system. So while market discipline should continue to play a significant role in our system, I see it as one which reinforces, rather than replaces, the discipline imposed through regulatory and supervisory standards.**

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Even then there would be no assurances that market responses to signs of bank weakness would come early enough to promote corrective action. Instead, it could merely exacerbate problems by creating funding strains. Thus, the overriding concern with heavy reliance on market discipline, particularly when exerted through

pressure from uninsured depositors, is that it will lead to further instability in our financial system. So while market discipline should continue to play a significant role in our system, I see it as one which reinforces, rather than replaces, the discipline imposed through regulatory and supervisory standards. How can those standards be maintained and strengthened?

To begin with, certain minimum safeguards must be a necessary condition for expanded banking powers or interstate banking. These include authority for regulators to prescribe prudential limitations for the conduct of new activities; to review expansion proposals to ensure they are supported by adequate financial and managerial resources; and to retain authority to supervise all aspects of bank holding company operations.

There is also a need to strengthen regulatory discipline. This might include selective reforms to the deposit insurance system, involving controls on the use of brokered deposits and perhaps the use of risk sensitive premiums. What could be more helpful would be devising benchmarks for relating our higher capital adequacy standards to risks being managed, both on and off the balance sheet. Still, these are, at best, only useful tools. And, in the case of higher capital standards, we must keep in mind that, if they can't be supported by quality earnings to attract new capital, they can become self-defeating.

In the final analysis, less formal regulation will require strengthening the supervisory process. For one, the discipline of liquidity management needs to receive more attention. Recent experiences have dramatized the importance of keeping business plans consistent with sustainable funding strategies. In those cases where funding depends on heavy use of potentially volatile sources, much closer links need to be established between a bank's funding practices and the maintenance of high standards of financial strength. Ideally, those links should be established by banks themselves and then reinforced by the supervisors and marketplace.

Also, old lessons on the importance of portfolio diversification and on resisting temptations to reach for earnings through creative stretching of credit standards, need to be relearned. Supervisors can reinforce this through clearer standards for determining what constitutes excessive concentrations in a bank's portfolio.

The supervisors must also be prepared to move earlier and more forcefully to bring about corrective action,

especially at larger banks where weakness can pose risks to the overall system. The lack of forceful follow-up has been a recurring criticism of the supervisory process. Tendencies to defer to management on how to respond to points of supervisory criticism, or to be guarded in the signals sent to a bank's board until problems become self-evident, will have to be overcome.

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Finally, bank supervisors at both the Federal and state level must ensure that their respective standards aren't reduced to a least common denominator. This is especially important in terms of state bank supervisors. They now are under pressure to help attract new jobs into their states through liberal banking regulations and to assume greater responsibility for supervision of state chartered banks, yet still respond to local budgetary pressures. This is not a particularly healthy combination of pressures at a time of strains and rapid changes in our financial system. Nor are all state banking departments as well equipped as ours here in New York to respond to these pressures. We in the Federal Reserve are prepared to work closely with the states to help strengthen their respective banking departments.

What all this adds up to is an unusually complex and imposing agenda for the regulators and for the next Congress. From the regulators, you can expect a steady flow of policy initiatives designed to shore up financial standards in the industry. From Congress, I think you should expect significant Federal banking legislation, since it is clear that failure to act will trigger frantic efforts to exploit the numerous existing loopholes. There is little point in speculating on the likely particulars of such legislation. But it will have to deal with the broad issues touched on today. How they are resolved will have an important bearing on the future structure of the financial system in which you operate, even if it doesn't have an immediate effect on the special role you play in your local markets.

# The M1-GNP Relationship: A Component Approach

The sharp decline in M1's velocity in 1982 and early 1983 caused considerable concern about whether the money-income relationship had become so unstable that monetary targeting was no longer a viable approach for the implementation of monetary policy. More recently, however, the return of M1's velocity to a more normal trend raised the opposite question of whether M1 should be reinstated to its former role in the policy process. Indeed, after greatly reducing the weight given M1 in the policy process in 1982 and then monitoring rather than targeting M1 in 1983, the Federal Open Market Committee (FOMC) once again gave M1 equal weight alongside M2 and M3 in the July 1984 policy review. Clearly, understanding the reasons for the breakdown in the money-income relationship in 1982 and 1983 as well as some assessment of whether recent, more normal trends can be expected to persist are important for policy purposes.

What caused the money-income relationship to break down? Some analysts have suggested that the cause was the introduction of nationwide NOW accounts, while others have pointed to the variability of M1 growth.<sup>1</sup> Thus far, however, not much effort has been made to identify which components of GNP might not be contributing to GNP growth the same way as in the past

when M1 growth changes.<sup>2</sup> Also, not much work has been done on the question of whether M1 growth that comes from NOW accounts has a different effect on spending than does M1 growth that comes from currency and demand deposits. As a result, in this paper, the sources of the breakdown in the money-income relationship are explored in two ways: first, by looking at the GNP component effects of changes in M1 growth, and second, by looking at the different effects that M1 less NOW accounts (M') and NOW accounts have had on the growth of GNP and its components.<sup>3</sup>

The primary conclusion is that the relationships between several of the GNP components and money have changed. In part this results from the consideration that M1 growth due to NOW accounts has considerably less effect on various spending categories than does M1 growth due to M'. The breakdown in the money-income relationship also reflects in part a significant change in the cyclical pattern of M1 velocity. After the different effects on GNP of M' and NOWs are allowed for, velocity exhibited its normal cyclical pattern during the 1982 recession, but deviated sharply from past patterns

<sup>2</sup>The sectoral effects of changes in M1 growth had been the topic of research interest in the past. For more detail, see David Meiselman and Thomas D. Simpson, "Monetary Policy and Consumer Expenditures: The Historical Evidence," in *Consumer Spending and Monetary Policy: The Linkages*, Federal Reserve Bank of Boston, June 1971.

<sup>3</sup>M' was derived by subtracting the other checkable deposit component of M1 from total M1. The other checkable deposit component of M1 includes some other minor series in addition to NOW accounts such as savings subject to automatic transfer. In this article, the term "NOW accounts" is used rather than the term the "other checkable deposit component of M1."

<sup>1</sup>Rik W. Hafer, "The Money-GNP Link: Assessing Alternative Transaction Measures," Federal Reserve Bank of St. Louis *Review*, March 1984. Michael T. Belongia, "Money Growth Variability and GNP," Federal Reserve Bank of St. Louis *Review*, April 1984. For other explanations of the 1982-83 deviation of velocity from past trend, see "Monetary Targeting and Velocity," Conference Proceedings, Federal Reserve Bank of San Francisco, December 1983.

during the first year of the recovery in 1983. Moreover, once the different effects on spending from  $M'$  and NOWs as well as typical cyclical movements in velocity are allowed for,  $M1$  variability no longer appears to be a significant explanation of the weaker-than-expected growth of GNP over 1982 and 1983. A detailed set of conclusions is presented at the end of this article.

### Theoretical causes of the breakdown

Before analyzing the possible sources of the breakdown in the money-income relationship statistically, it might be worthwhile to ask at a theoretical level what could have caused the sharp decline in  $M1$  velocity. A simple IS-LM model can be used to illustrate some possible causes.

$$\begin{aligned}(1) \quad Y &= -cr + X \\(2) \quad M1 &= -ar + bY + Z\end{aligned}$$

where:

$M1$  = narrow money stock (exogenously determined, Footnote 4)  
 $r$  = interest rate  
 $Y$  = income  
 $Z$  = money demand shift  
 $X$  = autonomous expenditures  
 $a, b, c$  = structural parameters

If equations (1) and (2) are combined to derive the reduced form for income, the following equation results:

$$(3) \quad Y = \frac{c}{a+bc} M + \frac{a}{a+bc} X - \frac{c}{a+bc} Z$$

This equation resembles reduced-form equations used to estimate income growth as a function of current and lagged money growth and autonomous expenditures (which are usually found to be insignificant). Money demand shifts,  $Z$ , are implicitly assumed not to occur and are therefore not included in the reduced form, although in theory, if they could be satisfactorily measured, they should be included. Other variables sometimes included are supply side shocks such as the relative price of energy and hours lost due to strikes. When this equation is estimated, the constant term is about equal to long-run average growth of velocity, and the sum of the coefficients on the growth of current and lagged money stock is roughly equal to one (Footnote 1). Hence, this equation, as it is usually estimated with a lag covering about one year, is a convenient tool for analyzing unusual movements in velocity over the longer run without over-emphasizing quarter-to-quarter volatility in  $M1$ .<sup>4</sup>

<sup>4</sup>Over the years, many objections have been raised about the reduced-form approach. In particular, even though the Federal Reserve has set  $M1$  targets since the early 1970s, that is not the same as saying that  $M1$  has been exogenously determined over the entire period. Rather,  $M1$ , like income, is an endogenous variable

From equation (3) it can be seen that 5 factors, individually or in various combinations, could have caused income to be unusually weak relative to money growth in 1982 and 1983:

- (1) The interest elasticity of expenditures ( $c$ ) declined.
- (2) The interest elasticity of money demand ( $a$ ) increased.
- (3) The income elasticity of money demand ( $b$ ) increased.
- (4) There was a shift in the money-demand function ( $Z$ ).
- (5) There was a decline in autonomous expenditures ( $X$ ).

Given the rapid pace of financial innovation and de-regulation in recent years including the introduction of NOW accounts nationwide in 1981, it is possible that one or more of the key elasticities ( $a$ ,  $b$ , or  $c$ ) has changed or that the money demand function itself has shifted.<sup>5</sup> The effects of NOW accounts on the reduced-form equations for GNP and its components will be studied in the next section. Moreover, since velocity growth is known to have a cyclical pattern, weakening during recessions and growing very rapidly during the first years of recoveries, it is possible that some of the apparent breakdown in the money-income relationship could be due to the deep recession in 1982 and the rather strong recovery in 1983 and 1984. In the third section of this paper, the error pattern from the reduced-form equation is analyzed to see whether there are any cyclical factors that systematically affect the accuracy of the reduced-form equation.<sup>6</sup> In the final section, the

#### Footnote 4, continued

and the correlation observed in the "reduced-form" equation results from both variables responding in a systematic way to other factors in the economy. Nevertheless, as long as this money-income relationship is stable,  $M1$  can play a useful role in the policy process even if it is not exogenously determined, if for no other reason than it might serve as a leading indicator of what income will do. Hence, the "reduced-form" equation relating income growth to current and past money growth is a convenient tool for examining the instability in velocity over 1982 and 1983. Because the reduced-form model is being used in this paper, the discussion is often in terms of "money causing or determining income" even though the underlying process is much more complex.

<sup>5</sup>For more detail on this, see John Wenninger, "Financial Innovation, A Complex Problem Even in a Simple Framework," this *Quarterly Review*, Summer 1984. Also see Thomas D. Simpson, "Changes in the Financial System: Implications for Monetary Policy," *Brookings Papers on Economic Activity*, 1984-IV.

<sup>6</sup>In a recent paper, John Tatom tested for this in an equation for velocity using the gap between real GNP and potential GNP. He did not, however, try to incorporate the effect in the more conventional reduced-form equation. Moreover, when his equation is simulated for 1982 and 1983, it tracks 1982 fairly well. But for 1983, it over-predicts velocity growth by 4.2 percentage points, suggesting that there are other explanations for the recent breakdown in the ( $p. 8$ )

question of whether the increased variability in M1 growth since 1979 could be a factor that explains the sharp decline in M1's velocity is explored briefly.

### Reduced-form equations using components

But before these other factors are allowed for, the sharp decline in M1's velocity in 1982 and early 1983 is analyzed using the more standard equation in which nominal income growth is specified as a function of current and past M1 growth. The initial statistical exercise undertaken in this section is quite straightforward. First, total GNP growth is broken down into the growth due to each of its components. In other words, the growth rates of the individual components are not used, but rather the contribution of each component to total GNP growth.<sup>7</sup> In that way, when the component contributions of GNP growth are regressed on M1 growth, the sum of the coefficients across component contributions equals the coefficient obtained when GNP itself is regressed on M1 growth. Thus, for a given change in out-of-sample M1 growth it is possible to see which components are no longer contributing to total GNP growth as in the past, and hence the sources of the breakdown in the overall money-income relationship can be identified.

Looking at the relationship between components of GNP and M1 is somewhat unconventional, since at a conceptual level M1 growth is typically viewed as a determinant of nominal aggregate demand without much concern about the sectoral composition of the nominal

#### Footnote 6, continued

money-income relationship since 1982. For more detail on the 1982-1983 simulation as well as other explanations for the decline in velocity in 1982 and early 1983, see John A. Tatom, "Alternative Explanations of the 1982-1983 Decline in Velocity," in *Monetary Targeting and Velocity*, Conference Proceedings, Federal Reserve Bank of San Francisco, December 1983.

<sup>7</sup>An example might help explain the variables being used here. For ease of illustration, let income (Y) have two components, consumption (C) and investment (I). The change in income ( $\Delta Y$ ) is equal to the change in consumption ( $\Delta C$ ) plus the change in investment ( $\Delta I$ ). Or in equation form,  $\Delta Y = \Delta C + \Delta I$ . If both sides of this equation are divided by Y, the result is  $\Delta Y/Y = \Delta C/Y + \Delta I/Y$ . This last equation says that the percentage change in income can be accounted for by the increase in consumption as a percent of income and by the increase in investment as a percent of income. In other words, if income increases 10 percent, 7 percent might be due to the increase in consumption and 3 percent due to the increase in investment. If  $\Delta Y/Y$ ,  $\Delta C/Y$ ,  $\Delta I/Y$  are regressed on M1 growth ( $\Delta M/M$ ), the following equations would result:  $\Delta Y/Y = a_1 + b_1 \Delta M/M + V_1$ ,  $\Delta C/Y = a_2 + b_2 \Delta M/M + V_2$ ,  $\Delta I/Y = a_3 + b_3 \Delta M/M + V_3$ , where  $a_1$ ,  $a_2$  and  $a_3$  are intercept terms,  $b_1$ ,  $b_2$  and  $b_3$  are the coefficients on money, and  $V_1$ ,  $V_2$  and  $V_3$  are error terms. Since  $\Delta Y/Y = \Delta C/Y + \Delta I/Y$ , it is also true that  $\Delta Y/Y = (a_2 + a_3) + (b_2 + b_3) \Delta M/M + (V_2 + V_3) = a_1 + b_1 \Delta M/M + V_1$ . This means that the intercept terms, coefficients and error terms in the component equations add up to the intercept term, coefficient and error term in the aggregate equation. Hence, when studying the stability of the money-income relationship in recent years, this approach enables us to identify which components are no longer contributing to GNP growth the same way as in the past when M1 growth changes.

income growth. Moreover, if the money-income relationship had remained stable, it could be argued that there would be no need to examine the relationship between money and the components of GNP, since, by controlling money the Federal Reserve is attempting to keep nominal income growth at a noninflationary rate. Therefore, the Federal Reserve should not be that concerned about the sectoral composition of that growth. However, when the aggregate relationship breaks down in such a dramatic way as in 1982 and early 1983, it seems quite natural to look at the relationships between M1 and the individual components of GNP to see whether the problem can be traced to changed behavior in certain sectors of the economy that might have undergone structural change. This exercise, in turn, might yield some insights into the causes of the breakdown in the aggregate equation, insights that might be useful in the future.

Of course, the source of the problem might not be with GNP and its components, but rather with M1 and its components. NOW accounts have become a larger proportion of M1 in recent years, and since NOW accounts pay explicit interest, consumers may be holding transactions as well as savings balances in them. This, in turn, could mean that M1 growth due to NOW accounts might not have the same effect on GNP and its components as M1 growth due to currency and demand deposits (M'). Therefore, in addition to regressing GNP growth and the component contributions of GNP growth on M1 growth, equations were also reestimated using two independent variables, the contributions of M' and NOW accounts to total M1 growth.<sup>8</sup> By repeating the exercise in this fashion it is possible to see not only which GNP components are not responding to M1 growth the same way as in the past, but also whether the components of M1 growth have different effects on GNP and its components. If M1 growth from increases in NOW accounts has a different effect on GNP or on its components than M1 growth from currency and demand deposits, then the Federal Reserve perhaps should react to M1 growth differently depending upon the sources of its growth.

Table 1 shows the results of regressing GNP growth and the component contributions to GNP growth on current and lagged M1 growth for the period from 1948-II to 1979-IV.<sup>9</sup> The results in the first row suggest that a one percentage point increase in M1 growth will be associated with an increase in GNP growth of about 1.1 percentage points. Of that 1.1 percentage point increase

<sup>8</sup>These series were constructed the same way as the component contributions to GNP growth (Footnote 7).

<sup>9</sup>Throughout this paper, a polynomial distributed lag of current M1 growth and 4 lags is used. The polynomial is second order, (p. 10)

Table 1

**Reduced-Form Estimates Using M1 Growth**

1948-II to 1979-IV

	M†	(t)	$\bar{R}^2$	Average Error*		
				1980-I to 1981-IV	1982-I to 1984-II	1980-I to 1984-II
(1) GNP growth . . . . .	1.11	(6.75)	0.30	-0.2	-4.8	-2.8
<b>GNP growth due to</b>						
(2) Durable consumption . . . . .	0.08	(1.27)	0.04	-0.5	0.1	-0.2
(3) Nondurable consumption . . . . .	0.28	(6.35)	0.23	-0.4	-1.5	-1.0
(4) Services . . . . .	0.21	(10.23)	0.45	0.9	-0.2	0.3
Investment in						
(5) Structures . . . . .	0.07	(4.96)	0.17	0.2	-0.6	-0.2
(6) Durable equipment . . . . .	0.17	(5.12)	0.18	-0.4	-0.7	-0.6
(7) Residential structures . . . . .	0.06	(1.70)	0.25	-0.7	0.1	-0.7
(8) Business inventories . . . . .	0.10	(0.77)	0.007	0.3	-0.2	0
(9) Net export . . . . .	0.02	(0.54)	-0.009	0.3	-1.1	-0.5
(10) Federal Government purchases . . . . .	0.06	(0.87)	-0.002	0.3	-0.3	-0.1
(11) State and Local purchases . . . . .	0.06	(3.74)	0.09	-0.1	-0.4	-0.3

\*Out-of-sample errors.

†Sum of coefficients obtained from regressing GNP growth and the contributions to GNP growth from its components on a polynomial distributed lag of M1 growth (current quarter and 4 lagged quarters).

Table 2

**Reduced-Form Estimates Using Component Contributions to M1 Growth**

1948-II to 1984-II

	M†	(t)	NOW†	(t)	$\bar{R}^2$	Average Error*		
						1980-I to 1981-IV	1982-I to 1984-II	1980-I to 1984-II
(1) GNP growth . . . . .	1.13	(6.96)	0.66	(3.50)	0.29	1.5	-1.6	-0.2
<b>GNP growth due to</b>								
(2) Durable consumption . . . . .	0.10	(1.67)	0.06	(0.84)	0.05	-0.3	0.2	0
(3) Nondurable consumption . . . . .	0.27	(6.38)	0.12	(2.47)	0.22	0.3	-0.4	-0.1
(4) Services . . . . .	0.19	(8.26)	0.24	(9.12)	0.43	0.7	-0.4	0.1
Investment in								
(5) Structures . . . . .	0.06	(3.53)	0.05	(2.76)	0.13	0.2	-0.4	-0.1
(6) Durable equipment . . . . .	0.18	(5.76)	0.09	(2.43)	0.18	0	-0.2	-0.1
(7) Residential structures . . . . .	0.08	(2.58)	0.03	(0.79)	0.30	-0.5	0.3	0
(8) Business inventories . . . . .	0.15	(1.23)	0.10	(0.69)	-0.004	-0.1	0.2	0.1
(9) Net export . . . . .	-0.003	(0.07)	-0.06	(1.18)	-0.009	0.7	-0.6	0
(10) Federal Government purchases . . . . .	0.05	(0.68)	0.03	(0.34)	-0.02	0.4	-0.2	0.1
(11) State and Local purchases . . . . .	0.06	(3.83)	0.01	(0.54)	0.08	0.2	-0.1	0

\*In-sample errors.

†Sum of coefficients obtained from regressing GNP growth and the contributions to GNP growth from its components on polynomial distributed lags of the contributions to M1 growth of M<sup>1</sup> and NOW accounts (current quarter and 4 lagged quarters).



in GNP growth, 1/2 percentage point comes through nondurable consumption expenditures and consumption of services (rows 3 and 4). Also important are the contributions from investment in durable equipment and structures (rows 5 and 6). Durable consumption expenditures and residential structures, with  $t$  statistics between 1.3 and 1.7, seem to be somewhat less systematic sources of the response of GNP to changes in M1 growth. Changes in M1 growth do not appear to affect GNP growth through inventories, net exports or Federal Government purchases—consistent with what most analysts would expect. Somewhat surprisingly, however, state and local government purchases appear to be significantly influenced by changes in M1 growth.

The right-hand side of Table 1 shows the average out-of-sample errors in projecting GNP and the component contributions for two periods: 1982-I to 1984-II (the period of greatest difficulty in forecasting GNP with M1 growth), and the period 1980-I to 1981-IV when forecasting GNP with M1 growth was quite accurate on average despite changes in the Federal Reserve's operating procedure, the introduction of nationwide NOWs, and the use of credit controls.<sup>10</sup> Looking at the first equation, which regresses total GNP growth on M1 growth, the average error in the first period was virtually zero, while in the second period it was -4.8 percentage points. The regressions for the component contributions suggest that in the earlier period M1 growth predicted GNP growth accurately because of offsetting errors among the components, whereas in the second time period almost all the sectors (except for durable consumption and residential structures) have negative average errors. Looking only at those relationships that were significant over the 1948 to 1979 period, the breakdown in the money-income relationship since 1982 can be traced primarily to nondurable consumption expenditures, investment in structures and durable equipment, and state and local government expenditures. These four components show significant bias after 1982-I and account for 65 percent of the total average error of -4.8 percentage points. Clearly, the breakdown

in the money-income relationship has not been caused by some unusual behavior in just one or two sectors, but rather is a broad-based development.

Can this widespread phenomenon be traced to different responses to M1 growth depending upon whether it is due to increases in  $M'$  or NOW accounts? Table 2 sheds some light on this question. The first regression shows that total GNP growth does respond differently to M1 growth depending on the source of that growth. M1 growth due to NOW accounts appears to have only about 60 percent of the impact on GNP growth that M1 growth, due to increases in  $M'$ , does. In terms of the component contributions, different responses can be seen for nondurable consumption, durable equipment spending, residential structures and state and local government spending. Why should aggregate demand as well as the demand for some of the components of GNP respond differently to changes in M1 growth coming from  $M'$  and NOW accounts? The reason why NOW accounts have a smaller impact on spending than  $M'$  may be because the demand for NOW accounts has a greater interest elasticity than the demand for  $M'$ . Hence, consumers will not require as large a decline in interest rates to hold a given increase in NOW accounts as they would have in the past to hold the same amount of additional demand deposits. The smaller decline in interest rates, in turn, means a smaller response in spending to changes in NOW accounts than to changes in  $M'$ .<sup>11</sup> Moreover, as NOW accounts have become a larger fraction of M1, the interest elasticity of the demand for aggregate M1 has been also increased.<sup>12</sup>

How accurate are forecasts of GNP growth based on past M1 growth once the different effects of M1 and NOW accounts are allowed for? The far-right hand side of Table 2 provides a rough answer to this question by looking at the in-sample errors over the 1980-I to 1984-II period. For the period as a whole (1980-I to 1984-II), the in-sample errors in predicting GNP growth and the contributions of its components have been quite small when different effects of M1 growth are allowed for, depending upon the source (far right hand column). For subperiods and individual years within this longer period, however, some of the average errors were still fairly large. This suggests that, while over a long period of time, one can perhaps obtain a rough estimate of the different effects of M1 growth depending upon the source, over shorter periods those different effects are not likely to be constant. Thus, even though it appears

*Footnote 9, continued*

constrained on the far right to zero. No attempt was made at this point to search for the "best lag structure" for each component of GNP. Alternative lag structures at the aggregate level as well as at the component level are likely to produce somewhat different results. Rather, the purpose of this exercise was to see if, by just using a simple lag structure, it would be possible to point to a certain component of GNP as causing the recent breakdown in the money-income relationship.

<sup>10</sup>While a case could be made to break the period into pre- and post-nationwide NOWs in 1981-I, the errors from the reduced-form equation do not show any significant bias until 1982. Indeed, some analysts argue that NOWs did not distort M1 and hence there was no need to adjust M1 for NOWs in 1981. See, for example, John Tatom, "Recent Financial Innovations: Have They Distorted the Meaning of M1?", Federal Reserve Bank of St. Louis Review, April 1982.

<sup>11</sup>For more on this, see Wenninger, *op.cit.* In that article, a case is made that NOW accounts could well be increasing the interest elasticity of the demand for M1, at least temporarily. Also see Simpson, *op.cit.*

<sup>12</sup>From the simple IS-LM model presented earlier, it can be seen that an increase in the interest elasticity of the demand for M1 would reduce the responsiveness of income to changes in money growth.



that changes in M1 growth due to NOW accounts have less effect on GNP than M1 growth due to M', the exact magnitudes probably have changed somewhat over time. This, of course, makes it difficult to use any sort of an "adjusted M1" for policy purposes.

### Cyclical shifts in the reduced-form equation

The next question to be examined is whether the role assigned to NOW accounts in explaining the breakdown in the money-income relationship instead reflects the cyclical behavior of velocity. Over the cycle, velocity is usually very weak (or declines) during recessions and grows very rapidly during the first years of recoveries. If this cyclical behavior of velocity systematically affects the accuracy of the reduced-form equation over the business cycle, then the role of NOW accounts in explaining the breakdown in the money-income relationship over the most recent cycle (1982-83) might have been overstated.

To see if this cyclical velocity effect has played such a role, zero-one dummy variables for recessions and first years of recoveries were included in the aggregate reduced-form equations from Tables 1 and 2. Equations 1 and 3 in Table 3 are the same as the first equations in Tables 1 and 2 respectively. In the top part of Table 3, the effects of using cyclical dummies are shown for reduced-form equations in which M1 growth is the monetary variable. The bottom half of Table 3 shows the results when cyclical dummies are incorporated into a reduced-form equation in which M1 growth is divided into growth due to M' and NOW accounts. Looking first at the top of the table, the dummy variables for recessions and first years of recoveries are significant

(equation 2). The  $\bar{R}^2$  is considerably improved by including these variables, suggesting that reduced-form equations with M1 growth as the independent variable have had significant cyclical error patterns in the past.

Once these cyclical effects are allowed for, does M1 growth still appear to have different effects on GNP depending whether the M1 growth comes from NOW accounts or M'? The bottom half of Table 3 provides an answer by showing the results when the equations in the top half are estimated through 1984-II and M1 growth is broken down into its two components, as was done in Table 2. Even after allowing for cyclical swings in velocity, M1 growth due to NOW accounts still appears to have less effect on GNP growth than does M1 growth due to M' (compare equations 3 and 4). The difference between the two coefficients, however, is not as great in equation 4 as in equation 3. Nevertheless, the difference is still sufficiently large (0.32 percentage point in equation 4 compared to 0.47 in equation 3) to cause some concern that NOWs are a different type of monetary variable than M'.

After allowing for cyclical effects and the different effects of the components of M1, how accurate has the money-income relationship been in recent years? Table 4 contains the in-sample errors in predicting GNP growth for each calendar year over the 1982-I to 1984-II period with the reduced-form equations in Table 3 (equations 1 and 2 were reestimated through 1984-II). The results from equations 1 and 2 (in which M1 growth was used) show that allowing for just cyclical effects did reduce the average errors over the entire 1982-I to 1984-II period. All of the improvement, however, came from 1982; the equation with the cyclical dummies

Table 3

### Cyclical Effects on the Money-Income Relationship

1948-II to 1979-IV:							
(1)	Y	=	3.0 (4.0)	+1.11 M (6.8)			$\bar{R}^2$ = 0.30
(2)	Y	=	4.5 (5.1)	+0.86 M (5.3)	-5.2 Rec (4.8)	+3.7 FYR (3.6)	$\bar{R}^2$ = 0.49
1948-II to 1984-II:							
(3)	Y	=	3.0 (4.0)	+1.13 M' (7.0)	+0.66 NOW (3.5)		$\bar{R}^2$ = 0.29
(4)	Y	=	4.8 (5.6)	+0.82 M' (5.1)	+0.50 NOW (2.9)	-5.1 Rec (5.1)      +3.3 FYR (3.4)	$\bar{R}^2$ = 0.48

Where: Y = quarterly growth rate of nominal GNP  
M = polynomial distributed lag of M1 growth  
Rec = zero-one dummy variable for recessions  
FYR = zero-one dummy variable for first year of recoveries  
M' = polynomial distributed lag of M1 growth due to M1 less NOW accounts  
NOW = polynomial distributed lag of M1 growth due to NOW accounts

Table 4

**Average In-Sample Prediction Errors**

In percent; from equations in Table 3

	Equation 1* (M1 only)	Equation 2* (M1 and Cyclical Dummies)	Equation 3 (M', NOWs)	Equation 4 (M', NOWs and Cyclical Dummies)
1982 . . . . .	-7.8	-1.8	-4.2	-0.4
1983 . . . . .	-3.7	-5.2	-1.9	-4.4
1984 (first half) . . . . .	2.7	3.0	4.2	3.9
Entire Period . . . . .	-4.1	-2.2	-1.6	-1.1

\*Reestimated through 1984-II.

(equation 2) was less accurate in 1983 than the one without (equation 1), and they have been about equally accurate thus far in 1984. So while it is possible to improve the money-income relationship with cyclical dummies, the relationship still has not been stable since 1982-I, and in particular 1983 was a difficult year to explain GNP growth in terms of M1 growth.

Are these conclusions appreciably changed if one also allows for the different effects of NOWs and M' as well as the cyclical velocity shifts? Comparing the errors from equations 3 and 4, respectively, to the ones from equations 1 and 2 helps answer this question. For the entire 1982-I to 1984-II period the average errors are reduced in each case by allowing for different impacts of NOWs and M': from -4.1 to -1.6 percentage points for equations 1 and 3 which do not have cyclical dummies, and from -2.2 to -1.1 percentage points for equations 2 and 4 which include the cyclical dummies. The average errors are also reduced for the individual years 1982 and 1983 for each of these sets of equations. By and large, these results are broadly consistent with the notion that NOW accounts have altered the way in which the economy responds to changes in M1 growth even after cyclical effects are allowed for.

But that does not mean that the instability in the money-income relationship in 1982 and 1983 has been fully explained. For equation 3, which allows for different effects of M' and NOWs, but not for cyclical velocity shifts, the average error in 1982 was -4.2 percentage points and in 1983 it was -1.9 percentage points. While including the cyclical dummy variables (equation 4, Table 4) reduces the overall average error somewhat, the effect is basically to reverse the relative size of the average errors in 1982 and 1983. In other words, rather than becoming smaller in absolute value in 1983 than in 1982, the average error becomes larger in absolute value when these cyclical dummies are included. This

suggests that while the different effects of M' and NOWs and cyclical dummies can go a long way in explaining the 1982 instability in the money-income relationship (equation 4), the 1983 error remains largely unexplained. As a matter of fact, the average error of -4.4 percentage points for 1983 is not that much larger in absolute value than the coefficient on the dummy variable for first years of recoveries estimated through 1979 (3.7), suggesting that basically 1983 did not have the normal increase in velocity for the first year of the recovery that would have been expected from past patterns. Hence, a case can be made that the recent instability in the money-income relationship can be traced in part to the different effects M' and NOWs have on GNP growth and in part to a breakdown in past cyclical velocity patterns.

While the component responses to M' and NOW accounts have been examined and cyclical velocity swings allowed for in the aggregate equations, the question of which GNP components account for the cyclical swings in velocity—and hence which ones might account for the breakdown in the money-income relationship in 1983—still remains to be analyzed. To answer this question, the component equations in Table 2 (incorporating separate effects for M' and NOWs) were reestimated using the zero-one cyclical dummies that were used in equations 2 and 4 in Table 3 as well as a dummy variable for 1983 (D83) so the large negative average error from equation 4 in Table 4 for 1983 can be accounted for.<sup>13</sup>

<sup>13</sup>Including a separate dummy variable for 1983 in effect prevents the large error for 1983 from affecting the other coefficients, in particular the coefficient on the dummy variable for first years of recoveries which had dropped from +3.7 to +3.3 when the sample period was extended (Table 4). With the 1983 data unable to affect the other coefficients because of this dummy variable, the size of the average error for 1983 (as measured by the coefficient on the dummy variable) increases from -4.4 in Table 4 to -6.0 in Table 5. With

From Table 5 it can be seen that the cyclical swings in overall velocity are due primarily to business inventories. Inventories, while not correlated with money growth, have a pronounced cyclical impact on GNP accounting for 35 percent of the weaker-than-expected GNP growth during recessions and for virtually all of the stronger-than-expected GNP growth during the first years of recoveries. Some other components mirror the GNP cyclical patterns in one of the stages, but it appears that inventories are the primary reason behind the overall pattern. Which components appear to be behind the instability of the money-income relationship in 1983? As it turns out, the error is spread across several components with consumption components accounting for 43 percent of the total average error, and investment in structures also an important factor. As was the case earlier for the entire 1982-I to 1984-II period, the breakdown in the money-income relationship in 1983 cannot be traced to unusual behavior of a single component.

Even though the 1983 instability in the money-income relationship suggests that the normal cyclical pattern in M1 velocity has at least temporarily broken down, one cannot rule out alternative explanations. In particular, nationwide NOW accounts have been in existence for only about 3½ years, and perhaps the coefficient estimated for it here in the money-income relationship still has not stabilized, but rather is still evolving to some long-run value. The negative average error in 1983 would suggest that the size of the coefficient in absolute value could still be declining. If this is true, it would suggest that rather than using an intercept shift for 1983, as was done in Table 5, the appropriate procedure would be to allow for the coefficient on NOWs to change over time. Since a zero-one intercept shift was significant for 1983, the statistical results would show a significant change in the NOW account coefficient if it was allowed to shift rather than the intercept in 1983. How-

*Footnote 13, continued*

the dummy variable for 1983 in the aggregate equation, the difference between the coefficient on M1 growth due to M' and the coefficient on M1 growth due to NOW accounts is the narrowest of any of the regressions estimated, only about 0.20 percentage point as compared to 0.32 and 0.47 percentage point for equations 4 and 3 in Table 3. This reflects the consideration that NOW accounts have been making an important contribution to M1 growth for only a few years and, including the dummy variable for 1983, prevents the 1983 experience from affecting the coefficient on NOW accounts not only at the aggregate level but also at the component level as well. Hence, if it were possible to find a variable that explained the 1983 error in the reduced-form equation quite well, the different effects on spending from M1 growth due to M' and NOW accounts might not appear as significant as shown in Table 2 for the aggregate equations or the component equations. In terms of F tests for differences in coefficients, the hypothesis that the sum of the coefficients on M' is the same as the sum of the coefficients on NOW accounts is rejected at the 95 percent confidence level for equation 3 in Table 3, at the 90 percent level for equation 4 in Table 3, but not for equation 1 in Table 5.

ever, if the negative error in 1983 was attributable to drift in the coefficient on NOW accounts, then one might expect the negative errors to continue into 1984. The errors, however, are positive over the first half of 1984 (Table 4), suggesting that the negative errors in 1983 are probably associated with a breakdown in the usual pattern of velocity in the first year of the recovery rather than a drift in the coefficient on NOW accounts. In any case, this can only be resolved in some more definite sense after more experience with NOW accounts. And with NOW accounts scheduled for further deregulation in 1985 and 1986, it will be quite a while before anyone can be confident that the relationship between the economy and NOW accounts is fully understood. Hence, only limited consolation can be taken in the return of M1's velocity to a more normal trend over the past year or so.

### **Variability in M1 growth**

Finally, while a case can be made that the recent breakdown in the money-income relationship is in part due to NOW accounts and unusual cyclical movements in velocity, the question still remains whether the increased variability in M1 growth in recent years is also part of the explanation for the weaker-than-expected growth in GNP (see footnote 1 for references that make this case). Table 6 contains some regression results that might help shed some light on this question.

Equation 1 is a reduced-form equation estimated through 1979-IV using M1 growth only (for this shorter sample period, measures of M1 variability were not significant). If this equation is estimated through 1984-II including a measure of M1 variability (equation 2, Table 6), it comes in significantly with a negative sign, suggesting that the increase in M1 variability has reduced income growth and therefore could be a factor behind the sharp decline in M1's velocity.<sup>14</sup> Moreover, the sum of the coefficients on M1 growth remains at about the same value as in the earlier period, and the  $R^2$  stays at 0.38.

That, of course, still leaves the question of whether M' and NOWs would still show different effects on GNP growth once the increased variability in M1 growth has been allowed for. Equation 3 in Table 6 is the same as equation 4 in Table 3, except that, in addition to allowing for cyclical velocity shifts and different effects on spending growth from M' and NOWs, it also includes

<sup>14</sup>The measure of "money variability" used here was a five-quarter moving average of the squared deviations of the current quarter's M1 growth rate from the average of the previous four quarters. A nine-quarter distributed lag was used in the regression. Any measure of M1 variability is arbitrary, and no claim is made that the results obtained here would hold for all possible measures. For example, if the lag is shortened from nine to five quarters, the M1 variability measure is not significant.

this measure of money variability.<sup>15</sup> However, in this equation, where money variability is in some sense allowed to "compete" with alternative explanations of the breakdown in the money-income relationship, it

becomes insignificant. While it might be possible to construct some alternative measure of M1 variability that could compete better with these alternative explanations of the breakdown in the money-income relationship, the results here do not suggest that M1 variability has been an important factor behind the breakdown in the money-income relationship once other factors are allowed for. The results still point to different effects from M' and NOWs and a breakdown in the usual cyclical pattern in

<sup>15</sup>The sample period also begins later because of the longer lag on the M1 variability measure. Hence, the 1949-50 business cycle is excluded from the sample period and this affects the coefficients on the dummy variables for recessions and first years of recoveries relative to the comparable regression in Table 3.

Table 5

### Reduced-Form Estimates Using Component Contributions to M1 Growth and Zero-One Cyclical Dummy Variables

1948-II to 1984-II

	M** (t)	NOW* (t)	Rec (t)	FYR (t)	D83† (t)	$\bar{R}^2$
(1) GNP growth . . . . .	0.88 (5.8)	0.69 (3.9)	-4.94 (5.4)	3.63 (4.0)	-5.95 (2.6)	0.51
<b>GNP growth due to</b>						
(2) Durable consumption . . . . .	0.06 (1.0)	0.03 (0.4)	-0.63 (1.6)	0.80 (2.1)	-0.32 (0.3)	0.10
(3) Nondurable consumption . . . . .	0.25 (5.4)	0.17 (3.0)	-0.46 (1.6)	-0.08 (0.3)	-1.19 (1.7)	0.23
(4) Services . . . . .	0.22 (9.2)	0.29 (10.1)	0.27 (1.8)	0.13 (0.9)	-1.37 (3.8)	0.48
Investment in						
(5) Structures . . . . .	0.04 (2.5)	0.09 (4.5)	-0.43 (4.3)	-0.02 (0.2)	-0.96 (3.9)	0.29
(6) Durable equipment . . . . .	0.11 (3.5)	0.07 (1.9)	-1.01 (5.2)	0.19 (1.0)	0.07 (0.2)	0.34
(7) Residential structures . . . . .	0.06 (1.8)	-0.03 (0.7)	-0.20 (1.0)	0.77 (3.8)	0.50 (1.0)	0.39
(8) Business inventories . . . . .	0.04 (0.3)	-0.04 (0.3)	-1.76 (2.3)	3.21 (4.3)	-0.41 (0.2)	0.19
(9) Net exports . . . . .	0.006 (0.1)	-0.02 (0.3)	0.04 (0.1)	-0.52 (1.7)	-0.48 (0.6)	0.003
(10) Federal Government purchases . . . . .	-0.01 (0.2)	0.11 (1.3)	-1.15 (2.6)	-0.86 (2.0)	-1.37 (1.2)	0.04
(11) State and Local purchases . . . . .	0.09 (5.7)	0.03 (1.5)	0.41 (4.1)	-0.007 (0.7)	-0.41 (1.7)	0.19

\*Sum of coefficients obtained from regressing GNP growth from its components on polynomial distributed lags of the contributions to M1 growth of M' and NOW accounts (current quarter and 4 lagged quarters).

†A dummy variable set equal to one for 1983; zero elsewhere.

Table 6

### M1 Variability and the Money-Income Relationship

(1)	Y	=	2.3 (3.2)	+1.17 M (7.8)					$\bar{R}^2$	=	0.38
(2)	Y	=	3.0 (4.3)	+1.14 M (8.2)	-0.11 VAR (3.0)				$\bar{R}^2$	=	0.38
(3)	Y	=	3.7 (4.4)	+0.94 M' (6.6)	+0.63 NOW (2.3)	-4.0 Rec (4.7)	+1.9 FYR (2.4)	-0.006 VAR (0.1)	$\bar{R}^2$	=	0.52

Where: Y = quarterly growth rate of nominal GNP  
M = polynomial distributed lag of M1 growth  
Rec = zero-one dummy variable for recessions  
FYR = zero-one dummy variable for first year of recoveries  
M' = polynomial distributed lag of M1 growth due to M1 less NOW accounts  
NOW = polynomial distributed lag of M1 growth due to NOW accounts  
VAR = polynomial distributed lag of a measure of M1 variability (Footnote 14)

velocity as the most important factors behind the sharp decline in M1's velocity in 1982 and early 1983.<sup>16</sup>

## Conclusions

In sum, the primary conclusions of this article are:

- The breakdown in the money-income relationship at the aggregate level since 1982 appears to be spread across several components of GNP. Hence, it is not possible to say that the breakdown reflects an unusual development in a single component.
- One reason for the breakdown appears to be that M1 growth due to NOW accounts has a smaller impact on GNP and on some of its components than does M1 growth due to M'. This could be because the demand for NOW accounts has a larger interest elasticity than the demand for M'. Hence, smaller changes in interest rates are now required to prompt the public to hold a given amount of additional money balances. The smaller change in interest rates, in turn, means that spending will not respond as much to a given change in M1 growth as in the past, causing velocity to appear unusually weak.
- Allowing for this smaller impact of NOW accounts on spending in an ex post sense produces relatively small average errors in predicting GNP (or the component contributions) over the entire period from 1980-I to 1984-II.
- However, the relatively large negative error that remained for 1982 after allowing for the different effects of M' and NOWs suggests that there may be systematic cyclical influences on velocity not captured in the reduced-form equation.
- If cyclical shifts in velocity are allowed for in

reduced-form money-income equations, M' and NOW accounts still show different effects on GNP growth, although the difference is somewhat smaller.

- However, while adding cyclical dummies to the reduced-form equation that allows for different effects from M' and NOWs virtually eliminates the 1982 error, it still leaves a substantial negative error for 1983. This suggests either that the different effects from M' and NOWs are not constant over time or that there has been a fundamental change in the cyclical behavior of velocity.
- These results seem to argue for caution in interpreting M1 for policy purposes, particularly since the effects of NOW accounts could change again in 1985 and 1986 as the remaining regulations on these accounts will be eliminated.
- When NOW accounts become fully deregulated, it could turn out that the interest elasticity of the demand for NOW accounts will be lower than currently and also lower than the interest elasticity of the demand for M' because the rates paid on NOWs will tend to move with market rates.<sup>17</sup> That means larger changes in rates will be required to induce consumers to hold a given amount of additional NOW account balances or M1 balances. Hence, a given change in NOW accounts will be associated with larger changes in spending than estimated here. This, then, means that if the relative effects of NOWs and M' on GNP growth are examined in a reduced-form equation at some future date, the opposite result of what was reported here might be found; that is, M1 growth due to NOWs might have a larger impact on GNP than M1 growth due to M'.
- It does not appear that GNP growth has been significantly lowered by increased variability in M1 growth once the different effects of M' and NOWs on GNP are allowed for, along with cyclical shifts in velocity.
- By and large, it appears that it will take a considerable amount of time before there is enough experience with NOW accounts to be reasonably sure of their relationship to the economy.

<sup>16</sup>In a sense, attributing the breakdown in the money-income relationship in part to a deviation in velocity from normal cyclical patterns still begs the question of what is actually behind that part of the breakdown in the money-income relationship. In other words, it is not possible to state precisely what economic development caused the deviation in velocity from past patterns during the first year of this recovery even though it was possible to account for the deviation in terms of the components of GNP. Hence, it might be more accurate to state the conclusion as follows: the apparent breakdown in the reduced-form money-income relationship in 1983 was not due to the cyclical error pattern this equation has shown on average in the past and, in part, remains unexplained.

<sup>17</sup>For more detail, see Wenninger, *op. cit.*, and Simpson, *op. cit.*

John Wenninger



# CRR and Excess Reserves: An Early Appraisal

Any major change in banking regulation raises the possibility that the way depository institutions operate may alter. The recent shift in reserve accounting procedures, from lagged reserve requirements (LRR) to contemporaneous reserve requirements (CRR), may have caused banks to manage their excess reserves differently (Box 1). Even before CRR's introduction, there was considerable disagreement about how it might affect the demand for excess reserves. The issue is important because excess reserves have implications for monetary policy: unexpected movements in excess reserves can affect the Open Market Trading Desk's ability to apply the degree of pressure on reserve positions desired by the Federal Open Market Committee.<sup>1</sup>

Why do depository institutions hold excess reserves at all? Banks, thrifts and other depository institutions are required by law to hold a pre-set proportion of certain deposit liabilities as reserves. In general, whether under LRR or CRR, institutions hold reserve balances to meet average reserve requirements, to facilitate clearings through their reserve accounts, and to avoid the penalties associated with overdrafts (Box 2). They hold excess reserves, above and beyond the required level,

out of precautionary considerations because many of the flows through their reserve accounts are unpredictable.

But excess reserves earn no return, and so there is an opportunity cost to holding them. Naturally, this means that institutions have a strong incentive to maintain as small a precautionary cushion as possible. To do so, however, requires careful reserve management, which itself can be costly. Thus, banks essentially seek to balance the cost of foregone interest income against the cost of reserve management practices. For example, if the expected interest rate was 10 percent, a bank that would hold \$100,000 in excess reserves over the course of a year without careful reserve management would not be willing to pay more than \$10,000 for additional reserve management.

While the cost of management is difficult to measure, it is presumably proportionally higher for small institutions, where retaining a full-time reserve manager is not economical. And since the volume of excess reserves held without reserve management probably changes as the size of the bank increases, one would expect to see different sizes of banks manage reserves to different degrees.

Another factor that some analysts felt would affect the volume of excess reserves is the increased uncertainty under CRR about the level of required reserves an institution must hold in its reserve account. Under LRR, banks knew their required reserves in the current period with certainty, since they were calculated based on deposits held two weeks earlier (Box 1). Under CRR, banks must calculate their required reserves based on deposit averages that occur nearly contemporaneously with the period when reserves must be maintained.

<sup>1</sup>For example, see the discussions of CRR and LRR by W. Poole and I. Auerbach in the *American Banker* 1979 issues of November 16, November 30, December 6, and December 24. For policy implications of excess reserves see "Monetary Policy and Open Market Operations in 1983," this *Quarterly Review* (Spring 1984), pages 39-56.

I wish to thank Irving Auerbach of Aubrey G. Lanston & Co. Inc. and David Jones of the Board of Governors of the Federal Reserve System for helpful discussions.

A quick glance at the data for total excess reserves does indeed give the impression that the shift to CRR substantially increased the demand for excess reserves. In 1983, excess reserves averaged \$488 million, and since February of this year they have averaged \$668 million. But the increase may not be entirely due to CRR. In February of this year, reserve requirements were lowered for member banks pursuant to the Monetary Control Act (MCA) of 1980.<sup>2</sup> Some depository institutions might adjust their reserve holdings relative to deposit levels very slowly, which might increase excess reserves. (If reserve requirements are lowered, but banks maintain the same level of reserves, then they are automatically holding more excess reserves.)

In assessing the effects of CRR, banks' demand for excess reserves before and after CRR was examined. Econometric techniques that control for factors such as the MCA reserve requirement changes were used. It also seemed desirable to use data in which banks are separated by size. Not all banks manage reserves to the same extent and they may not all be affected the same way by changes in reserve requirements or accounting procedures.<sup>3</sup> In that regard, this study differs from some earlier published research efforts, where the focus was the behavior of all banks as a single group.<sup>4</sup>

In the next section of this article, banks' demand for excess reserves under LRR is discussed, broken down into four different groups of depository institutions: the fifteen largest; other large member commercial banks; small member commercial banks; and all other institutions.<sup>5</sup> The section following reports preliminary results

<sup>2</sup>The MCA established new reserve requirements for all depository institutions. Briefly, all member banks' reserve requirements were reduced from their pre-MCA ratios. The phase-downs occurred at about six-month intervals, the last one becoming effective on February 2, 1984. The typical impact on the reserve requirements of all member banks was a reduction of about \$2 billion at each phase-down. Nonmembers' requirements are being gradually phased in, with annual increases occurring every September. The typical impact on the reserve requirements of all nonmember institutions is an increase of about \$1 billion at each phase-in. The new requirements are to be complete in September 1987.

<sup>3</sup>Although the discussion of excess reserves in this article is in terms of four groups of institutions, the aggregate demand for excess reserves was also examined to see whether any change occurred as a result of CRR. In terms of out-of-sample predictions, the aggregate equation estimated under LRR has been quite accurate, on average, in tracking the level of excess reserves. However, if the coefficients on the variables in the aggregate equation are tested for change after CRR, some do show significant change. This suggests that the relatively accurate performance of this equation was due to offsetting effects of CRR and further argued for a disaggregated approach in examining the possible effects of CRR.

<sup>4</sup>David Beek, "Excess Reserves and Reserve Targeting", this *Quarterly Review* (Autumn 1981), pages 15-22.

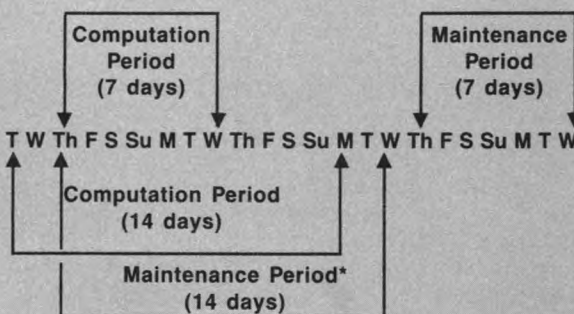
<sup>5</sup>This particular classification was chosen since it reflects the greatest degree of data disaggregation available under CRR. Of necessity, these are first-announced figures and therefore subject to (p. 18)

## Box 1: Timing of LRR and CRR

The Federal Reserve Act requires all depository institutions to hold a specified fraction of certain deposit liabilities as required reserves. The period during which the required reserves must be maintained is called the reserve maintenance period. The period during which reserve requirements are computed (that is, the period during which deposit liabilities occur) is called the computation period. The two periods need not coincide.

Under lagged reserve requirements, as shown in the diagram, each period covered seven days, starting on Thursday and ending on the subsequent Wednesday. Also, the computation period terminated two weeks before the end of the maintenance period—that is, it was lagged.

### Lagged Reserve Requirements



### Contemporaneous Reserve Requirements

Under CRR, the periods are extended to fourteen days. The computation period extends from Tuesday to the second following Monday; the maintenance period extends from Thursday to the second following Wednesday. The computation period thus ends only two days before the end of the maintenance period—the two periods are now more nearly contemporaneous.\* The short inter-period lag of only two days would appear to make it more difficult for an institution to determine and hold the correct level of required reserves, and this greater uncertainty would tend to increase the demand for excess reserves. On the other hand, because of expanded carryover and the longer averaging period under CRR, the demand for excess reserves could be reduced (Box 3 on p. 23).

\*This is so only for transactions deposits, such as regular checking accounts and NOW accounts. The maintenance period for nontransactions deposits, i.e. time and savings deposits, begins seventeen days after the end of the computation period.

on whether CRR has changed excess reserves demand of any group. By and large, only the behavior of the other large member banks appears to have changed and they are now holding lower levels of excess reserves on average as a result of CRR.

### **Excess reserves demand under LRR**

#### *The fifteen largest banks*

The statistical analysis generally supports the widely-held presumption that the large money center banks managed reserves actively under LRR. While they held on average about 30 percent of total required reserves, their excess reserves comprised only 3 percent of total excess reserves. The average bank in this group used

*Footnote 5, continued*

subsequent revisions. Unfortunately these revisions are not available on a disaggregated basis. Large member banks are those with domestic assets equal to or greater than \$750 million in 1979. The other institutions group contains all nonmembers who hold reserves or clearing balances directly with the Federal Reserve. Included here are foreign banks operating in the United States under the International Banking Act of 1978.

the reserve carryover privilege effectively, allowing its excess reserves to drop by \$1 million for every \$1 million increase in net carryover of reserves from the previous week (Table 1). There was no difference in response to carryover surpluses as compared with carryover deficiencies (Box 3 on p. 23).

How sensitive were their reserve holdings to the Federal funds rate? Their reaction was clearest in response to the differences in the Wednesday low and high values of the Federal funds rate, relative to what they might have expected based on recent low and high values of the Federal funds rate.<sup>6</sup> The largest banks' excess reserves demand increased by about \$7 million for every percentage point fall in the Wednesday low value of the Federal funds rate below its six-week average (Table 1). Clearly, the lower the interest rate, the more incentive there was for reserve managers to

<sup>6</sup>The daily maximum and minimum values are "representative" values, so designated by consensus among the Federal funds brokers. These values are employed as deviations from a six-week moving average of lagged Wednesday lows and highs.

### **Box 2: Factors Determining the Demand for Excess Reserves**

Depository institutions must hold a certain percentage of their average deposit liabilities as reserves. They also hold reserve balances to permit the routine clearing of checks, drafts and other financial instruments through their accounts. Even though reserves earn no interest for the depository institution, some amount of excess reserves is desirable, because reserve flows are uncertain and may not be sufficient to cover reserve requirements during particular maintenance periods. Excess reserves help banks ensure that their reserve obligations will be met and that they can avoid account deficiencies and overdrafts at the Federal Reserve.

In planning to meet its reserve needs, an institution anticipates receiving certain inflows of reserves over the reserve maintenance period. Important determinants of expected available reserves are anticipated deposit levels and clearings drains. Typically, these exhibit regular seasonal patterns, caused by influences such as social security disbursements and bank holidays. The institution may also obtain reserves from three other sources: borrowing from the discount window, purchasing in the Federal funds market, and using its reserve carryover privilege. The reserve carryover privilege allows each institution to carry a certain portion of its reserve surplus or shortage into the next accounting period (Box 3). Therefore, in estimating the excess reserves demand function for each group, it is necessary to include variables such as reserve carryover, discount window borrowings, and seasonal patterns.

Banks must also consider the costs of obtaining and holding these excess reserves. The most obvious cost is the foregone interest on the idle reserves. This can be measured by the Federal funds rate, since undesired accumulations or shortages of reserves are traded in the Federal funds market. To minimize lost interest income, banks can hire reserve managers to monitor their account positions closely, maintain the needed balances for reserve requirements and clearings, and guard against overnight overdrafts.

But of course, employing a full-time reserve manager itself entails an expense for the bank. For a small institution, that cost may outweigh the benefit in interest income. Instead of monitoring their account balances closely, such institutions may simply hold higher levels of excess reserves, determined largely by reserve availability. Or they may have someone manage reserves only on a part-time basis. Since part-time reserve managers are likelier to respond more slowly to factors affecting reserves, small banks' excess reserve holdings would adjust sluggishly. In contrast, the largest institutions, by virtue of the scale and volume of their operations, find it profitable to respond to the cost of funds. Their reserve managers react quickly to take advantage of changes in the actual or expected Federal funds rate. Closely managed reserve positions are indicated in the statistical analysis by low levels of excess reserve holdings, rapid adjustment of reserve positions, and sensitivity to the Federal funds rate.



hold back their funds, because the opportunity cost of idle balances decreased. To put it another way, when the supply of reserves in the banking system is much larger than the demand, then the Federal funds rate must fall even lower in order to induce banks to hold the large supply as excess reserves. Similarly, during a reserve scarcity, the Federal funds rate must rise higher than usual until banks are willing either to hold very low levels of excess reserves, or turn to the discount window for funds. For the largest banks the effect was a fall of about \$2 million for every percentage point rise in the rate's high value. These reductions are substantial, considering that mean excess reserves held by the fifteen largest banks over the LRR sample period were only \$14.7 million.

Rather than relying on excess reserves, banks can, to a limited extent, use the discount window as a source of funds when unexpected reserve drains occur. But, since frequent borrowings are discouraged, banks tended to be more cautious the more they had borrowed recently. It appears that for every \$1 million increase in average borrowings over the previous four weeks, current holdings of the fifteen largest banks' excess reserves rose by almost \$0.1 million.

Calendar factors—such as the end of the year, the week after the year-end and the end of a quarter—also accounted for a buildup of excess reserves. The usual explanation for this is “window dressing”: wishing to portray a conservative image on their earnings reports, banks consciously build up their excess reserves at these times. In contrast, seasonal factors that largely reflect reserve availability, such as bank holidays and social security disbursements, were not significant—further evidence of careful reserve management.

#### *Other large member commercial banks*

Like the money center banks, under LRR the other large member commercial banks also held low levels of excess reserves (almost \$29 million, which is only 7 percent of the total) and used the carryover privilege effectively (Table 2). Excess reserves decreased \$0.7 million for every additional million of net carryover. Here, too, there was apparently no difference in response to carryover surpluses as compared with carryover deficiencies.

For this group, however, the Federal funds rate was not important. While this might suggest higher costs of active reserve management, the explanation more likely lies in the important role the other large member banks play as funds intermediaries for the smaller institutions. As such, they probably obtained reserves to meet their own reserve needs from these smaller banks, and entered the Federal funds market primarily as sellers.

Again, in contrast to the fifteen largest, the other large

Table 1

### **Excess Reserves of the Fifteen Largest Member Commercial Banks**

In millions of dollars; LRR sample period from 7/8/81 to 2/1/84

Independent Variable	Coefficient	t-value
Constant	5.0	0.4
Net carryover	-1.0*	-8.1
Wednesday low value of Federal funds rate	-7.1*	-4.5
Wednesday high value of Federal funds rate	-1.9	-1.2
Borrowed reserves	0.09	1.5
<b>Seasonal Dummies</b>		
Year-end	58.9	1.4*
Year-end†	63.2	1.7
Quarter-end	66.2*	2.8
S.E.E. = 60.77	D.W. = 2.17	$\bar{R}^2 = .45$

\*Significant at the 99 percent confidence level.

†Week after the event.

In regressions where carryover was decomposed into its surplus and deficiency components, the coefficient for carryover deficiency was \$1.1 million with a t-value of 4.1; the coefficient for excess carryover was \$-1.0 million with a t-value of -4.8. This difference, in absolute value, was not statistically significant.

Borrowed reserves is a four-week moving average of lagged discount window borrowings by this group of banks.

members' reserve holdings responded to calendar factors such as bank holidays, implying less active reserve management. As was mentioned (Box 2), banks can use excess reserves as a relatively inexpensive substitute for closer monitoring of their reserve account balances. In such a case, reserve holdings tend to reflect the reserve availability due to such seasonal events.

In brief, the importance of calendar factors such as bank holidays and month-ends suggests that the other large member banks, as a group, managed reserves less actively, on average, than the fifteen largest banks. Also, while they used their carryover privilege effectively, their excess reserves were not completely offset, dollar for dollar, as were those of their larger competitors.

#### *Small member commercial banks*

Over the LRR sample period, small member commercial banks held on average \$227 million of excess reserves. These were the highest levels of holdings among the four categories and accounted for about 54 percent of the total.

Seasonal factors were the major influence (Table 3). Social security disbursements, bank holidays, and quarter-ends were all associated with higher excess reserve holdings. Excess reserves tended to fall about \$24 million the week before a month-end. Similarly, the

week before a bank holiday typically had a drop of about \$12 million.

The small member banks were the only group whose excess reserve holdings exhibited both a long-term and short-term response to the reserve requirements phase-downs established under the MCA. The long-term impact on excess reserves was a rise, equal to 0.8 percent of the cumulative reduction in all member banks' reserve requirements. Discussions with Reserve Banks suggest that this long-term increase should be attributed to the implementation of the MCA. Evidently, the MCA reserve

reductions lowered some small member banks' required reserve balances below the minimum level thought necessary to avoid overnight overdrafts. At the same time, there was no incentive for these institutions, because of the additional reserve management costs involved, to reduce their excess reserve balances. Either reducing their maintained balances or raising their required clearing balances would have necessitated monitoring reserve balances more closely to ensure against reserve deficiencies.

The short-term or transitory response was quite different. Reserves freed by MCA phase-downs appear to have been held initially as excess reserves, with off-setting adjustments occurring over the following weeks. This response probably reflects how slowly these banks adjusted their reserve positions.<sup>7</sup>

Overall, it seems that the small member banks, holders of the highest level and largest percentage share of total excess reserves, modified their holdings gradually and mainly in response to seasonal influences. Their higher cost of active reserve management offers a reasonable explanation. Unlike the larger member banks, the small members did not seem to use the carryover privilege, partly because many of them routinely hold excess reserves.

#### *All nonmember institutions*

The nonmembers were the second largest holders of excess reserves, averaging 36 percent of the total, or \$153 million, over the LRR sample period. Their behavior resembled that of small commercial member banks in several ways (Table 4). For example, seasonal factors were important. Once again the ends of the month, quarter, and year, as well as bank holidays, were all accompanied by a build-up of excess reserves. Similarly, slow adjustment characterized changes in their excess reserve holdings. Again, higher management costs are the plausible explanation.

The MCA reserve requirements phase-ups do not seem to have had a significant, direct impact. More important was a small, ongoing rise in their reserve holdings of \$0.6 million per week. How can this be explained? Prior to the MCA, thrifts and nonmember commercial banks, by definition, held no excess reserves. During 1982 and early 1983, however, nonmembers' excess reserves increased to reflect both growth in the number of institutions having active Federal Reserve accounts, and more intensive use of such accounts for clearing purposes. Both of these influences indirectly would account for gradually rising excess reserves levels. Moreover, as the phase-ups progressed and more institutions with higher management costs

<sup>7</sup>The statistical importance of the lagged six-week moving average of their excess reserves further bears out this point.

Table 2

### **Excess Reserves of Other Large Member Commercial Banks**

In millions of dollars; LRR sample period from 7/8/81 to 2/1/84

Independent Variable	Coefficient	t-value
Constant	-16.7	-0.8
Net carryover	-0.7*	-2.6
MCA	-0.002	-1.5
<b>Seasonal Dummies</b>		
Quarter-end	31.0	1.3
Month-end	36.1†	2.4
Holidays	50.6*	4.4
Admission Day‡	97.0*	2.6

S.E.E. = 62.12

D.W. = 2.10

$\bar{R}^2 = .28$

### **The Additional Impact of the Independent Variables Under CRR**

In millions of dollars; sample period from 7/8/81 to 9/26/84

Independent Variable	Coefficient	t-value
MCA	.0003	0.2
Net carryover	-0.6	-1.0
Quarter-end	-60.8	-1.0
Month-end	-56.8	-1.4
Holidays	-29.4	-1.0
Admission Day‡	-59.9	-0.8

\*Significant at the 99 percent confidence level.

†Significant at the 95 percent confidence level.

‡Week before the event.

MCA measures the total reduction in all member banks' reserve requirements attributed to the Monetary Control Act phase-downs. While not significant, it is included mainly to distinguish between the effects of CRR and the final MCA phase-in which also occurred during the first period of CRR.

Holidays refers to those bank holidays when most, though not necessarily all, System banks were closed.

Admission Day is a California holiday.

The value of the F statistic to test for the overall homogeneity of behavior between LRR and CRR was  $F(17, 128) = 2.19$ .

The null hypothesis of no change is rejected at the 99 percent confidence level.

became bound, excess reserves would rise to guard against deficiencies and overdrafts.<sup>8</sup>

### Excess reserves demand under CRR

Estimating the impact of CRR on the four groups of institutions poses some problems. So far, through September 26, 1984, only seventeen maintenance periods have occurred. Moreover, the beginning of CRR coincided with the final phase-down in member banks' reserve requirements under the MCA; the impacts of the two events must be disentangled. And, of course, data for institutions broken down by size are not available in final revised form at this time.

Nevertheless, the *fifteen largest member banks* consistently show unaltered demand for excess reserves—hardly a surprising result. These banks already managed reserves aggressively and so probably reacted quickly and smoothly to changes. Moreover, CRR did not impose as many new costs, since some of these banks were already experienced under LRR in projecting their reserve needs and the Federal funds rate.

In contrast, the *other large member commercial banks* clearly appear to have altered their behavior under CRR and have, as a result, been carrying lower excess reserves. Of course, identifying the source of changed behavior on the basis of only a limited number of observations is at best a delicate matter. Nonetheless, a pattern consistently emerged. First, the influence of net carryover in reducing excess reserves demand is greater under CRR by an additional \$0.6 million for every additional million of net carryover (Table 2). Second, the seasonal factors such as bank holidays and the quarter- and month-ends have a much smaller impact under CRR (Table 2).

Due to the temporarily expanded carryover privilege under CRR, other large member banks' net carryover has, on average, been 44 percent higher (Box 3). The new level of about \$18 million, together with the greater responsiveness mentioned above, would lower their average excess reserves demand under CRR by almost \$11 million. In fact, the other large members have held virtually no excess reserves on average during CRR, as compared to about \$30 million on average under LRR. While the higher average level of net carryover may not be permanent, largely reflecting the temporarily expanded carryover provision, the banks' increased sensitivity to net carryover may continue beyond the first year of CRR. To the extent that carryover is used as a passive reserve adjustment tool, it is more potent under CRR than LRR because of the new two-week averaging (Box 3).

<sup>8</sup>An institution is bound if its required reserves, excluding required clearing balances, exceed its vault cash.

Table 3

### Excess Reserves of Small Member Commercial Banks

In millions of dollars; LRR sample period from 7/8/81 to 2/1/84

Independent Variable	Coefficient	t-value
Constant	-31.0	-1.6
MCA	-.008*	-3.5
Average excess reserves	0.6*	5.4
<b>Seasonal Dummies</b>		
Year-end‡	79.8†	2.3
Quarter-end	58.7*	3.1
Month-end‡	-24.1	-1.8
Holiday‡	-11.8	-1.0
Holidays	39.8*	3.5
Admission Day‡	53.0	1.6
Social security‡	49.8*	3.8
Social security	68.9*	4.9
Social security§	41.6*	3.1
S.E.E. = 52.15      D.W. = 1.91 $\bar{R}^2 = .72$		

\*Significant at 99 percent confidence level.

†Significant at 95 percent confidence level.

‡Week before the event.

§Week after the event.

MCA measures the impact of the phase-downs on all member banks' reserve requirements.

The specification also includes a second order polynomial lag with a far constraint, on the change in the MCA variable. The coefficients were significant at the 99 percent confidence level.

Average excess reserves is a six-week moving average of lagged excess reserve holdings by this group of banks.

Holidays refers to bank holidays at the Federal Reserve Bank of New York.

Admission Day is a California holiday.

The remaining reduction appears to reflect a different response to the seasonal factors. Based on data available so far under CRR, it seems possible that the reduced impact of the seasonal factors is due to the greater flexibility of the two-week averaging permitted by the new reserve accounting system. For example, the first quarter-end under CRR occurred on only the third day of the maintenance period, leaving ten days for reserve position adjustments, since settlement day was on April 11. Under LRR, the same quarter-end would have allowed only three days for adjustments, since settlement day would have been on April 4. Consequently, the typical quarter-end reserve build-up had a longer period to be offset during CRR than LRR.<sup>9</sup>

Why was a similar reduction not identified for the fifteen largest banks? As has already been suggested, the fifteen largest banks did not gain appreciably from the

<sup>9</sup>Indeed, the behavioral relationship estimated with LRR data does not predict well for this first quarter-end period.



greater flexibility afforded by two-week averaging simply because they were already very efficient. That is, their reserve managers could execute all desired adjustments to their reserve positions in just the one week allowed under LRR; for them the greater flexibility of two-week averaging was not important.<sup>10</sup> Similarly, there was little room for improvement in using the carryover privilege more effectively.

Small member banks held higher excess reserves, on average, during CRR (\$477.5 million) than during LRR (\$227 million). However, once the historical short- and long-term effects of the MCA phase-downs are allowed for, no significant change in their excess reserves behavior emerges.

Examining small members' holdings period-by-period shows that they were highest during the first two periods of CRR (\$620 and \$599 million, respectively). This suggests that much of any CRR effect was merely transitional while the banks adjusted to the new system.<sup>11</sup>

<sup>10</sup>A numerical example might clarify matters. Suppose that excess reserves are undesirably high by \$10 for both the fifteen largest and the other large member banks. Also suppose that the aggressive managers at the fifteen largest banks can fully offset their \$10 in one week, while the other large members need two weeks. The average holdings for the two weeks by the fifteen largest banks will be \$0 under both LRR and CRR. However, the other large members will hold, on average, under LRR \$5 (=  $[10+0]^{1/2}$ ) and \$0 under CRR. Therefore, their average would be lower when two-week averaging is allowed.

The results for *nonmembers* are mixed. Statistically, the case for whether behavior has changed or not is borderline.<sup>12</sup> Like the other large member banks', month- and quarter-ends have a much smaller impact on nonmembers under CRR. But in contrast to the larger members, holidays now seem to have a greater influence than before, increasing the need for excess reserves.

Since nonmembers consist of both large and small institutions who may respond rather differently to CRR, the mixed findings are not surprising. Moreover, this group also includes institutions for whom CRR is not especially relevant as their deposits are primarily non-transactions accounts and thus require much lower reserves.

### Summary

In sum, no evidence was found to indicate that the excess reserves demands of the fifteen largest member

<sup>11</sup>Consistent with this hypothesis is that the LRR relationship predicts quite well into CRR if the first two CRR observations are omitted; the out-of-sample mean absolute and root-mean-squared prediction errors are not unreasonable, being \$33.9 and \$41.8 million, respectively. By comparison, the in-sample errors are \$36.3 and \$49.4 million, respectively.

<sup>12</sup>The observation for the period ending on September 26 is pivotal in arguing for altered behavior. However, nonmembers' excess reserves were so low for this period that one may question the accuracy of the underlying data.

Table 4

### Excess Reserves of Nonmember Institutions

In millions of dollars; LRR sample period from 7/8/81 to 2/1/84

Independent Variable	Coefficient	t-value
Constant	48.1	1.8
MCA	-0.006	-0.7
Time	0.6*	2.6
Average excess reserves	0.5†	3.9
<b>Seasonal Dummies</b>		
Year-end‡	87.8†	3.5
Year-end	91.1†	3.2
Quarter-end	26.1	1.5
Quarter-end§	39.5†	3.2
Month-end	19.4*	2.0
Holidays‡	-11.2	-1.4
Holidays	23.9†	2.7

S.E.E. = 38.64

D.W. = 2.00

$\bar{R}^2 = .64$

\*Significant at 95 percent confidence level. †Significant at 99 percent confidence level. ‡Week before the event. §Week after the event.

MCA measures the total increase in all nonmember institutions' reserve requirements attributed to the MCA phase-ups.

Average excess reserves is a six-week moving average of lagged excess reserve holdings by this group of institutions.

Holidays refers to bank holidays at the Federal Reserve Bank of New York.

banks or the small member banks had changed over the first seventeen statement periods under CRR. The evidence on the nonmember institutions was mixed, possibly because this group is too heterogeneous to allow patterns to emerge clearly. The other large member banks were the only group clearly indicated as having

altered their excess reserves demand. Their lower average holdings may be explained by the expanded carryover privilege and the greater flexibility afforded by the two-week averaging under CRR. Of course, because the data are both limited and unrevised, it is still early to tell whether these responses to CRR will continue.

### Box 3: The Reserve Carryover Privilege

The reserve carryover privilege allows each institution to carry forward, into the next accounting period, a certain proportion of its reserve surplus (that is, a proportion of the excess of its reserve holdings over its reserve requirements). Without the carryover provision, such reserve surpluses would be wasted, since reserves earn no interest. Similarly, a certain percent of the shortfall in its reserve holdings can also be carried over into the next period. Negative carryovers are not permitted for two or more consecutive periods.

Thus, depending on whether its net carryover is positive or negative, the institution may hold lower or higher reserve balances in the next period. This privilege allows the institution more flexibility in timing the acquisition of more reserves. As such, carryover can be described as a passive reserve adjustment tool: any unforeseen last minute changes in its reserve positions may be covered by being carried forward.

Under LRR, banks, thrifts and other depository institutions were allowed to carry forward a portion of their current reserve surplus or deficiency equal to 2 percent

of their daily average reserve requirements. Under CRR this provision has been temporarily expanded to ease the transition. During the first six months of CRR (February 2 to August 1, 1984) the permissible ratio was 3 percent. Currently, during the next six months of CRR, that ratio is reduced to 2½ percent; it will return to the earlier 2 percent level starting January 31, 1985.

The carryover provision can be a more potent passive reserve adjustments tool under CRR, even after it reverts to the 2 percent ratio. Take the case of a bank that has managed its reserve position exactly until the last day of the reserve maintenance period, when it has a late unexpected reserve drain that leaves it short on reserves. How large a drain can it cover if its carryover for the period is \$70? Under LRR, when the maintenance period was 7 days long, the drain could be as large as \$490 = (\$70 x 7) without causing the bank to be deficient in its reserve holdings. Under CRR, when the period is twice as long, the same bank could have a drain as large as \$980 = (\$70 x 14) and still not be deficient.

Kausar Hamdani

# In Brief

## Economic Capsules

### New Findings on Brokered Deposits

The development of the market for brokered deposits—funds placed in commercial banks or thrift institutions through money brokers—has led to certain well-publicized abuses that pose unwarranted risk to the federal deposit insurance funds. Depository institutions in distress can obtain federally insured liabilities more easily through this market and therefore avoid normal market or regulatory discipline. In addition, heavy reliance on insured brokered funding can enable an institution to grow faster or take on greater risk than sound banking practices normally would allow.

We have investigated possible linkages between bank weakness or failure and use of brokered deposits at over six hundred commercial banks.<sup>1</sup> The first question we addressed is whether some level of brokered deposits can be considered a threshold above which a failed bank would impose a disproportionate cost on federal insurance agencies. (This cost depends on the disparity between the market value of the bank's assets and liabilities.) In reviewing the costs incurred by the FDIC due to commercial bank failures between September 1983 and March 1984, we found that banks with brokered funds in excess of 5 to 10 percent of their total deposits tended to impose a greater relative cost burden

on the FDIC than other failed banks. However, this burden did not appear to increase proportionately at threshold levels of 15 to 20 percent.

The second issue we considered is whether financially weak commercial banks are more likely than stronger banks to use substantial amounts of brokered deposits. Financial weakness was measured by an index of financial ratios. Previously published studies have found these ratios to be reasonably good indicators of financial weakness.<sup>2</sup>

Using data from the March 1984 call reports, we found that weaker banks (as measured by the rankings of their index scores) on average held significantly more brokered deposits as a percentage of total deposits than stronger banks. This result was evident for both total brokered deposits and fully insured brokered deposits.<sup>3</sup> We then considered whether there was a level of use of brokered deposits at which there was a particularly clear distinction between stronger and weaker banks. The strongest distinction was found for levels of use at about 3 percent of total deposits; also at 1 percent and 5 percent. At higher levels of use the relationship was weaker. On average, banks with brokered deposits less than 5 percent of total deposits (comprising nearly two-thirds of the sample) had strong index scores.

Similar results appeared when we focused on the weakest subsample of banks using brokered funds. Banks whose scores were more than two standard deviations worse than their peer group means were found to hold significantly more brokered deposits than

<sup>1</sup>The results presented here are extracted from "Brokered Deposits and Bank Soundness: Evidence and Regulatory Implications" by Sherrill Shaffer and Catherine Piché, Federal Reserve Bank of New York Research Paper No. 8405. The research discussed in this report is based on evidence from the 671 commercial banks using brokered deposits as of March 1984, and the 560 banks using them as of September 1983. We also studied 18 commercial banks that failed between October 1983 and March 1984, half of which used brokered funds.

<sup>2</sup>See, for example, the articles and bibliography in *Economic Review*, Federal Reserve Bank of Atlanta, November 1983, especially pages 27-34. We used the following four ratios: loans and leases to total funds, capital to risk assets, expenses to revenues, and commercial and industrial loans to total loans.

<sup>3</sup>Fully insured brokered accounts are brokered accounts with balances not exceeding \$100,000. Nearly 23 percent of the banks that accepted brokered funds reported that all of their brokered accounts exceeded \$100,000.

other banks.<sup>4</sup> Among these especially weak banks, we found that the relationship between increased use of brokered deposits and weakness was not significant at threshold levels of 1 to 5 percent of deposits, but was strong at threshold levels of 10, 15, and (for fully insured brokered deposits) 20 percent.

Overall, these findings would appear to support the case for some form of prudential regulation on the use of brokered deposits, particularly on a fully insured basis. If a percentage limitation on the use of such deposits were to be considered, then these results would suggest that an appropriate ceiling would be in the range of 5 to 10 percent of total deposits.

<sup>4</sup>There were nine such banks, or 1.3 percent of the sample. Thirty-eight, or 5.7 percent, of the banks had scores more than 1½ standard deviations worse than the norm, and these banks were also found to be heavier-than-average users of brokered deposits. Three peer groups were defined: domestic banks smaller than \$300 million, other domestic banks, and banks with at least one foreign office.

Sherrill Shaffer and  
Catherine Piché

## Why Have Used Car Prices Risen So Fast?

Since 1981 used car prices have climbed at double digit annual rates, making them one of the fastest rising components of the consumer price index (CPI). In contrast, the prices of new cars have lagged behind the overall CPI. Some of this difference stems from the method the CPI uses to calculate new and used car

price inflation. But more than half reflects economic factors that have affected the used car market.

Part of the discrepancy between used and new car prices arises because the CPI treats their quality changes differently. The new car price index is adjusted for the costs of improvements. Costs of government-mandated changes, such as better fuel efficiency and safety measures, as well as other new features are counted as increases in real expenditures and not as inflation. This is not true for used car prices; no adjustment is made to offset the price impact of changing automobile quality.

The amount these quality changes contribute to *used* car price inflation can be estimated by using the difference between the rates of increase in quality-adjusted and not-quality-adjusted *new* car prices. According to this measure, between 1972 and 1980 almost the entire spread between CPI used and new car inflation can be attributed to quality changes in automobiles (table). But since then, only about forty percent of the divergence is explained by quality adjustment differences. The remainder probably has been caused by several economic factors that have tightened the used car market.

First, the voluntary restraints on Japanese imports since May 1981 have limited the supply of imported cars, especially the less expensive models with few options. Consumers, looking for a less costly alternative to a new domestic car, have been forced into the used car market. Naturally, this puts pressure on prices in the used car market.

Second, new cars have become less affordable for more people, particularly since 1980. For example, between 1973 and 1980, the amount of time it took the

\*In 1983 the average price of imported cars exceeded the average price of domestic cars for the first time, despite the stronger dollar. This relative price appreciation in imports is the combined result of a more upscale model mix and premiums to dealers because of short supplies.

### Average Annual Rates of Car Price Change

In percent

Period	Overall CPI	Used Car Inflation (CPI)	New Car Inflation (CPI)*	Used Car Inflation (Quality Adjusted)†
1972-I to 1981-I . . . . .	7.9	9.1	5.8	5.6
1981-II to 1984-II . . . . .	5.0	15.7	3.8	10.5

\*CPI new car inflation excludes costs of quality changes.

†Quality Adjustment is based on the difference between CPI and Bureau of Economic Analysis measures of new car prices. The latter does not adjust for the costs of quality changes.



average worker to earn the cost of a new car rose from about 28 weeks to 32 weeks. Since then it has risen to almost 38 weeks, more than double the rate of increase in the previous period. As a result, consumers now keep their cars almost two years longer (currently for 7.4 years on average) and finance them for about a year longer (currently about 48 months on average). In effect, the supply of used cars in the market has been reduced further by this trend toward keeping automobiles longer.

Finally, it is possible that inadequate production of some domestic auto models has led to higher used car prices. Certain popular new models, especially large-size cars, have been in short supply during this expansion, raising demand for similar-sized used cars. Also, increased demand for used cars may have resulted from resistance by some consumers to legally-mandated quality changes (such as unleaded gasoline) in new models, changes that are not yet completely included in the used car stock.

In conclusion, quality adjustment is sufficient to explain the gap between new and used car inflation between 1972 and 1980. Since then this gap has widened. Economic factors as well as this technical factor seem to be behind the large contribution used cars have made to the increase in the CPI so far in this expansion.

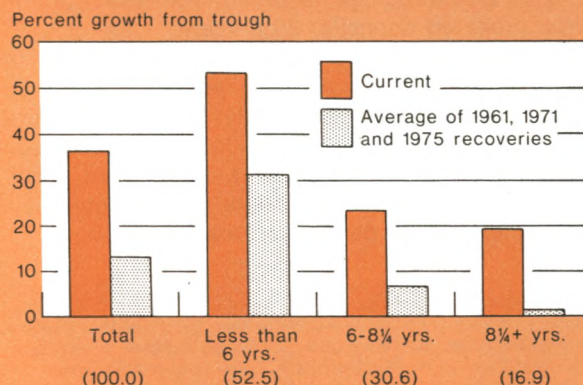
Robert T. McGee

## The Changing Durability of Business Investment Expenditures

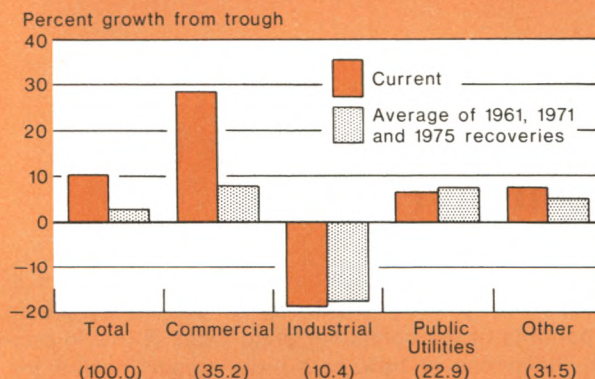
The composition of business fixed investment (BFI) in this expansion has important consequences for the growth of the capital stock. If a large portion of BFI is being devoted to short-lived assets, then a growing share of future saving will have to go toward replacing depreciated capital, rather than adding to the capital stock. A look at the composition of BFI—including long- and short-lived producers' durable equipment (PDE), and structures—over the past seven quarters shows an encouraging pickup in long-lived investment, particularly when compared with earlier expansions. However, spending on short-lived equipment has soared in this recovery, pushing the share of BFI going toward more durable assets to a new low.

Purchases of producers' durable equipment, which

### Real Producers' Durable Equipment in the First Seven Quarters of Expansion by Length of Productive Life



### Real Nonresidential Construction in the First Seven Quarters of Expansion



The productive lives used here, which equal fifty percent of Bulletin F service lives, are based on the service lives employed by the Commerce Department to calculate the capital consumption allowance. See *Fixed Reproducible Tangible Wealth in the United States, 1925-79*, United States Department of Commerce (1982), page T-17. The less than 6 years category is composed of office, store, construction, mining, oil field, and service industry machinery, trucks, tractors, and cars. The 6 to 8 1/4 years category contains instruments, photo and communication equipment, general industrial machinery, electrical transmission and distribution equipment, miscellaneous and miscellaneous electrical, and household appliances. The last category equals the balance of the expenditure groups presented in Table 5.7 in the National Income and Product Accounts. Scrap was excluded from the total PDE expenditure category.

The numbers in parentheses correspond to the average share of each group in either PDE or nonresidential construction in the first three quarters of 1984. The data for the third quarter of 1984 were taken from the preliminary estimate of GNP.



currently represent more than two-thirds of BFI, have registered impressive gains in this recovery. Much of this surge has been concentrated in short-lived assets (chart). Expenditures on equipment with productive lives of less than six years, such as office and store machinery, cars, and light trucks, have climbed more than 50 percent from their 1982 trough level. Their share of PDE has also increased to 52.0 percent from 46.2 percent.

In contrast to earlier cyclical upturns, investment in longer-lived capital, such as communication equipment, electrical machinery, and steam engines, has also displayed a good deal of strength. Spending on equipment with service lives from 6 to 8 $\frac{1}{4}$  years, for example, has advanced more than three times as fast in the current recovery as in previous upturns. Investment in assets with longer productive lives has shown even more resilience compared with the past: usually it is still about equal to its trough value at this stage of the cycle.

Business investment in structures, another long-lived asset, has been fairly robust in this expansion, increasing at more than triple the rate of prior recoveries. As usual, spending on structures initially declined after the overall economy turned up. But by the end of 1983, most categories of construction had started to grow, registering large advances in the first half of 1984. Most of the overall strength has come from the commercial sector. The other expenditure categories have moved approximately in line with previous cyclical upturns.

Despite the relatively fast growth in spending on structures and longer-lived equipment, their share in BFI has tumbled in this expansion (to 62 percent in the third quarter of this year from 69 percent at the trough), continuing a trend that began in earnest in the early 1970s. This long-term shift to short-lived assets has been responsible for an increase in the amount of worn-out capital that needs to be replaced each year. In 1983, for example, about 10.5 percent of the private capital stock (excluding residential structures) was used up in the production of other goods and services, compared with less than 9 percent of the stock each year in the latter half of the 1960s.

The current decline in the share of long-lived assets is likely to increase further the proportion of the capital stock exhausted each year. To be sure, the shift toward short-lived capital may be appropriate; reflecting, for example, concern that a faster pace of technological obsolescence may make long-lived investment unprofitable. But it also means that less of the economy's savings over time will be available to finance increments to the capital stock, with the balance being used to finance the replacement of obsolete capital.

Douglas M. Woodham

## Why the 1984 Federal Budget Deficit was Lower Than Expected

The fiscal 1984 federal budget deficit came to just over \$175 billion, some \$25 billion lower than the Administration, the Congressional Budget Office (CBO), and many private analysts were projecting a year or so ago. To what extent is the lower-than-predicted deficit accounted for by the unexpected strength of the current economic recovery? Our analysis shows that only about one-fourth of the overestimate of the deficit can be explained by the course of the business cycle over the past year. The remainder was due to factors unrelated to the economy's performance (Table 1).

It is true that initial estimates of federal revenues and outlays were based on economic forecasts which underestimated real GNP growth over the past year to a considerable degree (Table 2). But the effect this had on the level of projected deficits was offset somewhat by predictions for interest rates which were too low. Forecasts for the rate of inflation—which proved to be too high—contributed to slight overestimates of both federal revenues and outlays, so they do not explain much of the lower deficit outcome.

If the unexpectedly low deficit had indeed been the result of the strong recovery, then most of the amount by which the deficit was overestimated should have been in those budget components which are especially sensitive to the economy's performance—in particular, tax receipts and expenditures for programs affected by the level of unemployment. But this was not the case in either the Administration's budget estimates or CBO's.

The underestimates of federal revenues due to cyclical factors was no more than \$4 billion (Table 1). This is because it takes about one year of sustained higher real growth before revenues are boosted appreciably.

While virtually all of the amount by which the deficit was overestimated occurred on the spending side of the budget, only a small portion was in cyclically sensitive categories (Table 1). Initial projections of outlays for programs affected by the level of unemployment were only about \$3 billion too high.\* Any other unanticipated shortfalls in spending related to the stronger economy were largely offset by greater net interest outlays (about \$3 billion).

Most of the overestimates of federal spending were for defense, and were unrelated to real economic growth

\*This includes expenditures for unemployment compensation, Medicaid, Aid to Families With Dependent Children, and food stamps.

Table 1

**Fiscal 1984 Federal Budget Deficit Overestimates**

In billions of dollars

	Administration	CBO
Deficit forecast*	200	196
Actual deficit	175	175
Overestimate	25	21
Overestimate due to†		
Cyclical factors	6	5
Noncyclical factors	19	16
Revenues (forecast less actual)†	-1	-2
Cyclical factors	-2	-4
Noncyclical factors‡	1	2
Outlays (forecast less actual)†	24	19
Cyclical factors	4	1
Noncyclical factors	20	18

\*Each forecast was based on federal policies in effect at the time.

†Federal Reserve Bank of New York staff estimates.

‡Includes legislation enacted during the year.

Sources: Administration forecast from *Mid-Session Review of the 1984 Budget*, July 25, 1983. CBO forecast from *Economic and Budget Outlook: An Update*, August 1983.

Table 2

**Economic Assumptions Underlying Budget Estimates for Fiscal 1984: Ex Ante vs. Ex Post**  
In percent

Forecasts	Beginning of Fiscal 1984	Latest Estimate
<b>Real GNP*</b>		
Administration	4.5	6.5
CBO	4.3	6.6
Blue Chip Consensus	4.4	6.5
<b>GNP Deflator*</b>		
Administration	5.0	4.4
CBO	5.0	4.1
Blue Chip Consensus	5.3	4.0
<b>Unemployment Rate†</b>		
Administration	8.9	7.2
CBO	8.4	7.3
Blue Chip Consensus	8.6	7.4
<b>3-Month T-Bill†</b>		
Administration	8.5	9.5
CBO	8.6	10.0
Blue Chip Consensus	8.7	9.9

\*Percent change, 1984-IV over 1983-IV.

†Percent average, calendar year 1984.

Sources: Administration ex ante and ex post forecasts are from the *Mid-Session Review of the 1984 Budget*, July 25, 1983 and *Mid-Session Review of the 1985 Budget*, August 15, 1984, respectively. The corresponding CBO forecasts are from the *Economic and Budget Outlook: An Update*, August 1983 and August 1984. The Blue Chip Consensus forecasts are from *Blue Chip Economic Indicators*, October 1983 and September 1984.

(Table 1). There are two principal reasons why initial estimates for defense outlays were too high—\$14 billion by CBO and \$18 billion by the Administration. First, the level of defense budget authority (BA) approved by Congress for fiscal 1984 was about \$10 billion less than CBO had initially assumed, and \$15 billion less than the Administration had requested. Second, an apparent slowdown in spendout rates from defense BA was not anticipated by most analysts.

Without the shortfall in outlays due to noncyclical factors, the deficit for fiscal 1984 would have been between \$190 and \$195 billion, the stronger-than-expected recovery notwithstanding. Furthermore, if the recent shortfall in defense expenditures is made up during the coming year, then current estimates of about \$175 billion for the fiscal 1985 deficit under existing policies may prove to be too low.

Peter D. Skaperdas

## Are the Leading Indicators Signaling A Recession?

The recent behavior of the composite index of leading indicators has attracted a lot of attention: the index fell in June and July and was virtually unchanged in August before rising modestly in September.<sup>1</sup> Is the index signaling that the economy is about to enter a recession? An analysis of the record of the leading indicators suggests that it is not a very reliable guide to whether the economy is near a cyclical peak.

Assessing the performance of the leading indicators is somewhat difficult since there are no hard and fast rules about what qualifies as a clear signal that a turning point in the economy is near. Some analysts use a rule-of-thumb that two or more months of consecutive declines in the index herald a turning point. But this simple device does not say anything about how many months are likely to pass before the economy will enter a new phase of the business cycle.

One possible definition of a correct signal of a turning point is a two month or more decline in the index followed by a peak within six months of the first drop in the series. Using this definition, all seven post-war cyclical peaks were foreshadowed correctly by the

<sup>1</sup>The index actually fell 0.06 percent in August; movements of less than  $\pm 0.1$  percent are not treated as signaling any change in economic activity.

## Recent Reliability of the Index of Leading Indicators in Signaling Peaks in Economic Activity

Signal*	False or Correct	Date of Peak	Average Monthly Decline† (In percent)
May 1969-Jul. 1969 . . . .	false	‡	-0.74
Oct. 1969-Apr. 1970 . . . .	correct	Dec. 1969	-0.51
Jun. 1971-Jul. 1971 . . . .	false	‡	-0.18
Jun. 1973-Sep. 1973 . . . .	correct	Nov. 1973	-0.49
Nov. 1978-Dec. 1978 . . . .	false	‡	-0.24
Jun. 1979-Aug. 1979 . . . .	false	‡	-0.71
Oct. 1979-Nov. 1979 . . . .	correct	Jan. 1980	-1.54
Dec. 1980-Feb. 1981 . . . .	false	‡	-0.70
May 1981-Oct. 1981 . . . .	correct	Jul. 1981	-0.40
Jun. 1984-Aug. 1984 . . . .	§	§	-0.90

\*A signal equals 2 months or more of consecutive declines in the index of leading indicators. A signal is considered to be correct if a peak occurs within six months of the first decline in the index. The dates of the peaks correspond to peaks as defined by the National Bureau of Economic Research.

†For correct signals, the average monthly decline covers all months up to and including the date of the peak.

‡Not applicable.

§Unknown.

leading indicators. But in the past 15 years, the index has also signaled other "recessions": about twice as many recessions as actually occurred (table). Its performance from 1950 to the beginning of 1969 was even worse with four false signals for every correct one.<sup>2</sup> Thus the mere fact of a decline in the index provides little information about the likelihood of a recession.

Lengthening the time period between the start of a

<sup>2</sup>If the definition of a signal is modified to be at least three months of consecutive declines in the series, the accuracy of the leading indicators is only marginally improved. The longer period does reduce the number of incorrect signals. But the index failed to foreshadow correctly the January 1980 turning point since the decline in the leading indicators before that peak was only two months long. It should also be pointed out that some of the false signals, particularly in the 1950s and 1960s, may be due to the fact that the variables and weights currently employed in calculating the composite index differ from the ones used earlier.

correct signal and the peak to 12 months helps reduce the number of false signals. But this modification presents other difficulties: over a period as long as twelve months, policy changes or reversals of underlying trends can easily offset the factors that caused the indicators to peak in the first place. Moreover, multiple peaks have actually occurred in the series during the twelve months preceding a turning point in economic activity, and these peaks are difficult to relate to the business cycle. Thus the improved accuracy of the longer period is gained at the expense of more uncertainty about how much time will elapse before a peak in economic activity—the real object of interest—will occur.

The size of the decline in the index, furthermore, does not help much in distinguishing between false and correct signals. There have been a number of false signals where the average monthly decline in the index was considerably larger than those that occurred with correct signals. The peak in December 1969, for example, was preceded by a correct three-month signal that had an average monthly decline of -0.51 percent. The majority of false signals in the post-war era, in contrast, had even larger average declines.

Could distinguishing between false and correct signals be aided by looking at how many of the twelve components that make up the composite index are declining? Since 1959, the number of components falling before cyclical peaks generally increases quite rapidly, and averages about two-thirds at the peak.<sup>3</sup> Even so, there have been false signals that exhibit the same behavior. So a high degree of congruence among the components does not guarantee that the signal is correct.

In sum, the recent brief yet steep decline in the index has prompted speculation that a turning point in the economy is near. But the index of leading indicators has falsely predicted recession many times, including some instances when there has been both a sustained decline in the index and a rise in the number of components that are falling. Barring further declines in the series, there is little basis upon which to predict confidently that its recent weakness is presaging a recession.

<sup>3</sup>Based upon a six-month moving average in the proportion of components that are declining each month.

Douglas M. Woodham

# Treasury and Federal Reserve Foreign Exchange Operations

During the February-July period under review, the exchange markets were subject to frequent shifts in expectations, shifts that were reflected in swings in dollar rates. The dollar declined substantially during February and early March only to strengthen thereafter. By end-July it had risen on balance against major currencies to trade at an 11-month high against the Japanese yen, an 11-year high against the German mark, and at record levels against many other European currencies.

In early February, sentiment toward the dollar turned decidedly cautious, though it was trading in the exchange markets close to highs reached in early January. Market observers were concerned that economic policies would be unduly stimulative given the economy's underlying strength and came to focus on the risk for the dollar of a potential rekindling of inflation. Evidence indicated that the U.S. economy was growing far more rapidly than had been estimated just weeks before. Budget deliberations left the impression that the deficit problems were unlikely to be resolved quickly. Market participants felt that the scope for flexibility in monetary policy would similarly be limited in view of sensitivities to the high level of interest rates both in nominal and real terms.

Meanwhile, the climate for investment abroad

appeared to be improving. News of strengthening foreign industrial activity and orders, especially in Germany, generated expectations of rising earnings and prompt relief from earlier financial strains. Inflation remained quiescent, and several countries were making clear progress in reducing the structural components of their budget deficits.

Under these circumstances, foreign exchange market participants questioned whether the burgeoning current account deficit of the United States could be financed at prevailing exchange rates and interest differentials. The deficits projected for 1984-85 implied that the United States would require capital inflows of such a magnitude as to eliminate the large net creditor position the United States had established over the entire post-war period. Public officials and private commentators around the world expressed concern about the size of the financing requirements ahead, the dependency of the United States on foreign capital inflows, and the vulnerability of the dollar to a potential shift in investor sentiment.

Market participants were, therefore, sensitive to reports that some internationally-oriented investors were already reducing the share of dollar-denominated assets in their portfolios in favor of the German mark and other currencies. The belief spread that the dollar had begun a long-awaited decline. Commercial leads and lags as well as professional positions were turned against the dollar. As the dollar declined and economic statistics confirmed that U.S. economic growth remained stronger than expected, some market observers pointed to the additional impact a drop in the dollar would have on

A report by Sam Y. Cross, Executive Vice President, Federal Reserve Bank of New York and Manager of the Foreign Operations of the System Open Market Account. Officers of the Foreign Exchange Function, together with Richard F. Alford, Andrew Hook, Thaddeus Russell and Elisabeth Klebanoff contributed to its preparation.

domestic prices. Although U.S. interest rates rose modestly during February and March, the increases were seen as not fully compensating for the escalation of inflationary expectations. Thus, the dollar fell steadily through the first week in March. Its decline of 10 percent against the German mark was among the largest. On a trade-weighted average basis the dollar declined about 7 percent.

In March, market participants began to sense more restraint in U.S. monetary policy and more progress in reducing the fiscal deficit than they had previously anticipated. The narrowly defined monetary aggregate (M1) had strengthened relative to its intended growth range. More fundamentally, the preliminary statistics for the first quarter showed credit demands accelerating rapidly and the overall economy expanding far more quickly than the Federal Open Market Committee (FOMC) had assumed when it set its monetary targets for the current year. Senior Federal Reserve officials expressed concern about the implications of these developments for a sustained expansion. Consequently, as the Federal funds rate continued to firm, market participants no longer expected the central bank to resist a rate rise. By late March, U.S. interest rates of all maturities had increased about one percentage point, and on April 9 the Federal Reserve raised its discount rate to 9 percent, bringing it more in line with money market rates. About the same time, Congress and the Administration were moving toward agreement on a "down payment" to reduce the fiscal deficit. Indeed, work on some of the legislation to cut the deficit by \$150 billion over three years was completed before the Congressional summer recess.

Largely in response to these developments, the dollar reversed course in the exchange markets early in March. With real interest rates in the United States again perceived to be rising, concerns about financing the current account deficit receded. Also, earlier predictions of gathering economic strength abroad were disappointed. The immediate outlook was complicated in a number of important countries by labor disputes in key industries that drew attention to serious labor-management conflicts, inflexibility of work rules, and a variety of domestic political issues. Thus, the earlier, more positive assessment of the investment climate abroad tended to erode, and talk of portfolio shifts out of the dollar gave way to reports of investors returning to dollar assets.

By early May, economic statistics suggested that the U.S. economic expansion was remaining exceptionally vigorous in the second quarter and that credit demands were reflecting heavy borrowing needs in both the private and public sectors. With the Federal Reserve then widely presumed to be willing to let these developments

Table 1

### Federal Reserve Reciprocal Currency Arrangements

In millions of dollars

Institution	Amount of facility July 31, 1983	Amount of facility July 31, 1984
Austrian National Bank . . . . .	250	250
National Bank of Belgium . . . . .	1,000	1,000
Bank of Canada . . . . .	2,000	2,000
National Bank of Denmark . . . . .	250	250
Bank of England . . . . .	3,000	3,000
Bank of France . . . . .	2,000	2,000
German Federal Bank . . . . .	6,000	6,000
Bank of Italy . . . . .	3,000	3,000
Bank of Japan . . . . .	5,000	5,000
Bank of Mexico:		
Regular facility . . . . .	700	700
Special facility . . . . .	269*	*
Netherlands Bank . . . . .	500	500
Bank of Norway . . . . .	250	250
Bank of Sweden . . . . .	300	300
Swiss National Bank . . . . .	4,000	4,000
Bank for International Settlements:		
Swiss francs-dollars . . . . .	600	600
Other authorized European currency-dollars . . . . .	1,250	1,250
Total . . . . .	30,369	30,100

\*Facility, which became effective August 30, 1982, expired on August 23, 1983.

Table 2

### Net Profits (+) or Losses (-) on United States Treasury and Federal Reserve Current Foreign Exchange Operations

In millions of dollars

Period	Federal Reserve	United States Treasury Exchange Stabilization Fund	General account
Third quarter 1983 . . . . .	-0-	-0-	+70.1
Fourth quarter 1983 . . . . .	-0-	-204.8	-0-
First quarter 1984 . . . . .	-0-	-0-	-0-
Second quarter 1984 . . . . .	-17.7	-21.4	-0-
July 1984 . . . . .	-0-	-0-	-0-
Valuation profits and losses on outstanding assets and liabilities as of July 31, 1984 . . . . .	-1,084.0	-742.5	-0-

Data are on a value-date basis.



show through in rising interest rates, expectations solidified that dollar-based rates would increase substantially further. Banks sought to lengthen their liabilities so as to lock in the cost of funds, putting medium-term interest rates especially under pressure. By the end of May, most dollar-based market rates had risen another full percentage point. Since most foreign interest rates held steady during the spring, interest differentials moved further in the dollar's favor.

Meanwhile, concern deepened in some quarters that rising interest rates were increasing burdens on the heavily indebted developing countries. Some market participants were also wary of the possibility that a meeting of Latin American debtor countries in Cartagena, Colombia in July would lead to a polarization of the debt negotiations.

It was in this context that one large American bank experienced funding difficulties in mid-May, following market rumors that it had substantial undisclosed losses on its domestic loans. Support efforts were organized by other large banks and the Federal authorities. But market participants were unsure that the financial strains could be contained without modification of monetary policy and took particular note of a temporary easing in the Federal funds rate. During late May, rumors circulated that deposits were being withdrawn from a few large U.S. banks known to have sizable exposures in Latin America. The dollar eased back as exchange markets became somewhat unsettled over the implications of these developments as well as the prospect of sizable amounts of funds being moved out of dollar assets. By May 24, rumors had come to encompass American banks more generally, and the exchange markets became extremely disorderly. The U.S. authorities conducted their only intervention operation of the period that day, selling \$135 million-equivalent of German marks to counter the disorder. Trading conditions did improve thereafter, though the dollar continued to decline for several more days.

Early in June the dollar resumed its climb as some of the concerns of May began to dissipate. Market professionals came to realize that the Federal Reserve had been able to provide the needed liquidity without compromising its monetary targets. Some questions about the adequacy of U.S. banks' accounting procedures were laid to rest as the rules on reporting loans to be "nonaccruing" were clarified. Concern over the LDC debt problem also eased amid discussion of multi-year debt restructurings for countries demonstrating the greatest progress in external adjustment. Another positive factor was the emergence of a constructive attitude from the Cartagena meeting.

Later on the demand for dollars intensified as U.S. capital markets regained their attraction to foreign

investors. A succession of economic statistics suggested that a significant deceleration of real growth in the United States had yet to occur. At the same time, statistics on U.S. inflation were much better than had been expected, implying that interest-rate differentials adjusted for comparative price performance had become even more favorable to dollar investments. Moreover, the deficit-reduction legislation nearing passage in the Congress contained a provision to remove a long-standing 30 percent withholding tax on interest earned on U.S. investments by nonresidents. This legislation, which was subsequently enacted, prompted talk that large new foreign inflows of capital would be attracted to the United States as certain investors who had been subject to the tax gained greater access to U.S. markets. When the U.S. bond and stock markets staged a strong rally late in July, market participants therefore anticipated substantial foreign interest.

The dollar was bid up quite strongly at the end of July to reach its highs for the period under review. The dollar's net advance for the six months was greatest against the Swiss franc and pound sterling, at 10 percent and 8 percent, respectively. Against most other major currencies the dollar rose on balance about 4 to 5 percent, and in trade-weighted terms it increased  $4\frac{1}{4}$  percent.

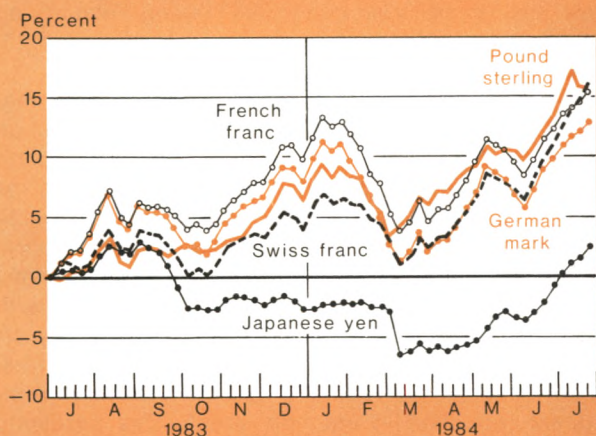
There were few changes in currency relationships among the other major currencies during the six months. Indeed, during the latter part of the period when the dollar was rising, the currencies participating in the joint intervention arrangements of the European Monetary System traded without strain. The authorities in those countries whose currencies had previously been under pressure were thereby able to rebuild their official reserve positions as well as to move cautiously in the direction of easing domestic interest rates and relaxing exchange controls. As a group, the major industrialized countries abroad sold dollars on balance during the six months in their intervention operations to support their own currencies. But these intervention sales were more than offset by interest earnings and acquisitions of currencies through foreign borrowings and other transactions, so that the foreign currency reserves of the major countries continued to grow.

At the beginning of the six-month period, the only drawing outstanding on credit arrangements of the U.S. monetary authorities was \$10 million drawn on December 29, 1983 by the Bank of Jamaica against a \$50 million U.S. Treasury temporary swap facility. The Bank of Jamaica fully repaid this amount on March 2 whereupon this facility expired.

On March 30 the U.S. Treasury announced that it would participate in an arrangement related to the efforts of the Government of Argentina to put into place

Chart 1

### The Dollar against Selected Foreign Currencies

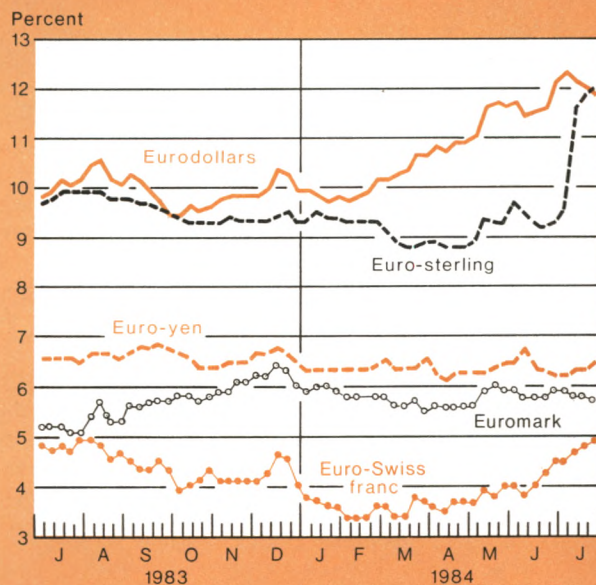


Percentage change of weekly average bid rates for dollars from the average rate for the week of June 27-July 1, 1983. Figures calculated from New York noon quotations.

Chart 2

### Selected Interest Rates

Three-month maturities\*



\*Weekly averages of daily rates.

an economic adjustment program supported by the International Monetary Fund (IMF). The Treasury's participation consisted of agreeing to extend temporary swap credits of up to \$300 million to Argentina upon agreement on an economic adjustment program between Argentina and the IMF; Argentina agreed to repay any such drawings on the Treasury from proceeds of IMF drawings. This undertaking was part of a \$500 million financing package that was used by Argentina to pay certain interest arrears. The \$500 million package consisted of: \$300 million credits extended to Argentina by the governments of Mexico, Venezuela, Brazil and Colombia, to be repaid upon Argentina's drawing from the U.S. Treasury; \$100 million additional credits extended by the eleven commercial banks in the working group for Argentina and \$100 million provided from Argentina's resources. The U.S. commitment, originally made for a 30-day period, was extended at the end of April for another month and again at the end of May for an additional 15 days. The Treasury's commitment under this agreement lapsed on June 15.

The Federal Reserve and the Treasury invest foreign currency balances acquired in the market as a result of their foreign exchange operations in a variety of instruments that yield market-related rates of return and that have a high degree of quality and liquidity. Under the authority provided by the Monetary Control Act of 1980, the Federal Reserve had invested \$1,424.2 million of its foreign currency resources in securities issued by foreign governments as of July 31. In addition, the Treasury held the equivalent of \$1,746.8 million in such securities as of end-July.

In the period from February through July, the Federal Reserve and the Exchange Stabilization Fund (ESF) of the Treasury received earnings of \$111.8 million and \$84.2 million, respectively, on their foreign-currency balances. They realized losses of \$17.7 million and \$21.4 million, respectively, on all of their operations in the market. As of July 31, cumulative bookkeeping, or valuation, losses on outstanding foreign currency balances were \$1,084.0 million for the Federal Reserve and \$742.5 million for the ESF. (Valuation gains and losses represent the increase or decrease in the dollar value of outstanding currency assets and liabilities, using end-of-period exchange rates as compared with rates of acquisition.) These valuation losses reflect the fact that the dollar has appreciated since the foreign currencies were acquired.

#### German mark

Through February and early March, the German mark strengthened against the dollar in response to substantial investment inflows, only to decline unevenly through July when these inflows subsequently slowed



and then reversed. The capital inflows early in the period reflected optimism that the difference in economic performance of the United States and Germany would be substantially narrow. But by spring it was clear that the U.S. economy remained stronger than expected and predictions of more rapid expansion in Germany were again disappointed.

At the opening of the period, the near-term outlook for the German economy and the German mark had become more buoyant. The pace of economic activity had regained momentum around the turn of the year, stimulated by a pickup of incoming foreign orders, renewed spending on plant and equipment, and a rebuilding of inventories in anticipation of a progressive revival of demand. Inflation remained low and earlier concerns were receding that the rise in import prices, reflecting last year's rise of the dollar against the mark, would generate generalized price pressures. Meanwhile, the government had made even more progress than expected in reducing its fiscal deficit during 1983. The growth of central bank money had dropped within the Bundesbank's target range by end 1983 and was remaining close to the lower limit of the central bank's even narrower, 4 to 6 percent target for 1984. With the outlook for sustained noninflationary growth thus improving, the capital markets in Germany strengthened.

Under these circumstances, the mark was the currency to benefit most from the shift in international portfolio investment flows which developed early in the year. Investors were attracted by the prospect of favorable trends in both asset prices and the mark's exchange rate, even though interest differentials remained strongly negative by comparison with the dollar and with most currencies within the European Monetary System (EMS). Long-term capital had begun to flow into Germany in January, reversing the capital outflows which had been stimulated over much of the preceding two years by the prospect of greater growth opportunities or higher yields abroad. The flows continued in February, and reports of foreign buying in the rallying German bond and stock markets received wide publicity. With Germany's current account expected to remain in substantial surplus for the year, reports of these investment transactions helped to encourage the view that the mark was embarked on a long-awaited upward trend. The mark's rise gained additional momentum from statements by public officials to the effect that the dollar was increasingly vulnerable to a sharp decline. The mark rose against the dollar to DM 2.5210 by March 7, 13 percent above its low of January and 11½ percent from end-January levels. This rise occurred even though German interest yields for most maturities eased and negative yield differentials compared with dollar investments widened by a full

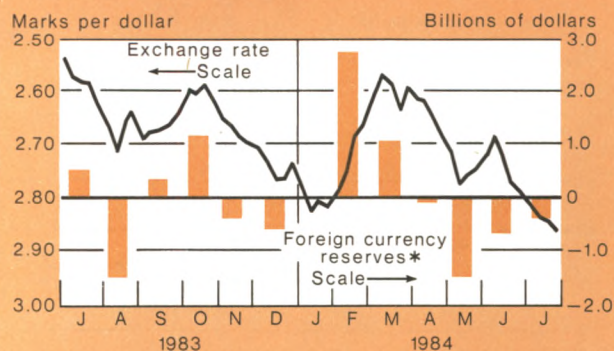
percentage point. As the mark strengthened the Bundesbank bought back some of the dollars sold in earlier intervention operations. In addition, its reserve position in the EMS improved as other countries in that arrangement sold marks to slow the advance of the mark against their own currencies. During February and March, Germany's foreign currency reserves rose \$3.8 billion to \$41.0 billion.

After the first week of March, however, the mark began a decline that was to continue, except for one major interruption, through the remainder of the period under review. As interest rates in the United States rose and figures were released showing that the expected increase in inflation had not yet materialized, market participants came to question whether large investment flows into Germany would be sustained. Market participants doubted the Bundesbank would allow any corresponding rise in Germany short-term interest rates, since the domestic recovery had not yet led to a significant reduction in unemployment. This perception deepened in April when new data showed some faltering of industrial activity. Thus, the earlier positive evaluations of the relative attractiveness of mark-denominated

Chart 3

### Germany

Movements in exchange rate and official foreign currency reserves



Exchange rates shown in this and the following charts are weekly averages of noon bid rates for dollars in New York. Foreign currency reserves shown in this and the following charts are drawn from IMF data published in *International Financial Statistics*.

\* Foreign exchange reserves for Germany and other members of the European Monetary System, including the United Kingdom, incorporate adjustments for gold and foreign exchange swaps against European currency units (ECUs) done with the European Monetary Fund.



investments eroded, and net portfolio inflows to Germany slowed markedly in March before turning negative in April.

Developments in the German labor market also contributed to the mark's decline starting early in April. By mid-month it became clear that annual wage negotiations between the union and employers in Germany's important metalworking industries were locked in a dispute over the union's demand for a five hour reduction in the standard work week. Strikes began in May in two major regions, initiating the most serious work stoppage in German industry for many years. Exchange market participants viewed the strike as important because of potential reductions in Germany's industrial production and current account performance for the year, as well as the possible long-term effect on Germany's competitiveness of any substantial concession to the union's demands. Against this background, trading in German marks became sensitive to news of the labor negotiations from April onward.

In these circumstances, news that Germany continued to register sizable trade account surpluses, while U.S. monthly trade deficits mounted to record levels, made little impression on the exchange markets. The mark dropped through several psychologically important levels, and its decline drew added impetus from selling by commercial entities and technically oriented speculators. By May 10, the mark fell some 10 percent from its March peak to DM 2.8010, less than 2 percent above the lowest level reached during the previous January.

The mark's decline against the dollar stalled at that point as problems of the U.S. and international banking systems became a dominant preoccupation in exchange markets for a time. The mark was temporarily buoyed from the belief that the Federal Reserve would modify its monetary stance to ease financial strains. At the same time, signs of a modest firming in money market interest rates in Germany were taken as presaging a possible move toward tighter monetary policy by the Bundesbank. Thus, the mark rose through much of May.

The exchange markets also became nervous in response to rumors of liquidity problems at several major U.S. banks with sizable LDC loan exposures or other problem loans. On May 24 trading conditions became extremely disorderly as these rumors began indiscriminately to refer to American banks more generally. Many traders attempted to withdraw from dealing in the face of such rumors. As the German mark jumped some 1½ percent in less than an hour, spreads between bid and asked quotes widened sharply and transactions became difficult to execute. In these circumstances the Desk entered the market to counter disorder, selling \$135 million equivalent of German marks. These marks were drawn in equal proportion from the foreign cur-

rency balances of the U.S. Treasury and the Federal Reserve. Following the operation, trading became more normal. The mark continued its rise at a more subdued pace through the first days of June, reaching DM 2.6600 on June 5.

The mark then resumed its decline against the dollar as new estimates indicated that U.S. growth still overshadowed Germany's growth performance and as further increases in U.S. interest rates widened the rate differentials adverse to the mark. The Bundesbank made clear it was not tightening monetary policy, even though it raised the discount rate, effective June 29, by 1½ percent to 4½ percent. The central bank acted at the same time to expand quotas of discount credit available to German banks, specified that the change was designed merely to shift more of its liquidity provision from the Lombard facility to the discount window, and kept its Lombard interest rate unchanged at 5.5 percent. These steps did not lead to any rise of German money market interest rates which remained steady throughout June and July.

In addition, the labor situation continued to influence the German currency during the summer. As the metalworkers' strike dragged on far longer than most observers had initially predicted, forecasts of Germany's 1984 growth and current account performance were revised downward. Even after settlement was announced late in June, press commentary questioned whether the upward momentum of the German economy could be recaptured. There was also uncertainty about the likely effects of the agreement on productivity in the affected industries and the extent it might become a standard for settlements in other sectors of the German economy.

Thus, the mark became vulnerable to renewed investor enthusiasm for dollar-denominated assets. By late July, the German mark had dropped below its previous low for the year, falling to DM 2.9205 on July 31 before closing that day at DM 2.9180. At this point the mark was trading 4 percent below its end-January levels. Within the EMS, the mark remained at the top of the narrow band but its margin over the other currencies had been considerably reduced. As pressures against the other EMS currencies subsided, some participating central banks purchased marks in the market to add to their own reserves.

Meanwhile, German foreign exchange reserves dropped some \$2.5 billion equivalent after March to \$38.4 billion. The change partly reflected dollar sales by the Bundesbank to slow the decline of its currency against the dollar, as well as some reduction in Germany's creditor position within the European Monetary System resulting from repayment of mark debt by partner countries.

## Japanese Yen

As the period opened, the Japanese yen was trading near record levels against European currencies, while showing somewhat less buoyancy against the dollar. By comparison with Europe, Japan's economic recovery was moving ahead more briskly. Its current account surplus, expected to exceed the previous year's \$21 billion, was likely to surpass by far any other country's surplus. These factors had attracted some investment from abroad. But, overall, inflows to Japan through the current account and through nonresident investments were more than offset by outflows of residents long-term capital—outflows that slowed the yen's advance against the dollar. To some extent these outflows were attracted by the relatively high interest rates and even more rapid growth in the United States. In part they reflected continuing diversification by Japanese investors of their rapidly growing financial assets. In addition, discussion about liberalizing the Japanese capital market, internationalizing the yen, and improving access of foreign firms to the Japanese capital market added to uncertainties about the immediate outlook for the dollar-yen exchange rate.

During February and early March, the yen was slow to benefit from the shift in sentiment against the dollar. In contrast to the mark, the yen remained steady against the dollar trading around ¥ 233 until early March 2.

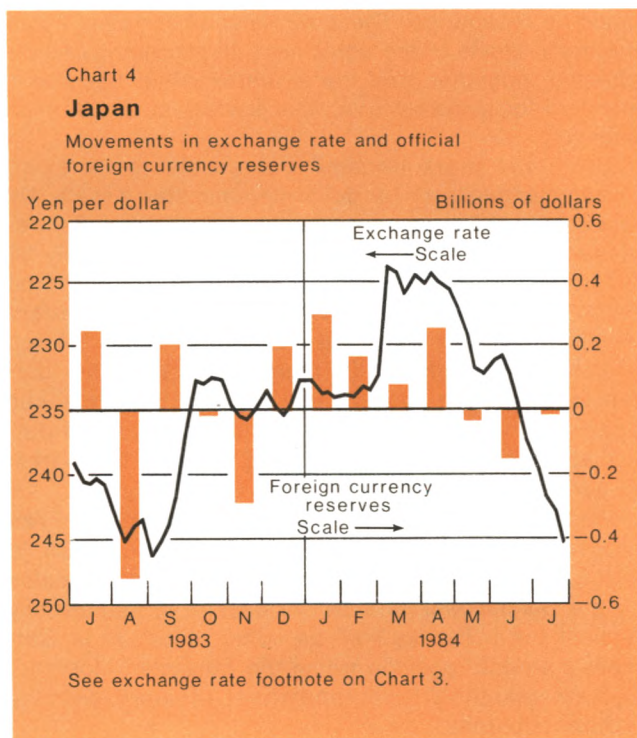
Then it rose abruptly as bidding appeared from both commercial and professional sources. The yen's advance quickened after market participants sensed that the yen might be catching up with the earlier rise of the mark. By March 7, the currency had risen some 6 percent to ¥ 220.00 against the dollar, its high for the period.

Following this rise, calls on the Bank of Japan to cut the discount rate were heard from diverse quarters. The central bank, however, rejected these suggestions, arguing that the yen's recovery was not yet sufficiently well established and that domestic as well as international developments should be taken into account. As it was, monetary policy was generally viewed as accommodative, with the Bank of Japan forecasting monetary growth to continue at about an 8 percent annual rate. Also, the Bank of Japan raised the ceiling for net new domestic lending by Japanese banks, as the domestic demand for funds continued to grow apace. Although the central bank's discount rate remained unchanged during the period, the banks lowered the long-term prime rate from 8.2 percent to 7.9 percent at the end of March.

From March on, interest differentials favoring dollar over yen assets widened steadily in part because short-term interest rates in Japan remained little changed or even declined slightly. At first, the yen held steady against the dollar, and thereby regained some ground against European currencies, as optimism about the Japanese economy was reinforced by fresh evidence of strengthening growth and a widening current account surplus. Domestic demand picked up and business confidence improved. With the prospect of rising profits for Japanese companies, prices on the Tokyo stock exchange were still climbing and reports circulated of increased foreign demand for Japanese equities.

But the yen started to decline against the dollar late in April. Soon afterward it began falling against other currencies as well, so that the yen did not return to the peak levels against the mark registered earlier in the year. Late in April the Tokyo stock market lost its upward momentum as stock prices started to erase some of the 11 percent gain of the first four months of the year. Talk of capital outflows then intensified.

In addition, attention had been directed to new discussions between the Japanese Ministry of Finance and the U.S. Treasury about liberalizing the Japanese capital market and internationalizing the yen. As one moved towards liberalization, the Japanese authorities eliminated, effective April 1, the requirement that corporations identify underlying commercial transactions before entering a forward contract, as well as making other changes in the administration of the foreign exchange market during spring. On May 29, the Japanese Minister





of Finance and the U.S. Secretary of the Treasury released a report containing a broad range of policy changes expected to affect the exchange rate over time

### Yen/Dollar Exchange Rate Issues

The Japanese Minister of Finance and the U.S. Secretary of the Treasury released on May 29 a report containing a broad range of policy changes. The report contained announcements by Japanese authorities of policy change in three broad areas: the Euro-yen market, the operation of Japan's domestic capital market, and the access of foreign financial institutions to the Japanese capital market. In the area of the Euro-yen market, perhaps the most important area for the internationalization of the yen, the authorities announced the basic commitment and decisions necessary to allow for the development of Euro-yen bond and banking markets, where nonJapanese can freely invest in or borrow a range of yen-denominated instruments.

Specifically, in the Euro-yen bond market, the announcement provided for the first time for the issue by nonJapanese corporations of yen-denominated bonds. Foreign issuers will face no restrictions on the number or size of issues and will not be required to use the Samurai market (Japanese domestic market for foreign bonds) as a prerequisite. In the Euro-yen banking market, the announcements include authorization for foreign and Japanese banks to issue short-term negotiable Euro-yen certificates of deposit from their offices outside of Japan. On the lending side, Japanese and nonJapanese banks will be free to extend Euro-yen loans to nonresidents of Japan.

Substantial changes in domestic financial market policies were also announced by the Ministry of Finance. These include the removal of nonprudential restrictions on overseas yen lending from Japan; the elimination of limits on oversold spot foreign exchange positions—so-called swap limits; relaxation of regulations on domestic certificates of deposit; permitting banks to sell new types of large-denomination deposit instruments with market-determined interest rates; a plan for establishment of a yen-denominated banker's acceptance market in Japan; and allowing qualified Japanese branches of foreign banks to trade Japanese government securities in the secondary market.

In the area of access by foreign financial institutions to the Japanese market, foreign banks will for the first time be allowed to engage in the trust banking business; the Tokyo Stock Exchange has begun to study ways to provide membership opportunities to foreign firms; and the Japanese authorities expressed their commitment to permit greater participation of foreign institutions in discussions pertaining to development of and in the implementation of financial policies.

(box). The report stated that the measures "...will help enable the yen to reflect more fully its underlying strength".<sup>1</sup>

During the remainder of the period, large-scale liquidation of nonresident's holdings of Japanese securities and heavy Japanese investment in foreign securities persisted. Overall long-term capital outflows jumped well in excess of the underlying current account surplus—to a record \$4.4 billion in April and to more than \$6 billion by June. Under these circumstances, the yen steadily declined against the dollar, easing to a low for the period of ¥ 247.30 on July 23. Trading at the close at ¥ 246.9, the yen had declined 5 percent against the dollar and 1½ percent against the mark from end-January levels. The Bank of Japan intervened during the second half of the period to moderate the downward pressure on the yen at times when trading became especially volatile. But over the six-month period, Japan's foreign exchange reserves showed little change, since declines due to intervention were offset by interest receipts.

### Swiss franc

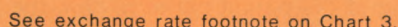
At the beginning of the period under review, the Swiss franc was trading steadily around SF2.2455 in terms of the dollar, slightly above seven-year lows reached in early January. Against the mark, however, the franc was strong by historical standards and near the SF0.80 level which, in the past, had prompted official concern over the competitiveness of Swiss exports. Yet, this time, market participants concluded that the authorities would not act to prevent a further appreciation of the franc if doing so would require them to deviate from their monetary policy objective of controlling inflation. Accordingly, exchange market participants had established positions in Swiss francs against marks and, thereby, had helped the franc to hold up better against the dollar just before the period.

During February and early March, however, the Swiss franc did not benefit as much as the mark from the shift in investor preferences then taking place, and the franc failed to keep up with the rise of EMS currencies against the dollar. The outlook for economic growth had not improved as much as for Germany and, though inflation was running at comparable rates, interest rates in Switzerland remained more than 2 percentage points lower than those on mark assets. Encouraged both by the interest rate differentials and by an easing of official regulations at the beginning of 1984, foreign bond offerings in the Swiss market picked up. The conversion

<sup>1</sup>Japanese Ministry of Finance—United States Department of the Treasury Working Group, *Report on Yen/Dollar Exchange Rate Issues*, (May 1984), page 33.



### Movements in exchange rate and official foreign currency reserves



The Swiss authorities did not intervene during the

During February both interest rate and oil market factors tended to favor sterling. The government had continued to aim at moderately restrictive fiscal and monetary targets, but both public sector borrowing and monetary growth had been running somewhat over their targets for the fiscal year. At least until these economic indicators had come closer to their intended ranges, market participants expected the pound would be supported by relatively attractive short-term interest rates. British interest rates were substantially higher than those in most major markets and close to parity with those available for U.S. dollar assets. In addition, intensifying military conflict in the Persian Gulf at times threatened to interrupt oil supplies, and the resulting upward pressure on crude oil prices was expected to improve Britain's current account position. Thus, sterling rose some 6½ percent in terms of the dollar during the month to a high of \$1.4955 on February 29. The currency was not, however, identified in market talk as one of those benefiting from reported shifts in portfolio capital out of dollar investments. Overall, the British currency rose nearly 2 percent on average to close the month at 83.3 in terms of the Bank of England's trade-weighted index.



its highest level during the period. At the same time, Britain's foreign currency reserves rose \$0.6 billion to \$9.1 billion.

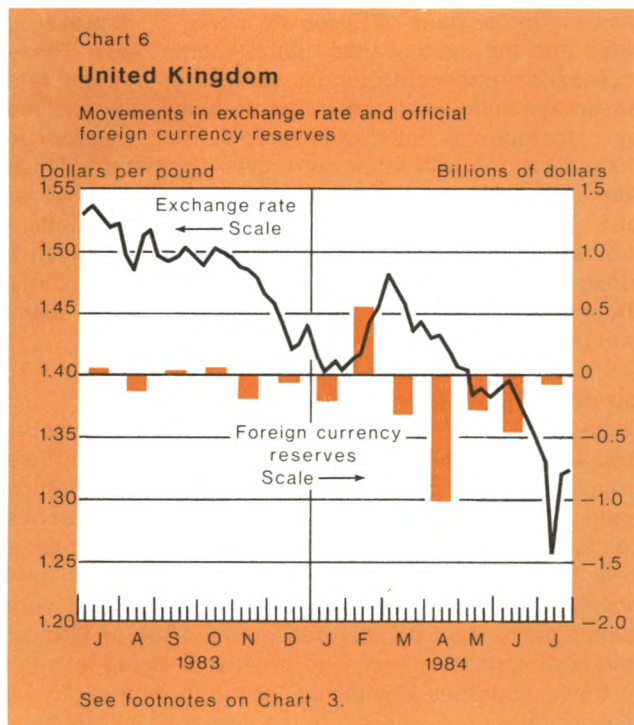
After the end of February, sterling began to decline against the dollar and other currencies. Unemployment had risen steeply in January and February and there were fears—borne out in early April—that industrial production would turn down as a result of a miners' strike. Expectations grew that the British authorities would be under pressure to lower interest rates. Then, publication of statistics showing that sterling M3 had dropped within its target range in the first two months of the year led market participants to believe that the authorities were in a position to let interest rates ease in order to stem the rise in unemployment.

Sterling's decline was interrupted briefly in the aftermath of the government's announcement on March 13 of its budget and monetary targets for 1984-85. Market participants generally praised the budget, which projected a decline in the public sector borrowing target and a reduced rate of monetary expansion along with some corporate tax reductions and other tax support for sterling as the period went on. Even with reforms, Sterling rose as foreign buying of British bonds and equities reportedly contributed to strong rallies in London's capital markets.

But the exchange rate rise was soon erased when market attention reverted to the developing pattern of interest rates. The Bank of England endorsed a half percentage point decline in the general level of short-term interest rates by cutting its dealing rates in two steps around mid-March. Combined with the rise of dollar interest rates then underway, this caused short-term differentials *vis-à-vis* the dollar to move some 2 percentage points and to become decidedly negative for sterling by late March.

The world oil market situation also provided less support for sterling as the period went on. Even with the continued fighting in the Persian Gulf, market participants became less convinced of the potential for higher oil prices in light of apparently ample supplies. In these circumstances, an occasional flare-up of Middle East tensions no longer caused the same surge of sterling buying as before, and market professionals, who as a group had been willing to hold long-sterling positions for a brief period in February, reestablished short positions.

Domestic labor problems also contributed to sterling's weakness at times. The strike by Britain's coal miners was not a particularly serious concern in the exchange markets at its inception in March, in view of the limited support given the miners' position by unions in other industries and the ample coal stocks available to supply the country's needs. But the strike began to be viewed more negatively as time went on. Sterling exchange



rates thus became more sensitive to news of the miners' strike and other labor disputes later in the period.

During May and June, negative interest differentials relative to the dollar widened further as U.S. interest rates rose. Market participants became increasingly convinced that, if faced with the choice, British authorities would let sterling depreciate rather than put further economic expansion at risk by raising domestic interest rates substantially. This view was consistent with the perception that, at current exchange rates, production costs in the United Kingdom were still high relative to those on the Continent, and that much of the growth in consumption during this recovery had been met by imports. It persisted even after the Bank of England endorsed a  $\frac{1}{2}$  percentage point rise in short-term market interest rates in early May. It was reinforced when, as the Bank of England announced a technical adjustment of the structure of its dealing rates in late June, the central bank indicated there was no need on monetary grounds for a general increase in interest rates.

Under these conditions, which were aggravated by a national dock strike, sterling's drop accelerated in early July, until the pound hit an all-time low of \$1.2970 and an eight-year low in effective terms. This drop quickly led to a sharp rise in interest rates in the London market that ended with a cumulative  $2\frac{3}{4}$  percentage point

increase in the Bank of England's money market dealing rates and the major banks' base lending rates. These increases restored sterling's short-term interest rate advantage relative to the dollar. Subsequently, helped by settlement of the dock strike, sterling steadied to fluctuate along with other currencies against the dollar. Although it closed July at a new low against the dollar of \$1.2970, it had recovered nearly 2 percent in effective terms. During the five months to end-July, Britain's foreign currency reserves declined almost continuously, dropping \$2.3 billion to \$15.4 billion by the end of the period.

### **European Monetary System**

During the period under review, the alignment of central exchange rates within the EMS remained relatively free from strain. Economic divergencies among the participating countries were reduced as all seven countries continued to implement policies aimed at reducing fiscal deficits, strengthening current account positions, and holding down inflation. Increases in wages and consumer prices had decelerated during 1983 in France, Italy, Denmark, Belgium, and Ireland, bringing inflation in these countries somewhat closer to—although still much higher than—the low rates prevailing in Germany and the Netherlands. The large current account deficits of France, Italy, Belgium, Denmark, Ireland had all been substantially cut—in the case of Italy, reversed—while the German and Dutch surpluses remained rather stable by comparison.

The joint float came under some pressure in the early part of the period as the dollar fell from its January highs. Flows out of dollar assets were attracted into the German mark to a far greater extent than to other EMS currencies—reflecting sanguine assessments of the investment climate in Germany as well as the wider opportunities for inflows afforded by its relatively open financial system. Thus, by the beginning of February, the mark was trading at or near its upper limit against the Belgian franc, after having quickly risen to the top of the EMS narrow band. All of the other EMS currencies were also clustered near the mark at the top of the narrow band, except for the Italian lira which traded about 3½ percent above the band within the wider limits established for that currency.

The German mark continued to strengthen through early March against all EMS currencies. The Belgian franc became pinned at its lower EMS limit against the mark. The Belgian central bank countered speculative pressure against its currency partly by raising its official lending rates one percentage point, effective February 16. The currencies that had shared the top of the narrow EMS band with the mark at the beginning of the period dispersed through the top half of the band, and

the Italian lira moved down closer to the narrow band.

Intervention support was provided to several currencies. The central banks of France, Belgium and Ireland financed the bulk of their official currency sales from the proceeds of external borrowings or other sources so that their foreign exchange reserves were little changed or even rose during the two months. Belgium also drew on the very short-term facility available through the European Monetary Cooperation Fund (EMCF). In the case of Italy, however, official sales of marks and dollars were partly reflected in a drop of foreign currency reserves of \$0.7 billion for February and March.

Pressures within the float ebbed after the first week of March, as the dollar began rising again and inflows into the German mark subsided. The mark eased against its partner currencies and, at times, the Dutch guilder alternated with the mark at the top of the narrow band. In addition, the spread between the topmost currency and the Belgian franc at the bottom narrowed to less than one percent by the end of July.

With the waning of tensions in the EMS, the French and Italian central banks were able to purchase substantial amounts of foreign currencies in the market to rebuild their reserve positions. Over the six-month period as a whole, foreign exchange reserves of these two countries rose on balance—by \$2.4 billion equivalent for France and by \$0.6 billion equivalent for Italy—to close at \$20.1 billion and \$18.5 billion, respectively. The Belgian central bank was able to cease its intervention sales of foreign currency and used the proceeds of further external borrowings to reduce its liabilities to the EMCF. Although Belgium's foreign currency reserves declined by \$0.5 billion during the six months to \$3.1 billion by the end of July, the decline was considerably smaller than its repayments of indebtedness to the EMCF over the six-month period.

The authorities of France, Italy and Belgium also took advantage of the easing of exchange-market pressures against their currencies to ease interest rates or, in the case of the first two countries, to ease foreign exchange controls. Money market interest rates in the three countries declined by ½ to 1 percentage point in the last four months of the period. Italy's Trade Ministry reduced the extent to which Italian exporters are required to conduct their trade financing in foreign currencies. In France, one of the first official actions of the new cabinet that took power in July was to relax restrictions on the use of credit cards abroad, which had been part of the March 1983 austerity program.

By the end of July, the EMS currencies had fallen between 13 and 16 percent from their March highs against the dollar, but were only 2 to 4 percent lower over the six-month period as a whole. Nevertheless they closed at levels that represented, in most cases, all-time



lows against the dollar. These wide movements against the dollar contrasted with their steadiness against one another. By the end of the period, the exchange rate structure which had been adopted in March 1983 had lasted longer than any other in the six year history of the EMS.

### Canadian dollar

By the opening of the six-month period under review, the Canadian dollar had settled into a trading range around Can.\$1.245 (\$0.803), drawing support from surpluses on Canada's trade and current accounts. But sentiment toward the Canadian dollar deteriorated early in February when published figures revealed that, despite an impressive recovery during 1983, the Canadian economy had not yet returned to satisfactory levels of production and employment and investment remained sluggish. Looking ahead, observers questioned whether

exports, a major contributor to Canada's growth last year, would remain so buoyant if the economic expansion in the United States were to moderate. They wondered also if credit demands would be as strong in Canada as they appeared to be in the United States. Thus, market participants focused on the monetary authorities' potential policy conflict between lending support to further economic growth and incurring the inflationary consequences of a weakening in the exchange rate. Against this background the currency showed vulnerability to selling pressure when Canadian short-term interest rates slipped below comparable U.S. rates.

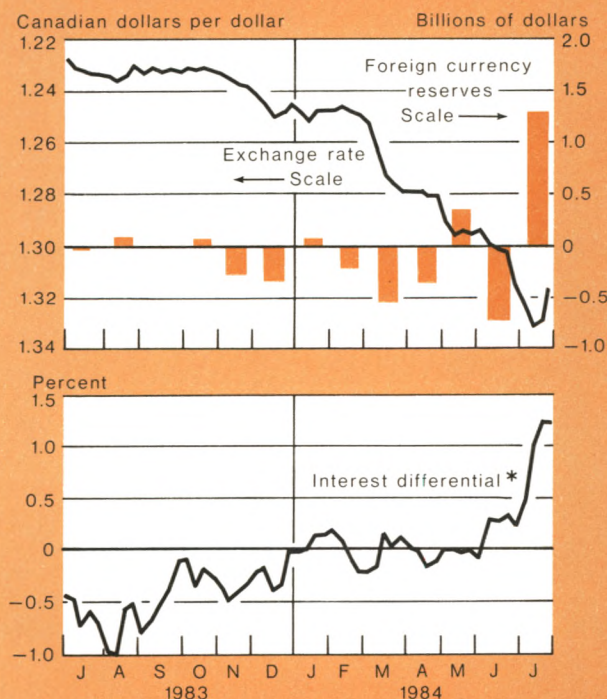
Public officials denied that they would welcome a sharp drop in the Canadian dollar and the central bank's *Annual Report* pointed to the dangers of currency depreciation. The central bank asserted that in the event of sharp downward movements of the Canadian dollar, "the successful pursuit in Canada of increasing price stability requires that Canadian policy try to moderate the exchange rate movements and to offset their inflationary effects."<sup>2</sup> But, for several months, market par-

<sup>2</sup>Bank of Canada, 1984 *Annual Report*, page 8.

Chart 7

### Canada

Movements in exchange rate, official foreign currency reserves, and interest differential



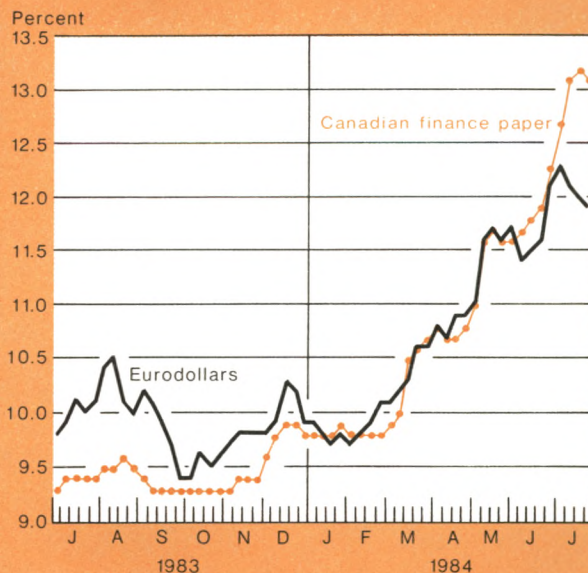
\* Canadian finance paper minus Eurodollars. Weekly averages of daily rates.

See exchange rate footnote on Chart 3.

Chart 8

### Interest Rates in Canada and the Eurodollar Market

Three-month maturities\*



\* Weekly averages of daily rates

ticipants perceived the Canadian authorities to be reluctant to allow interest rates to rise along with U.S. rates.

The Canadian currency was also subjected to other pressures during the spring. Market participants thought that Canadian subsidiaries of some U.S. oil companies would be sold and the proceeds converted into U.S. dollars to finance large take-over bids involving the parent companies. Commercial leads and lags shifted against the Canadian dollar. At the same time, market professionals sought to establish or increase short positions in the currency, adding further to the pressure.

Against this background, the Canadian dollar dropped off sharply in several waves of selling from March through July. The pressures were particularly intense in June and early July when a change in the leadership of the governing party and the prospect of national elections in September stimulated renewed debate on interest and exchange rate policy. During this episode the Canadian currency dropped to an all-time low of Can.\$1.3368 (\$0.7481). The Bank of Canada intervened in the exchanges to resist this decline.

Meanwhile, Canadian money market interest rates ratcheted upward and the Bank of Canada's bank rate

rose to a peak of 13.26 percent in the middle of July, even after U.S. money market rates had started to ease. These movements pushed interest rates on Canadian dollar assets significantly above those on U.S. dollar assets and buoyed the currency. Market sentiment was also encouraged by the waning of public debate over exchange rate and interest rate policy. As market participants' earlier concerns that the currency would depreciate lifted, the Canadian dollar recovered some of its earlier decline. It closed the period at Can.\$1.3094, down 5 percent on balance against the dollar over the period.

The Canadian authorities drew heavily on their reserve position to finance intervention to support the Canadian dollar from February to June, but they were able to buy back reserves in July. Their foreign currency reserves were supplemented as needed by borrowings of U.S. dollars on credit lines with Canadian and foreign banks, totaling \$1.4 billion, as well as by net borrowings in other foreign currencies equivalent to \$0.6 billion. Canada's foreign currency reserves nevertheless declined from the end of January to the end of April, falling \$1.1 billion to \$1.7 billion before returning to \$2.7 billion by the close of the period.

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A thumbnail sketch is provided for each of more than 300 separate items, including the level of sophistication of the expected audience and costs of the material, if any. The booklet should be of particular interest to teachers and extremely useful in helping to supplement economic course curricula and teaching materials. It is available free of charge. Write to the Public Information Department, Federal Reserve Bank of New York, 33 Liberty Street, New York, N.Y. 10045.

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