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This Quarterly Review is published by the Research and Statistics Group of the Federal Reserve Bank of New York. Statement of E. GERALD CORRIGAN, President of the Bank, on a perspective on the globalization of financial markets and institutions begins on page 1. Among the members of the staff who contributed to this issue are BEVERLY HIRTLE (on the growth of the financial guarantee market, page 10); and LAWRENCE J. RADECKI and CECILY C. GARVER (on the household demand for money: estimates from cross-sectional data, page 29).

A report on monetary policy and open market operations in 1986 begins on page 35.

Two quarterly reports on Treasury and Federal Reserve foreign exchange operations for the periods February through April 1987 and November 1986 through January 1987 begin on pages 57 and 64.

A Perspective on the Globalization of Financial Markets and Institutions

Mr. Chairman and members of the Committee: I am pleased to be able to appear today in order to discuss with the Committee recent and prospective developments regarding the globalization of financial markets and institutions, with particular emphasis on developments in the three major financial centers of the world: New York, London, and Tokyo. Within that broad framework, I will devote particular attention to a series of issues pertaining to access of U.S. firms to money and securities markets in Japan.

Background

Legend has it that Willie Sutton once said that he robbed banks because that's where the money was. The analogy is poor, but there can be no doubt that much of the current interest in Japanese financial markets stems from that same consideration: that's where the money is! Indeed, reflecting its very large domestic savings rate and its massive current account surplus, Japan has assumed a unique financial position in the world's community of nations. But Japan's financial position relative to the United States or to the rest of the world did not develop in a vacuum. Thus, before turning to the specific questions raised by the Committee, allow me to comment briefly on the general economic and financial environment within which we must seek to address the points of stress and tension which are so apparent.

Statement by E. Gerald Corrigan, President, Federal Reserve Bank of New York, before the Committee on the Budget, United States Senate, on Wednesday, May 6, 1987. The full testimony also included four appendices which are available from the Public Information Department of the Federal Reserve Bank of New York.

That broader perspective should include at least four major points of reference, as follows:

First, the dramatic rise in Japan's external surplus over the decade of the 1980s and the corresponding increase in the external deficit of the United States are primarily the result of macroeconomic considerations, including (1) the persistent and very large domestic savings gap in the United States—growing importantly out of the huge budget deficits—coupled with Japan's extraordinarily high internal savings rate; and (2) considerably more rapid growth in domestic demand in the U.S. economy, especially during the earlier stages of the current expansion. There is also the related issue of apparent differences in the ability of U.S. firms, perhaps especially manufacturing firms, to compete effectively in the external marketplace or with external competitors. All three of the factors, together with associated swings in exchange rates—swings that in my view tend to be exaggerated by the marketplace—lie at the heart of the severe imbalances in the world economy. The relative openness, or lack thereof, of Japanese financial markets is at most a marginal factor insofar as the underlying causes of trade and current account imbalances are concerned.

Second, reversing the imbalances that have developed over the past five years will not be easy and will take time. Moreover, if that adjustment is to take place in a context of growth rather than in a framework of contraction, we must deal with the fundamentals. More open external markets for

U.S. products and services are an important part of the agenda for adjustment, but absent underlying changes in economic policies and performance here in the United States as well as elsewhere in the world, more open *financial* markets simply will not materially help the adjustment process along.

Third, under the best of circumstances, the United States will be dependent on capital inflows from abroad for several years to come. That is, and to use a purely hypothetical example, even if our budget and trade deficits move lower at roughly the same speed as they increased, the United States would still have relatively large—and cumulating—current account deficits for the next few years. This, of course, implies that our external indebtedness will continue to grow, even if at a slower rate, such that net capital inflows will be needed. To the extent these necessary capital flows are impeded—for whatever reason—the implications for interest rates and exchange rates, and therefore domestic economic activity, are almost certain to be detrimental here and

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elsewhere. To put it more directly, we must take care to conduct our affairs in such a way that our foreign creditors will be willing to acquire and hold the needed amounts of dollar-denominated assets at interest rates and exchange rates that are otherwise consistent with noninflationary growth in the U.S. and world economy.

Fourth, whether we like it or not, the globalization of financial markets and institutions is a reality. Since that reality has been brought about importantly by technology and innovation, it cannot be reversed in any material way by regulation or legislation. Moreover, while this process of globalization and innovation is producing important benefits to suppliers and users of financial services, it also produces anomalous results. To cite an example or two, Japanese securities companies—whether owned by Japanese or foreign firms—cannot generally engage in foreign exchange trading and position-taking in Tokyo but

they do it in London and New York; U.S. banking companies cannot underwrite corporate debt and equity securities in the United States, but they do it in London or elsewhere.

More generally, national systems of supervision and regulation—to say nothing of tax and accounting policies—that were created many years ago were not designed for a marketplace of worldwide dimensions in which firms with differing charters and national origins compete head-to-head with each other around the clock and around

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the world. This situation is one of the reasons why I believe the Congress must get on with the task of fundamental reform of the structure of our banking and financial system—a task that is already well underway in several other countries.

A more rational structure at home—including a structure that works in the direction of strengthening the banking and financial system—would help encourage a more rational structure internationally. Both now and in the future, this is probably more important to the prospects for U.S. financial firms and U.S. national interests than are the relatively narrow issues of immediate dispute in particular markets.

In short, there are important and legitimate concerns that must be dealt with pertaining to access of U.S. firms to foreign financial markets. However, in seeking constructive solutions to those problems, we must be sensitive to the larger picture and we must recognize that the solutions to these larger problems are not to be found in the relatively narrow context of specific equity and access issues pertaining to the activities of U.S. financial firms abroad, as important as those issues are for other reasons.

Major international financial markets: an overview

At the risk of injuring the sensitivities of our friends in Frankfurt, Zurich, or Hong Kong—to say nothing of Chicago or San Francisco—it is probably fair to say that there are three dominant financial centers in the world today: London, Tokyo, and New York. Accordingly, and to provide some further perspective, Exhibit I attempts

to categorize the scope of activities available to various classes of domestic and foreign institutions in each of these markets.

As the exhibit indicates, there are important differences from one market to the other, but as a *general matter*, these differences do not reflect strictly legal distinctions based on the national origin of the firm in question. To put it differently, all three markets have de jure conditions of broad national treatment insofar as the general range of banking and financial activities is concerned even though there are important differences between the centers and, as noted later, important de facto distinctions in terms of competitiveness of foreign versus domestic concerns. For example:

- as mentioned earlier, banks, domestic or foreign,

cannot as a general matter underwrite corporate securities in New York or Tokyo but they may do so in London.

- securities companies, domestic or foreign, may not as a general matter deal in foreign exchange in Tokyo but they may in London and New York.
- in two instances, there is a small tilt in favor of U.S. banks in that as of March of this year, U.S. banks in Tokyo may have a securities affiliate whereas domestic Japanese banks may not, and U.S. banks were permitted in 1986 to own trust banks in Tokyo whereas Japanese city banks may not. By the same token, there are a number of foreign banks (none of which is Japanese) which have grandfathered securities subsidiaries in the United States.

Exhibit I

Permissible Activities by Type of Institution

Activity	Type of Institution											
	(1) US Bank Holding Co		(2) Japanese City Bank		(3) UK Clearing Bank		(4) US Securities Firm		(5) Japanese Securities Firm		(6) UK Merchant Bank	
Banking License	NY	YES	NY	YES	NY	YES	NY	S	NY	S	NY	S
	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES
	TO	YES	TO	YES	TO	YES	TO	NO	TO	NO	TO	NO
Dealing in Corporate Securities	NY	NO	NY	NO	NY	NO	NY	YES	NY	YES	NY	YES
	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES
	TO	S	TO	NO	TO	S	TO	YES	TO	YES	TO	YES
Foreign Exchange Dealing	NY	YES	NY	YES	NY	YES	NY	YES	NY	YES	NY	YES
	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES
	TO	YES	TO	YES	TO	YES	TO	NO	TO	NO	TO	NO
Dealing in U.S. Treasuries	NY	YES	NY	YES	NY	YES	NY	YES	NY	YES	NY	YES
	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES
	TO	NO	TO	NO	TO	NO	TO	YES	TO	YES	TO	YES
Dealing in UK Gilts	NY	NO	NY	NO	NY	NO	NY	YES	NY	YES	NY	YES
	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES
	TO	NO	TO	NO	TO	NO	TO	YES	TO	YES	TO	YES
Dealing in Japanese Gov't bonds	NY	NO	NY	NO	NY	NO	NY	YES	NY	YES	NY	YES
	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES
	TO	YES	TO	YES	TO	YES	TO	YES	TO	YES	TO	YES
Trust Bank	NY	YES	NY	YES	NY	YES	NY	S	NY	S	NY	S
	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES
	TO	YES	TO	NO	TO	YES	TO	NO	TO	NO	TO	NO
Account at the Central Bank	NY	YES	NY	YES	NY	YES	NY	S	NY	S	NY	S
	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES	LO	YES
	TO	YES	TO	YES	TO	YES	TO	YES	TO	YES	TO	YES

NY = New York

LO = London

TO = Tokyo

YES = Full license permitted.

NO = Not generally permitted.

S = Permitted only through special purpose companies, such as a 50 percent owned affiliate or a nonbank bank.

In short, looking at broad classes of financial activities in the three major centers does not suggest that there are systematic patterns of discrimination against foreign participants in any of the centers that are rooted in law. However, the simple "yeses" and "noes" in Exhibit I do not even begin to tell the whole story. Thus, the balance of this section will look at the individual markets in somewhat greater detail.

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Banking markets

For several decades, foreign banking institutions have had a major presence in the United States. This reflects several key factors, including: (1) the multinational population base of the United States; (2) the size and importance of U.S. markets; and (3) the role of the U.S. dollar as a reserve currency and an international medium of exchange.

Typically, foreign banks operating in the U.S. market

concentrate their activities heavily on the so-called wholesale market. While there are some important exceptions, foreign banks are generally not major factors in retail banking markets. In addition, most of the foreign banks that have a sizable presence in the United States are affiliated with well-known major banks abroad, many of which have Triple-A credit ratings. Needless to say, the prominent names of some of these institutions, together with their credit ratings, give them important recognition in their activities here in the United States.

As of year-end 1986, there were more than 250 foreign banks that had some kind of presence in the United States. In the aggregate, the assets of such foreign banks exceeded \$500 billion (Exhibit II) at year-end 1986 and constituted almost 20 percent of total U.S. banking assets. To an extent, this figure is inflated by virtue of the fact that some foreign banks—notably the Japanese—book most of their Western Hemisphere loans in U.S. offices. While not shown in the exhibit, foreign banks also account for about 20 percent of all commercial and industrial loans outstanding to United States addressees. In both instances, Japanese banks are by far the most dominant group of foreign banks, accounting for nearly half of the total assets and commercial loans outstanding at foreign banks in the U.S. In certain markets, such as standby letters of credit and standby's associated with U.S. municipal bond offerings,

Exhibit II

Banking Operations of Foreign Banks in the United States

Total U.S. banking assets (in billions)* of major foreign countries as of December 31

Expressed as a percentage of total U.S. banking assets

Countries	1982		1983		1984		1985		1986	
	dollars	percent	dollars	percent	dollars	percent	dollars	percent	dollars	percent
Japan	113.0	5.0	126.0	5.0	151.3	6.1	181.3	6.1	245.4	8.7
Canada	22.1	1.0	27.8	1.2	38.1	1.5	42.3	1.7	42.4	1.5
United Kingdom	52.2	2.5	53.0	2.3	51.4	2.0	61.2	2.4	40.6	1.5
Italy	14.3	0.7	17.5	0.8	23.9	0.9	29.1	1.1	36.4	1.4
Switzerland	13.0	0.6	13.1	0.6	15.3	0.6	18.3	0.7	24.5	0.9
France	16.6	0.8	16.2	0.7	18.3	0.7	20.7	0.8	22.4	0.8
West Germany	8.9	0.4	7.4	0.3	7.6	0.3	8.8	0.4	11.0	0.4
All other countries	60.5	3.0	70.9	3.1	72.4	2.9	97.2	3.8	103.9	3.8
Total U.S. banking assets of foreign banks	300.6	14	331.9	14	378.3	15	458.9	18	526.6	19
Total assets of domestic banking institutions†	1,821.1	86	1,986.5	86	2,076.8	85	2,098.7	82	2,285.9	81
Total U.S. banking assets†	2,121.7	100	2,318.4	100	2,455.1	100	2,557.6	100	2,812.5	100

*Amounts for each country include the total U.S. banking assets of all banks from that country, namely the aggregate of the assets of their U.S. branches, agencies, bank subsidiaries, Edge Act and Agreement corporations and New York State-chartered investment companies (called Article XII corporations).
†Includes the total consolidated assets (domestic and international) of all U.S. banks.

Japanese banks now account for between one-quarter and one-half of the total U.S. market.

Measured in terms of numbers of institutions, the U.S. banking presence in Japan is similar to that of Japanese banks in the United States. However, in terms of asset size, in either absolute or relative terms, U.S. banks are much smaller in Japan than are Japanese banks here, with total assets in Japan of something short of \$20 billion. As in the United States, most foreign banking activities in Japan are concentrated in the wholesale markets and in activities such as foreign exchange trading. In the recent past, however, at least one U.S. bank has demonstrated some interest in selective aspects of the Japanese retail banking markets.

The reasons for the relatively small U.S. banking presence reflect a variety of factors. Historical and strategic considerations probably play a role. It is also true that U.S. banks find it more attractive to book Asian loans in Hong Kong or Singapore rather than in Tokyo. Finally, the historical rigidities of the local funding markets in Japan make it difficult to build up a large banking operation in Japan, especially in the face of

In short, looking at broad classes of financial activities in the three major centers [London, New York, Tokyo] does not suggest that there are systematic patterns of discrimination against foreign participants in any of the centers that are rooted in law.

lingering uncertainties as to the receptivity of Japan to a broad-based presence of major foreign banks.

While the size of the U.S. banking presence in Japan is small, the same cannot be said for London. Indeed, the U.S. banking presence in London is more than six times the U. S. presence in Japan. And U.S. banking assets in the United Kingdom are roughly three times greater than U.K. banking assets in the United States. To a considerable extent, the size of U.S. banking operations in London reflects the long history of the importance of the London market, its openness to foreigners, and its association with the Eurocurrency markets which are so important to U.S. companies—financial and nonfinancial alike. In short, the London market has, for many years, sought out and welcomed foreign banks, in part by maintaining a “friendly” regulatory environment.

Securities markets

The comparative nature and scope of securities market activities by foreign firms in the three major markets are distorted somewhat because the U.K. does not require strict separation of commercial and investment banking,

whereas both Japan and the United States make such a distinction. In addition, data on relative size and importance of securities market activities are not as readily available as in banking. However, these limitations notwithstanding, some approximations of size and importance are possible.

In terms of numbers of firms and employment levels, U.S. securities firms' presence in Japan and Japanese securities firms' presence in the United States are very roughly equivalent and both have been growing quite rapidly in recent years. The activities of U.S. securities firms in Japan and Japanese firms in the United States also tend to be quite similar in that both are concentrated in trading-type activities. Both classes of institutions are engaged in underwriting activities in each other's markets but, to date, virtually all such underwriting by the foreign participants in both markets takes place as syndicate members, not as syndicate leaders or managers. In the United States, four Japanese securities houses (the “big four”) are members of the New York Stock Exchange while in Japan three U.S. securities houses—and one securities company that is owned by a U.S. bank through its London merchant bank—are members of the Tokyo Stock Exchange.

In short, in many respects, the relative size and importance of U.S. securities firms in Japan and Japanese securities companies in the U.S. are quite similar and, as noted earlier, both are growing rapidly. However, despite these broad similarities, there are particular

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Japanese initiatives: financial deregulation and access

The post-war Japanese financial system was, in many respects, modeled after the U.S. system. Not surprisingly, therefore, several features of the Japanese system which are the subject of controversy today—including interest rate ceilings on deposits and legal barriers separating classes of financial institutions including commercial and investment banks—are precisely the same issues that have and continue to provoke controversy in the United States. In Japan, as in the United States, pressures for sweeping change in the structure

and regulation of financial markets were largely muted until the late 1970s and early 1980s. Similarly, while U.S. financial firms have, for some time, had a minor presence in Japan, it was not until fairly recently that pressures for greater access built in a major way. These mounting pressures for deregulation and more open access reflected the interaction of a powerful set of macroeconomic forces as well as the wave of change and innovation that is rapidly transforming financial markets and institutions around the world.

In response to these forces, the Japanese authorities—under prodding from the United States and other governments—have over the past several years made major changes in the structure and regulation of financial markets, including important reductions in barriers to foreign presence in the Tokyo markets. Taken as a whole, the actions by the Japanese over the past several years are noteworthy, especially in the relatively short time frame involved. Indeed, I believe a case can be made that the Japanese record of the past several years is better than some observers suggest and is good enough to warrant confidence that further progress will be made in the future.

Having said that, I would hasten to add that despite this progress, the situation in Japan is still one in which barriers—visible and invisible—to open and effective competition between U.S. and Japanese financial firms remain important factors limiting the activities and competitive effectiveness of U.S. firms in Japan. It is also true that as the strategic importance of the Tokyo marketplace continues to grow and competitive pressures mount, concerns about those barriers have received increasing attention. However, in a number of important instances, specific issues raised by U.S. firms have little or nothing to do with national treatment considerations.

At the risk of a great oversimplification, the points of immediate concern to U.S. firms can be classified as follows:

- *Equal treatment issues:* While purely legal barriers to national treatment of U.S. firms in Japanese markets have been eliminated, certain distinctions between the treatment of U.S. and Japanese firms are seen as having important competitive implications even though the basis for the distinction is not to be found in law. Concerns about practices for issuing government debt and limitations on seats on the Tokyo Stock Exchange would fit in this category.
- *Regulatory policies:* There are several areas of regulatory policy which are viewed by some U.S. firms as especially troublesome. These would include remaining regulatory and administrative rigidities in the money market; prohibitions on cer-

tain activities such as foreign exchange trading by securities companies; and other miscellaneous matters such as withholding taxes on interest income to foreigners and limitations on the ability to engage in short selling. While all of these policies apply equally to U.S. and Japanese firms, certain U.S. firms allege that, in practice, they are more binding on U.S. firms since they impinge on activities in which U.S. firms have special expertise.

There is, however, another important area of regulatory policy which results in important differences in treatment and that relates to capital adequacy standards for banks, a subject which is covered in greater detail later in this statement.

- *Limitations on acquisitions:* In most foreign countries, acquisitions of banks or other financial concerns by U.S. firms are either limited by law or regulation or are very difficult to achieve as a matter of practice. In Japan, the most significant current barrier to acquisition may be price, but whatever the reason, it is easier for foreign entities to acquire U.S. banking and financial institutions than is the reverse.
- *Invisible barriers:* There are a host of considerations ranging from language and custom to relationships with bureaucrats which can be barriers to market participants in any foreign center, and Japan is certainly no exception. Indeed, some observers would contend that so-called invisible barriers in Japan are more of a problem than is the case in other international financial centers.

The record of the past six months

Over the past several months, Japanese authorities have implemented several important policy changes in furtherance of the goal of more open and more competitive financial markets in Japan. These steps included the following:

- *Deposit deregulation:* Effective April 6, 1987, the Ministry of Finance (1) reduced the minimum size of time deposits which are free of interest rate ceilings from 300 million yen (about \$2 million) to 100 million yen (about \$700,000); and (2) reduced the minimum size of money market certificates from 30 million yen (about \$200,000) to 20 million yen (about \$150,000). Both the new and the old regulations apply equally to domestic and foreign institutions.

In the area of deposit deregulation and greater money market flexibility, national treatment considerations are not the central issue since Japanese institutions operate under the same rules as foreign institutions. Rather, the money market issues are more a matter of greater market efficiencies in a

setting in which firms with special market expertise—Japanese or others—can take full advantage of those skills. While the extent of money market deregulation achieved is important, further steps are needed. This area will be one of those considered at the next round of so-called yen-dollar discussions between the U.S. Treasury and Japanese authorities planned for the near future.

- **Securities affiliates of U.S. banks:** In March 1987, the Ministry of Finance formally advised that it had amended its regulations to permit U.S. banking organizations to have securities affiliates in Japan, subject to the same terms and conditions that apply to securities affiliates of European universal banks. What is particularly significant about this action is that it provides access to Japanese securities markets for U.S. banks even though such access is not available to Japanese banks. It would also permit these U.S. bank affiliates in Japan a wider range of securities activities than is permissible here in the United States.

At present, there are three U.S. banks with securities affiliates in Japan through their U.K. merchant banks and I know of four U.S. banking organizations that are seeking to obtain licenses for securities affiliates under the arrangements noted above. The requests are in the advanced stage of review such that formal applications will soon be filed with final approvals expected in the near term. Of course these arrangements would also be subject to approval of U.S. bank regulatory authorities.

- **Access to the government securities market:** Prior to 1978, all Japanese government debt was sold by the so-called syndicate method whereby the terms of such debt issues were negotiated by the government and a syndicate of financial companies. Each member of the syndicate, in turn, received a predetermined share of the securities issue. The syndicate method of issuing government debt is still the dominant method of debt issuance in a number of countries, including a few major industrial countries. It is also the general procedure followed by Federal government agencies here in the United States as well as the prevailing method for issuing most corporate and municipal debt.

Because most Japanese government debt was issued in this fashion and because U.S. firms were generally not part of the syndicate, U.S. firms did not have meaningful direct access to new issues of Japanese government securities. De facto limits on access to new issues of government securities placed U.S. firms at a competitive disadvantage not just in the government market itself but in other markets as well because of the important linkages

between government securities and other securities.

In response to this situation, the Japanese authorities have taken several steps. First, for a number of short- and intermediate-term issues, they have fully adopted the auction method such that about 35 percent of new issues in 1986 were auctioned. In addition, the Japanese authorities have eliminated the requirement of having an account at the Bank of Japan in order to be eligible to bid in such auctions. However, the 10- and 20-year maturities are still issued by the syndicate method—a fact that is especially important in the case of the 10-year bond which is the largest and most important of the issues, especially in terms of secondary market trading.

In these circumstances, effective April 1, 1987, the syndicate has agreed to increase the total share of the new issues available to foreign securities firms from 1.19 percent to 5.725 percent of the share available to securities houses and it has raised the shares available to individual foreign companies from 0.07 percent to a maximum of 1

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percent. While still small, we understand that these shares for the foreign group as a whole are commensurate with the overall size of foreign securities firm secondary market trading in yen government bonds. Finally, as discussed below, the Ministry of Finance apparently is considering additional steps which would further open the market for Japanese government debt to foreign market participants.

Taken in the context of measures initiated by the Japanese authorities over the past several years, and taken in the context of further steps that may be under consideration at the present (see below), these latest initiatives by the Japanese strike me as helpful and as reflective of continued good faith efforts to move ahead with financial market liberalization. To be sure, further effort on a variety of fronts is needed.

Looking to the future

In looking to the future, there is a clear need to reduce both the specific points of friction referred to in this statement and, more importantly, to deal with the underlying problems which are at the heart of current tensions in the international economic and financial arena.

Insofar as particular problems relating to the activities of U.S. banks and securities companies in Japan are concerned, I would hope and expect that the Japanese would continue to move forward with efforts to liberalize their domestic financial markets, thereby providing greater competitive opportunities for U.S. firms in the Japanese marketplace. As I see it, there are four specific areas that warrant particular attention:

- **Greater access to the Japanese government securities market:** In this area, I believe that the Japanese authorities may be considering one or more possible further steps including: (1) the offering through auction of new maturities of intermediate and longer term issues which would work in the direction of increasing the percentage of issues sold through auction; (2) shifting the 20-year issue from a syndicate to an auction; and (3) the use of something like the U.S. noncompetitive tender system in the 10-year maturity which could provide larger shares to U.S. market participants while still preserving the syndicate framework for that issue. Needless to say, I would welcome initiatives along these lines which could pave the way to the day in which the auction method of issuing debt was the general practice. In turn, this would be an important step in the direction of establishing market practices in the Japanese government securities markets that are more in line with practices here and in London.

...the single item on which I place greatest emphasis relates to bank capital adequacy standards and specifically to the goal of moving Japanese bank capital standards into closer alignment with emerging international standards.

- **Increased representation in the Tokyo Stock Exchange:** As I understand it, plans are now underway to expand the number of seats—including seats held by foreigners—on the Tokyo Stock Exchange next spring when new facilities and computer capabilities will be in place. Procedurally, this will entail the establishment of a membership committee within the exchange in the near term. I am led to believe the committee's deliberations should be completed and its recommendations made to the full exchange membership late this year. Here too, I expect that the result of these deliberations would be some added representation of U.S. firms in the exchange. I would also hope the time schedule for this process could be accelerated, but I do understand the practical problems involved.

- **Money market liberalization:** As noted earlier, the next round of discussions between the Japanese authorities and U.S. Treasury representatives are scheduled to take place shortly. Those discussions will, among other things, focus on what further steps might be taken to reduce rigidities in the Japanese money market which, in turn, can make it easier for U.S. institutions to compete in the market and thereby more easily fund Japanese-based lending and securities market activities in the local currency.

Taking a longer term view of the situation, Japan faces many of the same problems in the financial area that we are so conscious of here in the United States. Namely, much of its overall banking and financial structure—as well as the regulatory and supervisory apparatus associated with that structure—were not designed for the current international market environment.

- **Bank capital standards:** While the areas mentioned above are important, the single item on which I place greatest emphasis relates to bank capital adequacy standards and specifically to the goal of moving Japanese bank capital standards into closer alignment with emerging international standards.

Efforts to establish international standards for bank capital adequacy have been underway within the Bank for International Settlements (BIS) for about three years. This effort was undertaken by the G-10 central bank governors in recognition of the fact that both competitive and prudential considerations pointed to the need for such standards as the globalization of banking was proceeding very rapidly. While efforts are proceeding in the BIS and through other multinational channels, the United States and the United Kingdom reached agreement earlier this year on a joint approach to capital standards in our respective countries. Such proposals were made available for public comment in January and final rules are expected to be put in place sometime later this year.

Senior officials of both the Bank of Japan and the Ministry of Finance have indicated that they agree in principle that Japanese bank capital standards should, in due course, be brought into broad alignment with international standards. And, preliminary discussions between senior Federal Reserve, Bank of England, and Japanese officials have been held on the subject. Further discussions are scheduled in the near term.

Achieving the needed degree of convergence in

this area will be much more difficult in the case of Japan than was true with the United Kingdom because the starting points with Japan are much further removed from prevailing practices in the United States and the United Kingdom. Moreover, as we have seen with U.S. banks, even relatively minor changes in this area can be controversial. Thus, while achieving convergence with the Japanese will be a long and difficult task. Progress along those lines is important.

As I see it, the four areas I have mentioned above are the clear priorities. Given the progress that has been made in the past, I am confident that efforts to move ahead in these and other areas will prove fruitful

If we are to come full circle in restoring balanced growth here at home and in the world more generally, we must also avoid any renewed outburst of inflation which would undermine prospects on all fronts.

and mutually beneficial. Partly for this reason, I am opposed to legislative efforts along the lines of the so-called "primary dealer" amendment that was incorporated into the trade bill passed by the House or as recently proposed by Senators Proxmire and Riegle. As I see it, such legislation could have the effect of stalling rather than accelerating discussions and negotiations, while possibly producing unintended adverse side effects—both in terms of general attitudes toward market liberalization and attitudes regarding capital inflows to the United States. It would be one thing to consider a legislative approach in an environment in which progress and good faith discussions were not taking place. However, this is not the current situation.

Taking a longer term view of the situation, Japan faces many of the same problems in the financial area that we are so conscious of here in the United States. Namely, much of its overall banking and financial structure—as well as the regulatory and supervisory

apparatus associated with that structure—were not designed for the current international market environment. The Japanese will have to come to grips with these issues just as we and others will have to do the same. In the case of the Japanese, coming to grips with these larger issues could also yield a situation in which constructive change on the Japanese side is forthcoming at their initiative, as a part of that larger process, rather than as a result of time-consuming and, at times, difficult discussions of specific points of concern and friction. In this regard, the point should also be stressed that problems of the nature discussed in this statement—specific or generic—are by no means limited to Japan.

In concluding, Mr. Chairman, let me return briefly to where I started—with the economic fundamentals. If we are to be successful in winding down our external imbalances in an orderly way, we in the United States must live up to our responsibilities—which means learning to live within our means. To be sure, actions abroad are needed and needed badly. But, as we call on others to open their markets and stimulate their economies, let us not lose sight of our end of the bargain. Our federal budgetary affairs—despite the efforts of this committee and others—are still in a state of disarray and must be put in order; the need for broad-based reform in our own financial structure must be addressed; pressing questions as to the degree of underlying competitiveness of our industrial sector must be answered; and patterns of savings and investment in our domestic economy must be brought into line with the longer run needs of rising productivity and standards of living. If we are to come full circle in restoring balanced growth here at home and in the world more generally, we must also avoid any renewed outburst of inflation which would undermine prospects on all fronts. Moreover, balanced growth in the world economy will also provide a much more constructive environment within which legitimate issues regarding financial market practices and evolution can be resolved here and elsewhere.

The Growth of the Financial Guarantee Market

Financial guarantees are instruments of credit enhancement which insure security purchasers against default and provide lower borrowing costs to issuers. The issuer or underwriter of a security purchases a financial guarantee to insure the timely payment of principal and interest in the event of the issuer's default. In general, this guarantee is unconditional and irrevocable, contains no deductible and constitutes a legal obligation of the insurer to the security holder. The guarantee is written for the life of the security, which, in the case of municipal bonds, can be as long as 30 years. Since the capital and resources of the insurer are pledged to back the insured security, the financial guarantee makes the security more marketable and reduces interest cost to the issuer. The financial guarantee, in effect, is a means for the insurer to "rent" its superior credit rating to security issuers whose own ratings are lower. The wedge that permits this transaction is the interest cost saved by the issuer.

The first financial guarantee product, municipal bond insurance, was developed in the early 1970s, and since that time, the market has expanded to include guarantees on a variety of instruments in both the municipal and corporate debt markets. Until the late 1970s the financial guarantee market consisted of just two firms which wrote guarantees for municipal bonds. The relationship among these firms, state insurance regulators, professional associations and the major credit rating agencies was straightforward and well established. Since 1981, however, the market for municipal bond insurance in particular and financial guarantees in general has grown significantly. Financial guarantees are now written for many different types of securities,

including limited partnership obligations, consumer receivable-backed securities, mortgage-backed securities, long-term and short-term corporate debt and taxable industrial revenue bonds. Another class of financial guarantees is being written to cover credit risk in such transactions as interest rate and currency swaps.

The purpose of this paper is to describe the cyclical behavior of the financial guarantee market and to discuss the factors which contributed to the market's recent growth. Like other property/casualty insurance lines, financial guarantees are subject to an underwriting cycle that is largely determined by changes in interest rates. Interest rates affect the financial guarantee cycle by influencing both the investment income of insurers and the interest cost savings of debt issuers. As the theory developed in this paper suggests, these influences cause the quantity of financial guarantee insurance underwritten to rise and fall with the level of interest rates. Interest rates also affect the financial guarantee market through their impact on the rest of the property/casualty insurance industry. Periods of high interest rates also tend to be periods of underwriting losses for property/casualty insurers. Since high interest rate environments correspond with the peak of the financial guarantee underwriting cycle, property/casualty insurers have incentive to redirect capital resources to the financial guarantee market when interest rates are high. Thus, the cyclical behavior of the property/casualty industry reinforces the cyclical behavior of the financial guarantee market.

While interest rates and the property/casualty underwriting cycle affect the cyclical pattern of the financial guarantee market, some part of the growth in the market

in the 1980s can be attributed to other factors. These factors include a general secular expansion of the market for credit enhancement services, changes in the federal tax code and the increase in innovation of products and services in securities markets. The financial guarantee market was also influenced by the growth of markets for alternative credit enhancement devices such as commercial bank letters of credit. The fact that these longer term influences coincided with the upswing of the underwriting cycle in the financial guarantee market led to the tremendous expansion of the market in the early 1980s. More recently, expansion in the market has slowed, as the fall in interest rates has moved the underwriting cycle into a relatively contractionary phase. The behavior of the market during this downswing, combined with regulatory proposals which could constrain financial guarantee activity, is likely to shape the nature of the market in its more mature stage.

Growth in premium volume

The growth of the financial guarantee market is best illustrated by the sharp increase in financial guarantee premiums in the 1980s. Unfortunately, comprehensive measures of financial guarantee premiums are not readily available since insurers have not been required to break out financial guarantee business from other insurance lines in annual reports to state insurance regulators. An estimate of financial guarantee premiums can be derived, however, from data on surety bond premiums. A surety bond is "an agreement providing for monetary compensation in the event of a failure to perform specified acts within a stated period."¹ Financial guarantees are technically a surety product and surety

¹1985-86 *Property/Casualty Fact Book* (Insurance Information Institute, New York, 1985).

premium data from reports to state insurance regulators can be used to infer the growth in financial guarantee premiums.²

Table 1 demonstrates the growth of surety premiums between 1976 and 1985. The rate of growth of surety premiums accelerated between 1982 and 1985, averaging 26.4 percent a year, as opposed to 12.8 percent a year during the period 1976 to 1982. Surety premiums reached \$2.5 billion in 1985, nearly five times their level in 1976.

A second source of data about financial guarantee premiums comes from the Surety Association of America. The Surety Association collects surety premium data by surety product from its member insurers. Membership in the association is voluntary, however, and financial guarantee insurers are underrepresented in the membership. This underrepresentation, combined with a tendency for financial guarantee business to be classified under "all other surety," means that the Surety Association's financial guarantee premium figures understate the actual volume of financial guarantee premiums. This underreporting is reflected by the fact that total surety premiums as measured by the Surety Association rose an average of only 12.5 percent between 1980 and 1985 (Table 2). Reported premiums for all financial guarantees rose considerably faster, however, increasing an average of 70 percent a year. Breaking the surety premium data down by product, municipal bond insurance premiums grew by 60 percent a year and premiums for other financial guarantees—including those for commercial investment and corporate debt enhancement—grew at over 80 percent a year, with most of the increase coming after 1982. In 1980, financial guarantee premiums accounted for just 3 percent of the total direct written premiums reported to the Surety Association. In 1985, they accounted for 24 percent.

The detailed Surety Association data can be used to make an estimate of financial guarantee premiums for all insurers. The surety premium data from reports to state regulators reflect the surety activity—both financial guarantee and traditional surety—of all insurers. Assuming that the Surety Association's premium data for traditional surety products is an accurate measure of the activities of all insurers in this area, then the Surety Association's traditional surety premium data can be subtracted from the state regulators' total surety premiums to provide a comprehensive estimate of financial guarantee premiums.

These estimates are reported in Table 3. Total estimated financial guarantee premiums increased an

²These data are compiled from state insurance regulators' reports by the A.M. Best Company.

Table 1

Premium Volume—Surety

Year	Direct Written Premiums (in thousands of dollars)*	Percent Change
1976	589,568	—
1977	696,350	18.1
1978	835,919	20.0
1979	902,552	8.0
1980	1,000,732	10.9
1981	1,088,848	8.8
1982	1,216,634	11.7
1983	1,488,641	22.4
1984	1,911,182	28.4
1985	2,454,556	28.4

*Premiums paid by policy holders, 50 states and District of Columbia.
Source: A.M. Best Co., Executive Data Service

average of 47.3 percent between 1980 and 1985, reaching a level of \$1.3 billion. Although this is slower than the 70 percent annual rate of increase implied by the Surety Association's financial guarantee premium data, the estimated premium data indicate a relatively steady rate of growth through 1985. Financial guarantee premiums increased by more than 50 percent in every year between 1982 and 1985.

A model of the financial guarantee market

The growth in the financial guarantee market reflected in these premium data can be attributed to both cyclical and noncyclical factors. In order to understand the cyclical component of the financial guarantee market, it is necessary to understand how financial guarantees are valued by security issuers and priced by insurers. Clearly, the issuer of a security will be willing to purchase a financial guarantee only if the price of the guarantee is less than the savings that result from the purchase of the guarantee. Similarly, insurers will be willing to sell a guarantee only if the premium received is greater than the expected loss from the guarantee plus administrative costs. This section discusses a model of the financial guarantee market that incorporates these decision rules.³

The central assumption of the model is that financial guarantee insurers are more effective credit analysts than other capital market participants. When a security is issued, market participants make an assessment of its credit risk and the market yield on the security will reflect this assessment. By shifting the ultimate liability

for a security's principal and interest payments from the borrower to the insurer, a financial guarantee lowers the security's credit risk and reduces its required market yield. The difference in total financing costs between the uninsured and the insured security can be interpreted as the market price of the security's risk and represents the maximum amount that a borrower would be willing to pay for a financial guarantee. Clearly, this interest cost reduction depends upon the credit market's initial assessment of the security's risk. This assessment may be inaccurate, however. If a financial guarantee insurer can determine that the security's true credit risk is lower than the risk perceived by the capital market, then the insurer will be willing to sell a financial guarantee and assume the credit risk from the security holder at less than the risk's market price. It is this wedge between the interest cost savings realized by the borrower and the "true" price of the risk as discovered

Table 3

Estimated Financial Guarantee Premium Volume (in thousands of dollars)

	Total Surety Premiums	Nonfinancial Guarantee Surety Premiums	Estimated Financial Guarantee Premiums
1980	1,000,732	813,585	187,147
1981	1,088,848	890,841	198,007
1982	1,216,634	887,124	329,510
1983	1,488,641	966,933	521,708
1984	1,911,182	1,054,046	857,136
1985	2,454,556	1,156,561	1,297,995

Source Column 1: A.M. Best Co.
Column 2: Surety Association of America

Table 2

Surety Premiums by Product (in thousands of dollars)

	Financial Guarantees					Traditional Surety			
	Total Financial Guarantees	Municipal Bond Guarantees	Commercial Loan Guarantees, Corporate Debt Credit Enhancement	All Other Commercial Loan Guarantees	All Other Financial Guarantees	All Contract	Worker's Compensation + Depository	All Other Surety	Total Surety
1980	25,247	12,951	N/A*	N/A	12,296	574,540	12,416	226,629	838,832
1981	64,122	46,345	N/A	N/A	17,777	604,666	14,664	271,511	954,963
1982	108,763	76,568	N/A	N/A	32,195	594,077	16,804	276,243	995,887
1983	191,050	95,651	N/A	N/A	95,399	640,918	18,081	307,934	1,157,983
1984	348,062	150,920	2,255	12,416	182,471	680,390	25,985	347,671	1,402,108
1985	358,037	123,509	43,669	53,881	136,978	769,674	16,830	370,057	1,514,598

*N/A = not calculated, included in "All other financial guarantees."
Note: All figures are direct premiums written.
Source: Surety Association of America

by the insurer that creates the market for financial guarantees.

The interest savings associated with financial guarantees can be substantial. In 1983, for example, a Louisiana agency issued a student loan bond. Part of the issue was insured by Fireman's Fund Insurance Company, received a AAA rating and yielded 7 percent.⁴ The remainder of the issue was backed by surplus revenue, received an A rating and was priced at 7.4 percent.⁵ Such differences in yields translate into significant dollar savings. In 1985, the South Carolina Public Service Authority saved an estimated \$2.4 million in interest costs over the life of a \$135 million ten-year electric revenue bond when it raised the bonds' rating from A to AAA with a guarantee from the Municipal Bond Insurance Association.⁶

The demand for financial guarantees is based upon the value of these credit enhancement services. A typical security is composed of a series of coupon payments and a principal payment that is due when the security matures. A financial guarantee lowers the security issuer's cost of borrowing. If bonds are assumed to sell at par and the yield curve is flat, then this reduction can be thought of as a reduction in the required coupon rate. The difference between the coupon rate on an insured and uninsured bond is the quality spread associated with that bond. The quality spread reflects the compensation that investors require to assume the additional risk associated with an uninsured security. Clearly, then, the higher a security's perceived market risk, the larger its quality spread and the greater the reduction in coupon payments associated with a financial guarantee. Borrowers with high perceived credit risk thus realize large interest cost savings and place the greatest value on a financial guarantee.

Just as the demand decisions of security issuers involve comparing interest cost savings to the financial

guarantee premium paid, the supply decisions of insurers involve comparing the expected losses from a financial guarantee with the premium received. Recall the central assumption of the model that financial guarantee insurers are able to discover the true credit risk of individual security issuers. Since insurers know the true probability of default, they can make an accurate calculation of the expected losses associated with any particular guarantee. The fact that they are able to distinguish among borrowers of different risk types means that there will be a separate financial guarantee market for each true risk class. That is, insurers are able to obtain information about the riskiness of individual borrowers that allows them to offer a different schedule of premiums to borrowers of different risk types.

If it is costly to obtain credit information, then the supply decision of insurers will also incorporate information costs. Assuming that expected losses per dollar of bond principal insured are the same within a risk class, then insurers for whom information costs are low will be willing to write guarantees at lower premium rates than insurers for whom information costs are high. Within a risk class, then, the upward slope of the supply curve is determined by the distribution of information costs among insurers.

Within a risk class, the supply of financial guarantees is determined by the true default probability and the demand for financial guarantees is determined by the perceived default probability. This aspect of the model highlights the importance of information about credit risk in the financial guarantee market. In fact, in this analytic framework, only borrowers whose perceived credit risk is greater than their true credit risk will purchase a guarantee. This result highlights the importance of insurers' ability to obtain superior credit information as an essential element underlying the market for financial guarantees.

The equilibrium price and quantity of financial guarantee insurance are determined by the intersection of the supply and demand curves in each risk class (Chart 1). If the volume of financing is exogenous to the model, then the equilibrium quantity of financial guarantees can also be interpreted as the share of financing insured.

Both the equilibrium premium rate and the share of financing insured in each risk class are affected by the characteristics of borrowers and insurers in that risk class. For instance, if the distribution of perceived credit risk around the true degree of credit risk is the same across risk classes, then the equilibrium price of a guarantee will be higher in riskier credit classes. In this case, average interest cost savings increase with the degree of true credit risk, a result which implies that demand increases. At the same time, since the

⁴Two major credit rating agencies, Moody's and Standard & Poor's, assess the credit risk of various debt obligations and assign ratings based on these assessments. Municipal and corporate bonds, for instance, are rated from AAA ("extremely strong") to CC ("highly speculative"), with bonds rated BBB and above considered to be of "investment grade." The two agencies have slightly different symbols for their rating levels, but the investment grade categories are analogous:

S&P	Moody's	Credit Evaluation
AAA	Aaa	extremely strong
AA	Aa	very strong
A	A	strong
BBB	Baa	adequate

⁵*The Bond Buyer*, November 17, 1983.

⁶John W. Rindlaub, "Municipal Bond Insurance" in *Financial Guarantee Insurance* (Insurance Information Institute, New York, 1986), page 15.

expected loss per dollar of insured principal increases with the degree of credit risk, the supply of financial guarantees decreases as the credit class becomes riskier. Increasing demand and decreasing supply therefore imply an increase in the equilibrium price and an indeterminant change in the equilibrium quantity of financial guarantees as the true degree of credit risk increases. Similarly, when the costs of obtaining credit information increase, the equilibrium price of financial guarantee coverage increases and the equilibrium quantity declines.

The equilibrium quantity and price of financial guarantees are also affected by the level of interest rates. In fact, the effects of interest rates on the supply and demand for financial guarantees shape the cyclical nature of the financial guarantee market. Interest rates affect demand by altering the value of interest cost savings realized by borrowers and affect supply by altering the expected financial guarantee losses of insurers.

The demand curve for financial guarantees is influenced by the factors that determine the value of a credit upgrade. Within a risk class, the level of interest rates affects the position of the demand curve by changing the value of interest cost savings. The direction of the effect of a change in interest rates on the value of a

credit upgrade is not clear, however. On the one hand, there is an observed tendency for quality spreads to increase with the level of interest rates.⁷ The result of this correlation is that interest cost savings tend to rise when interest rates are high. This tendency is offset, however, by the fact that higher interest rates reduce the present value of the future stream of coupon payment reductions. That is, holding the quality spread fixed, an increase in interest rates reduces the present value of the periodic interest cost savings because the opportunity cost of money is greater.

An increase in interest rates thus has two opposing effects on the value of interest cost savings: coupon payment reductions increase but are discounted over time at a higher rate. The sign of the net change in the value of interest cost savings thus cannot be determined a priori. Instead, the direction of change depends upon the relative magnitude of the two interest rate effects. If the increase in quality spreads is large enough to offset the effects of discounting at a higher rate, then the value of a credit upgrade will increase when interest rates rise. If the reduction in coupon payments is not sufficiently large, then interest cost savings will decline.

Which of these two effects dominates is an empirical question. In fact, it is quite possible that an increase in interest rates will raise interest cost savings at some times and lower them at others. Chart 2 plots the average ten-year Treasury bond yield against the implied interest cost savings on a 20-year municipal bond resulting from an upgrade from a BBB rating to a AAA rating. Although the interest cost savings measure is considerably more volatile than the Treasury bond yield, the two variables trend together. Average interest cost savings and Treasury bond yields increased from 1978 to a peak during 1981 and 1982. The two measures declined from that peak through the first quarter of 1987, despite diverging during 1984. Although during some periods the interest cost savings measure and the Treasury bond yield move in opposite directions, the overall movement of the two series is positively correlated.⁸

If the value of interest cost savings rises with the level of interest rates, then the demand for financial guarantees will also increase with the level of interest rates. That is, if an increase in interest rates raises the value



⁷One explanation for this correlation is that when interest rates increase, credit becomes scarce and lower quality bonds become significantly less liquid than higher quality bonds. Investors therefore require a differentially higher yield on lower quality bonds when interest rates are high.

⁸The correlation coefficient of the monthly interest cost savings and Treasury bill yield series is .20 for the period January 1978 to March 1987.

of a credit upgrade, then more borrowers will be willing to purchase a financial guarantee at any given premium rate. If the volume of financing is fixed, then the demand curve for financial guarantees will shift to the right when interest rates rise and shift to the left when rates fall. This pattern suggests that demand for financial guarantees moves pro-cyclically with changes in interest rates.

The supply of financial guarantees is also affected by the interest rate cycle. Like other insurance liabilities, a financial guarantee is a future claim on the insurer. In return for this future claim, the insurer receives a premium payment at the time that the policy is written. When interest rates are high, the premium payment required to offset this liability falls because interest income accrues more rapidly over the life of the guarantee. To cover the same volume of future claims, then, the insurer is able to charge lower premiums when interest rates are high. The supply of financial guarantees thus increases when interest rates rise and decreases when interest rates fall.⁹

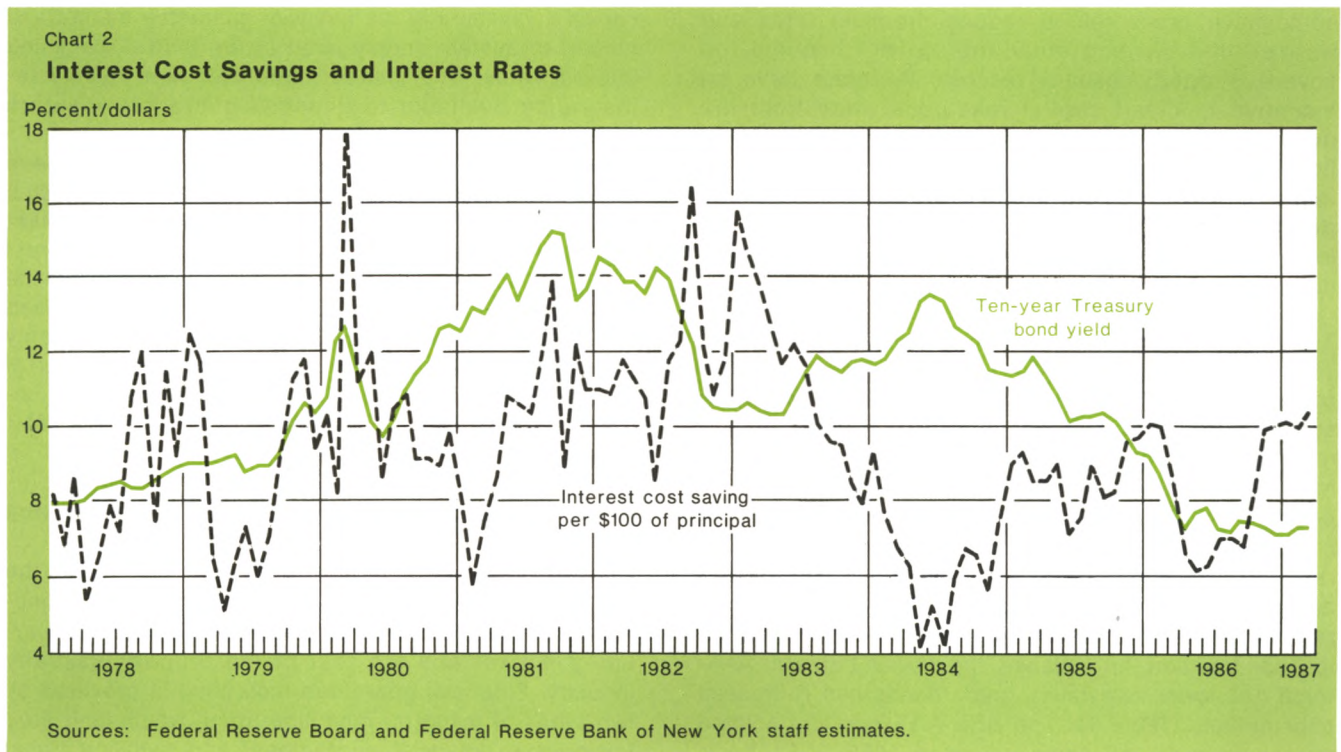
The effect of changing interest rates on supply may be even greater for financial guarantees than for other

insurance lines. Changes in the level of nominal interest rates are often due to changes in the expected rate of inflation. Most property/casualty lines insure against events such as auto accidents and malpractice findings. For this type of insurance, the dollar size of claims tends to rise and fall with the general price level, and insurers' loss reserve policies normally take this into account. For many types of financial guarantees, however, potential claims are fixed in nominal terms. Holding the probability of default fixed, financial guarantee insurers' expected losses do not move with expected inflation.¹⁰ A contraction in investment income is not offset by a corresponding reduction in loss liabilities when nominal interest rates fall. The cyclical effects of interest rates are not damped by inflation-induced changes in liabilities, causing the supply of financial guarantees to be more sensitive to nominal interest rate fluctuations than other types of property/casualty insurance.

This description of the supply and demand for financial guarantees suggests that the financial guarantee market moves cyclically with interest rates. When interest rates are high, both supply and demand

⁹See Robert T. McGee, "The Cycle in Property/Casualty Insurance," this *Quarterly Review* (August 1986) for a detailed discussion of the relationship between interest rates and the underwriting cycle.

¹⁰Of course, the movement of inflation is, in general, part of the cyclical behavior of the economy which may well affect default rates. Mortgage guarantee insurance, for instance, is susceptible to cyclical swings in default rates.



increase and the share of financing insured rises. When interest rates fall, on the other hand, both supply and demand contract and the equilibrium share of financing insured declines. The effect of interest rates on the price of financial guarantees is indeterminant, however, since changes in premium rates depend upon the relative size of movements in the supply and demand curves. This analysis suggests that the financial guarantee underwriting cycle is characterized by large swings in the equilibrium amount of insurance provided and by smaller adjustments in price. This combination implies that premium volume expands and contracts sharply over the underwriting cycle.

The cyclicity of the financial guarantee market is reinforced by its relationship with the rest of the property/casualty insurance industry. Many financial guarantee insurers are divisions or subsidiaries of larger property/casualty insurers. Like financial guarantee insurers, these property/casualty insurers realize higher investment income when interest rates are high and therefore reduce premiums during high interest rate periods. Since the demand for most types of property/casualty insurance is not affected by the level of interest rates, however, the premium cutting induced by an increase in interest rates undercuts property/casualty profitability. High interest rate environments tend to be profitable for financial guarantee insurers, however, since strong demand during these periods assures that competitive pressures to reduce premium rates and weaken underwriting standards do not become too severe. Property/casualty insurers therefore have an incentive to divert capital resources away from the overly competitive property/casualty market and into financial guarantees when interest rates are high. This inflow of capital augments the increase in financial guarantee supply that occurs when interest rates increase, reinforcing the interest rate driven cyclical nature of the market.

The financial guarantee market in the 1980s

This framework is useful for examining the experience of the financial guarantee market in the 1980s. In the early 1980s, both interest rates and quality spreads reached a cyclical peak, and financial guarantee premium volume began to increase rapidly (Table 3). This premium growth is consistent with the upswing of the financial guarantee underwriting cycle, as high interest rates and quality spreads caused both supply and demand to increase. Since 1982, however, both interest rates and quality spreads have declined. In the municipal bond market, for instance, the spread between AAA-rated and lower investment grade bonds has decreased substantially (Table 4). The BBB-AAA spread declined from a high of 160 basis points in 1982 to 81 basis

points in 1986. The yield on AAA-rated municipal bonds also fell, declining from a high of 10.88 percent in 1982 to 6.13 percent in the first quarter of 1987. Although quality spreads widened slightly at the beginning of 1987, this cyclical decrease in yields and spreads signals the downswing of the underwriting cycle.

The effect of these declining interest rates and quality spreads is evident in data from the municipal bond market. The total face value of municipal bonds backed by a financial guarantee fell from \$47 billion in 1985 to \$26 billion in 1986, a drop of 44 percent (Table 5). The share of municipal bonds insured dropped less sharply, however, since the volume of new municipal bonds issued declined from \$204 billion in 1985 to \$140 billion in 1986. In 1985, financial guarantees backed 23 percent of all new municipal bonds issued, as opposed to 19 percent in 1986. The share of insured bonds rose to 23.6 percent in the first quarter of 1987, although the volume of insured bonds is approximately the same as the 1986 volume at an annual rate.

Several factors aside from interest rates influenced this growth and subsequent contraction of the financial guarantee market during the 1980s. The increase in demand for credit enhancement services following the Washington Public Power Supply System (WPPSS) default led to the continued expansion of the financial guarantee market. The severity of the most recent property/casualty underwriting cycle also promoted capital investment in the financial guarantee market and helped to sustain supply even in the face of declining interest rates. The limited amount of high quality reinsurance available to financial guarantee insurers constrained this expansion, however.

In the most recent financial guarantee cycle, these idiosyncratic factors were dominant. When interest rates and quality spreads were rising, these noncyclical factors reinforced the upswing of the cycle. When interest rates and spreads fell, however, these factors offset the tendency for contraction in the market and sustained the growth of both supply and demand. It was only when interest rates leveled in 1986 that the influx of capital and the increase in demand for credit enhancement were less able to sustain growth in the market.

Relationship to the property/casualty insurance industry

One of the most important factors accounting for the sustained growth in premium volume through the mid-1980s was the relationship between the financial guarantee market and the rest of the property/casualty industry. Financial guarantee insurance is provided by two types of insurers: monoline firms, which limit their business to financial guarantees, and multiline firms,

which are involved in several different insurance lines. In a multiline firm, financial guarantees are one of many products which have a claim on the firms' capital and reserves.

The interest rate driven property/casualty insurance cycle has had a direct impact on the financial guarantee market. In the early 1980s, the property/casualty market experienced a sharp decline in underwriting profits as a result of competitive pressure to drop premium rates. This decline in profitability in traditional property/casualty lines provided incentive for insurers to divert capital to the increasingly profitable financial guarantee market in the early 1980s. Between 1981 and 1985, 14 new major insurers entered the financial guarantee market.¹¹ While some of the investors in these new entrants were from outside of the insurance industry, major multiline prop-

erty/casualty insurers such as Crum & Forster, Continental Insurance, Fireman's Fund, Traveler's Indemnity, and USF & G devoted capital and resources to writing financial guarantee insurance.

The initial influence of the property/casualty underwriting cycle on the financial guarantee market was thus to expand the amount of capital available to underwrite financial guarantees. This substantial capital influx caused a large increase in the supply of financial guarantees in the early 1980s.

In the mid-1980s, the influx of capital from multiline insurers began to slow. Commercial property/casualty lines experienced losses that forced some multiline insurers to allocate strained capital resources away from financial guarantees. An example of this is Industrial Indemnity Financial Corporation, a corporate debt insurer, which was closed early in 1986 by its parent organization, Crum & Forster, when that unit decided to allocate its capital to other insurance lines.¹² Along similar lines, USF & G, a multiline municipal bond insurer, had its rating of insured bonds dropped from AAA to AA because it suffered losses in the casualty business.¹³ The drop in rating reduced USF & G's ability to write municipal bond guarantees even though it had experienced no significant losses in this line.

This outflow of capital from multiline insurers was offset to a large degree by the formation of several monoline financial guarantee insurers in 1985 and 1986. These new monoline insurers include at least one AAA-rated municipal bond insurer (Capital Guarantee Investment Corporation) and two corporate financial guarantee insurers (Financial Security Assurance and Dryden Guaranty Trust). Although the municipal bond insurer, CGIC, is a reorganization of USF & G's previous financial guarantee subsidiary, much of the remaining investment in monoline insurers represents new capital in the market. This continued investment in the municipal bond and corporate financial guarantee sectors offset the withdrawal of multiline insurers from the business and did much to sustain supply through 1986.

Reinsurance

Although investment in primary capital has been maintained in at least the major financial guarantee product markets, these markets have been somewhat constrained by a shortage of high-quality reinsurance capital. As in other lines of insurance, reinsurance in the financial guarantee market spreads the risk of any particular guarantee among several insurers. The issuer of a financial guarantee (the ceding company) may transfer

¹¹Rindlaub, *op. cit.* page 12.

Table 4

Interest Rates and Quality Spreads Municipal Bonds

	Ten-Year Treasury Bond Yield	AAA Municipal Bond Yield	Quality Spreads		
			AA-AAA	A-AAA	BBB-AAA
1980	11.46	7.85	.22	.60	1.16
1981	13.91	10.42	.46	.89	1.33
1982	13.00	10.88	.43	.97	1.60
1983	11.10	8.80	.40	.84	1.37
1984	12.44	9.61	.27	.55	.77
1985	10.62	8.60	.33	.59	.99
1986	7.68	6.95	.21	.48	.81
1987-1	7.19	6.13	.15	.60	.97

Source: Moody's Investors Service,
Municipal and Government Manual

Table 5

Municipal Bond Insurance

	New Long-Term Issues (Billions of Dollars)	Insured Issues (Billions of Dollars)	Percent Insured
	1980	47.1	
1981	46.1	2.9	6.5
1982	77.2	7.6	9.8
1983	83.3	12.1	14.5
1984	101.9	20.9	20.5
1985	204.0	46.9	23.0
1986	140.0	26.2	19.0
1987-1	28.2	6.6	23.6

Source: New Issues: *Credit Markets*
Insured Issues: Financial Security Assurance, Inc.
Comments before the S.E.C.
(March 16, 1987)

¹²*American Banker*, January 22, 1986.

¹³John W. Milligan, "A One-Man Assault on the Municipal Guarantee Business," *Institutional Investor*, June 1986, page 242.

some part of the liabilities of that guarantee to another insurer (the reinsurer). This reinsurer may be a monoline insurer that writes only reinsurance or a financial guarantee insurer that writes both primary financial guarantees and reinsurance on financial guarantees. In any case, the ceding company pays the reinsurer a premium for the reinsurance policy. The reinsurance premium is in general a proportion of the premium received for the financial guarantee by the ceding company minus commission expenses.¹⁴

The demand for financial guarantee reinsurance has strained the capacity of the relatively few high quality reinsurers. The limited number of reinsurers has been further curtailed in reinsuring financial guarantees by losses in property/casualty lines which have reduced overall capacity. This contraction of capacity has been offset to some degree by the entry of two monoline municipal bond reinsurers, U.S. Capital Reinsurance Company and Enhance Reinsurance Company. Both insurers have approximately \$100 million in capital. Enhance is rated AAA by Standard & Poor's.

The exact extent of reinsurance in the financial guarantee market is difficult to measure. A rough measure of the amount of reinsurance of all surety bonds is contained in Table 6. Direct written premiums include all premiums received by an insurer for financial guarantee business and for any reinsurance assumed from other insurers. Net written premiums equal these direct premiums minus any reinsurance ceded to other insurers. The difference between direct and net premiums is thus net reinsurance premiums: the premiums paid for reinsurance ceded minus the premiums received for reinsurance assumed. Net reinsurance premiums measure the amount of reinsurance assumed by reinsurers who are not primarily financial guarantee insurers. As a fraction of direct premiums, reinsurance reached a peak of 19.4 percent in 1984 before falling off to just 8.4 percent in 1985. Because only data on net premiums are available, it is impossible to tell whether this decline is a result of an absolute reduction of reinsurance activity or whether it reflects a shift in the placement of reinsurance away from monoline reinsurers and towards other financial guarantee insurers. Given the acknowledged strain on reinsurance capacity, however, some real reduction in reinsurance activity is probably indicated by these data. Such a reduction implies a further constraint on the supply of financial guarantees.

Demand for credit enhancement

The final factor responsible for the growth of the finan-

cial guarantee market was an increase in the general demand for credit enhancement services. This increase in demand was largely a result of the 1983 WPPSS default. In 1983, WPPSS defaulted on \$2.25 billion in municipal revenue bonds issued to fund construction of two nuclear power plants. Over 78,000 bondholders were affected by the default, which received wide publicity. One of the outcomes of the WPPSS default was an increased investor concern about credit risk and a shift in preferences towards high-quality debt. The demand for credit enhancement services increased as part of this preference shift. The financial guarantee market was particularly affected since a portion of the WPPSS bonds was insured by the American Municipal Bond Assurance Corporation (AMBAC). AMBAC assumed responsibility for interest and principal payments on the \$23.6 million of WPPSS bonds it had insured. The WPPSS default and AMBAC's response brought about an increase in demand for credit enhancement, which helped to sustain demand for financial guarantees even as quality spreads narrowed.

The increase in the demand for credit enhancement services was also a result of innovations in securities markets which increased the importance of structured financings and asset securitization. The structure of these securities is more complicated than traditional debt financings. For this reason, obtaining credit information and making an assessment of the default risk of these securities is often difficult. The credit analysis associated with a credit-enhanced security, however, reduces to obtaining information about the credit enhancer and the nature of the guarantee rather than analyzing the entire structure of the underlying security.

Table 6

Reinsurance Of Surety (in thousands of dollars)

	Direct Premiums Written	Net Premiums Written	Reinsurance Premiums Ceded - Reinsurance Premiums Assumed	Percent Of DPW
1981	1,112,925	970,498	142,427	12.8
1982	1,247,829	1,094,117	153,712	12.3
1983	1,512,741	1,272,198	240,543	15.9
1984	1,941,130	1,564,934	376,196	19.4
1985	2,473,103	2,264,435	208,668	8.4

Note: Premium data include all business done by companies based in the United States

Direct Written Premiums = financial guarantee premiums + reinsurance assumed premiums

Net Written Premiums = Direct Written Premiums - reinsurance ceded premiums

Source: A.M. Best's Executive Data Services

¹⁴Michael R. Pinter, "The Reinsurance of Financial Guarantee Insurance" in *Financial Guarantee Insurance* (Insurance Information Institute, New York, 1986), pages 54-56.

Because of this simplified information requirement, credit enhancement enables borrowers to have greater access to public debt markets. In fact, many of these financings would not be feasible were it not for the ability of a credit enhancer to provide concise credit information to the market. The use of financial guarantees in these relatively complicated structured financings has greatly increased demand in the corporate financial guarantee sector.

Competition from commercial banks

Financial guarantee insurers' primary competitors in the market for credit enhancement services are commercial banks. Commercial banks compete with financial guarantee insurers in the credit enhancement market through Standby Letters of Credit (SLCs). A credit-enhancing SLC is similar to a financial guarantee in that the bank agrees to provide funds for interest and principal payments on a backed security in the event that the security issuer defaults. SLCs differ from financial guarantees in that they have a fixed expiration date that does not necessarily correspond to the maturity of the backed security. Although commercial bank SLCs are issued to cover a variety of bank customer activities, they are used in the credit enhancement market primarily to back commercial paper and tax-exempt industrial revenue bonds.

The overall use of SLCs has grown rapidly in the 1980s. Total outstanding SLCs were approximately \$250 billion at the end of 1986, up from just \$50 billion in 1980. Both domestic and foreign commercial banks participate in this market. In 1986, \$453 million (5 percent) of tax-exempt housing bonds issued were backed by SLCs, predominantly from domestic banks. Approximately 14 percent of tax-exempt hospital bonds were backed by SLCs, nearly three-quarters of which were issued by foreign banks. Foreign bank SLCs also dominated the market for enhancement of pollution control

bonds. Japanese and Swiss banks are particularly active in this area.¹⁵

As with financial guarantees, securities backed by SLCs receive a credit rating based upon the issuing bank's credit rating. Since very few domestic banks receive a AAA rating, SLCs from most domestic banks are at a competitive disadvantage to the relatively large number of AAA-rated financial guarantee insurers. This disadvantage is particularly acute in the municipal bond enhancement market. Domestic bank letters of credit accounted for only 10.7 percent of credit enhancement in the municipal bond market in 1986, down from 32.7 percent in 1984 (Table 7). On the other hand, commercial bank SLCs have a competitive advantage in the corporate credit enhancement market. Corporate securities backed by SLCs from domestic banks and the domestic branches of foreign banks are exempt from SEC registration requirements. Similar securities backed by financial guarantees do not qualify for this exemption. Financial guarantee insurers claim that this disparity places them at a competitive disadvantage in the corporate market and are petitioning the SEC to extend the registration exemption to securities backed by AAA-rated financial guarantees. This situation does not affect enhancement of municipal bonds since all municipal bonds are exempt from registration requirements.

There is at least one important respect in which financial guarantees and SLCs are complementary products. In many instances, insurers will require as part of the financial guarantee contract that security issuers obtain an SLC to absorb some part of the credit risk. In these cases, the bank issuing the SLC assumes the risk that the issuer will default, and the financial guarantee in turn stands behind the bank and thus serves mainly to give the guaranteed security a AAA rating. This structured credit enhancement is particularly prevalent in the corporate financial guarantee market, although it also occurs with municipal bond insurance.

Commercial banks are also involved in the financial guarantee market through equity investments in financial guarantee insurers. Citibank, Bankers Trust and J.P. Morgan have each become major investors in AAA-rated municipal bond insurers (AMBAC, BIG and FGIC, respectively). This investment gives these banks a share of the credit enhancement market for municipal bonds, in which most domestic commercial banks are at a competitive disadvantage.

Segmentation in the financial guarantee market

The financial guarantee market is segmented both by product and by type of insurer. Financial guarantee insurers fall into one of two groups. The first group

Table 7

Credit Enhancement in the Municipal Bond Market

	Face Value of Bonds Insured					
	1984		1985		1986	
	Millions of		Millions of		Millions of	
	Dollars	Percent	Dollars	Percent	Dollars	Percent
Domestic Banks	11,418	32.7	12,113	14.9	4,637	10.7
Foreign Banks	6,959	19.9	25,043	30.9	10,530	24.3
Insurers	16,551	47.4	43,979	54.2	28,125	65.0
Total	34,928		81,135		43,292	

Source: Financial Security Assurance, Inc. Comments before the Security & Exchange Commission, March 16, 1987

¹⁵Credit Markets, February 23, 1987; March 9, 1987; March 16, 1987.

includes major insurers such as the American Municipal Bond Insurance Corporation (AMBAC), the Municipal Bond Investor's Assurance Corporation (MBIA) and Financial Security Assurance Inc. (FSA) that have received a AAA claims paying ability rating from Standard & Poor's and/or Moody's. The second tier of the market is composed of various small non-AAA-rated insurers. The major insurers are recognized by state regulators and their actions are closely monitored by the rating agencies. Some of these firms are monoline insurers that are large participants in mature product lines such as municipal bond insurance (AMBAC, Bond Investors Guarantee Insurance, Financial Guarantee Insurance Company) and corporate financial guarantees (FSA). Others are large multiline property/casualty firms that have entered these mature markets or are innovating new financial guarantee products (Prudential, Continental, and until 1987, MBIA).

Firms in the second tier market, on the other hand, are not rated by the two major credit rating agencies, although they often receive a rating from the insurance rating firm, A. M. Best Company. These insurers are for the most part smaller multiline insurers that underwrite a variety of products in addition to financial guarantees. As such, their financial guarantee activity is not always discernible in financial statements and in reports to regulators and professional associations. Financial guarantees are most commonly included as part of surety business and occasionally reported in categories such as miscellaneous casualty.

The end result of this reporting procedure is that the activities of the second tier market are difficult to quantify. Participants in this segment of the market are often not known to regulators and professional associations until they are involved in some sort of default or failure. Since these firms are not rated by Moody's and Standard & Poor's, they for the most part do not perform the same type of credit enhancement offered by the major insurers. Instead, these smaller insurers write products such as mortgage-backed bond guarantees, limited partnership insurance and smaller corporate credit underwriting for small borrowers and businesses.

Municipal bond insurance market

The financial guarantee market is also segmented by type of product. One of the best understood financial guarantee products is municipal bond insurance. The first monoline municipal bond insurance company, AMBAC, opened in 1971 and was joined in 1974 by MBIA. Until the early 1980s, these two firms were the primary providers of municipal bond insurance. In the early 1980s, however, both the number of insurers writing municipal bond guarantees and the percent of

municipal bonds insured grew significantly. In 1985, nine major AAA-rated firms were engaged in writing municipal bond guarantees for an estimated 23 percent of the \$204 billion of new municipal bond issues, up from 3 percent in 1980 and 9.8 percent in 1982. In 1986, however, that percentage fell to 19 percent of the \$140 billion of new issues (Table 5). According to the Surety Association of America, municipal bond insurance generated \$150 million in premiums in 1984 and \$124 million in 1985, as opposed to only \$13 million in 1980 (Table 2). The total value of insured municipal bonds outstanding was estimated to be \$250 billion at the end of 1986, up from \$28 billion in 1975.

The major municipal bond insurers limit their coverage to bonds which are of investment grade on their own merit. For bonds at the lower end of the investment grade classification, insurers may require additional credit security. For instance, the issuing municipality might be required to create a reserve fund equal to one year's interest payments on the bond. Such a fund both reduces the insurer's loss exposure and provides a grace period for the issuer and insurer to restructure in the event of a default. In other cases, the issuing municipality might purchase a bank standby letter of credit to absorb all or part of the primary credit risk. In some instances, the letter of credit is used to raise the bond to investment grade and make it eligible to receive a financial guarantee.

The first major firm to offer financial guarantee insurance was AMBAC. Founded in 1971, AMBAC is now owned primarily by Citibank and an association of AMBAC employees. AMBAC insures a wide range of municipal bonds and related securities, including general obligation and revenue bonds, industrial revenue bonds, individual bond portfolios, municipal bond portfolios, unit investment trusts and hospital bonds. AMBAC is a monoline insurer with capital of \$245 million.¹⁶ AMBAC insures only investment grade securities and all issues insured by AMBAC receive a AAA rating from Standard & Poor's.

The second major municipal bond insurer is MBIA. MBIA was founded in 1974 as an association of multiline property/casualty insurers, but in January 1987 became an independent monoline firm with \$420 million in capital. MBIA's four investors are: Aetna Casualty and Surety (48 percent); Fireman's Fund Insurance (25 percent); CIGNA (17 percent); and Continental Insurance (10 percent). All issues insured by MBIA receive a AAA rating from both Moody's and Standard & Poor's.

Two other municipal bond insurers also receive AAA ratings from both Moody's and Standard & Poor's. Financial Guarantee Insurance Company (FGIC) was

¹⁶*Credit Markets*, January 8, 1987.

founded in 1983 with capital from five investors: Shearson Lehman/American Express, Merrill Lynch, General Electric Credit Corporation, Kemper Corporation and General Reinsurance Corporation. FGIC is a monoline insurer with \$334 million in capital.¹⁷ The founder of FGIC, Gerald Friedman, was also a founder of AMBAC.

The Bond Investor's Guarantee Insurance (BIG) company is the third firm to receive the "double triple" rating. Founded in 1984, BIG is owned by American International Group, Inc., Bankers Trust New York Corp., Government Employees Insurance Co., Salomon Inc., and Xerox Credit Corp. BIG is a monoline insurer with capital resources of \$124 million.¹⁸

Participation in this market by other major, AAA-rated firms has been marginal. In October 1986, however, a fifth monoline municipal bond insurer, Capital Guaranty Insurance Corporation, began operations in San Francisco. CGIC is an offshoot of USF & G and will assume the municipal bond guarantee business performed by USF & G's financial guarantee subsidiary. CGIC has an initial capitalization of \$100 million from six investors, including Constellation Investments, Fleet Financial Group, Norstar Bancorp, Safeco Corporation, Sibag Financial and USF & G.

Together AMBAC, MBIA, FGIC and BIG accounted for over 95 percent of municipal bond insurance written in 1985 and 1986 (Table 8). The share of insured volume written by these firms in the first quarter of 1987 appears to have remained at this level. However, 1985 may have been a peak year for this line of business.

¹⁷Credit Markets, December 8, 1986.

¹⁸Credit Marklets, September 8, 1986.

The volume of new municipal bonds issued reached only \$140 billion in 1986, and the dollar volume of insured issues fell to \$26.2 billion from \$46.9 billion in 1985. It appears that dollar volume remained at this lower level in the first quarter of 1987, with new insured volume running at a \$26.6 billion annual rate.

This decline in the volume of municipal bond issues insured can be attributed in part to a weakening of demand for municipal bond guarantees. The spreads between AAA-rated and lower investment grade municipal bonds fell by approximately 20 percent from 1985 and 50 percent from 1982 (Table 4), reducing the value of a credit upgrade and undercutting the demand for municipal bond insurance. In addition, changes in the federal tax code that repeal tax exempt status for some categories of revenue bonds and place a cap on total tax exempt issues for private activity bonds are likely to reduce total demand for guarantees by reducing demand from this sector of the municipal bond market.

Municipal bond insurers are developing new products to compensate for the decline in demand for traditional municipal bond insurance. Several insurers are enlarging their activities in the taxable municipal bond market. Others are developing new applications for already existing financial guarantee products. For instance, AMBAC has recently begun to market a form of municipal liability insurance in conjunction with the insurance broker Alexander and Alexander. The product consists of a renewable line of credit issued by a local bank and insured by AMBAC. In the event that a liability claim forces the municipality to draw on the line of credit, AMBAC guarantees that the loan will be repaid. The line of credit may be from \$2 million to \$50 million.¹⁹ Similarly, BIG has developed a program in which an insured letter of credit is substituted for the debt service reserve fund for municipal bonds insured by BIG. The substitution enables bond issuers to avoid the costs associated with the new tax law's arbitrage restrictions on reserve fund income.

The loss record for municipal bond insurers remained quite good through 1986 (Table 9). Since the market developed in the early 1970s, the only major loss suffered by these insurers has been the 1983 WPPSS default. AMBAC had insured \$23.6 million of the \$2.25 billion defaulted WPPSS bonds and is responsible for interest and principal payments on the bonds as long as they are in default. In addition, in September of 1986, AMBAC was forced to make interest payments on three Chattanooga, Tennessee industrial development bonds when the developer who had received the funds from the bonds defaulted on the September 1 payments. The face value of the bonds is \$55 million, but the total

¹⁹American Banker, January 2, 1987.

Table 8

Major Municipal Bond Insurers

	Share Of Total Insured Municipal Bonds (Percent)			Net Premiums Written (Millions of Dollars)	
	1985	1986	1987-I	1984	1985
MBIA*	31.5	35.9	37.6	141.3	167.9
FGIC	28.1	28.5	25.1	45.2	168.4
AMBAC†	28.3	24.5	12.2	N/A§	134.1
BIG‡	5.9	8.3	24.4	N/A	60.9

*Premium data for MBIA are for year ending November 30.

†Premium data for AMBAC are for following year ending June 30.

‡BIG's first year of operation was 1985.

§Not Available

Source: Premium data: Business Insurance
October 20, 1986.

Distribution data: Securities Data Company, Inc.

extent of AMBAC's liability in this case is not yet clear.²⁰

Corporate financial guarantee market

In contrast to the fairly uniform municipal bond insurance market, the corporate financial guarantee market is complex and diverse. The number of types of securities and transactions for which financial guarantees are written is large: commercial paper, limited partnerships, leases, receivables, mortgage-backed securities, consumer receivable backed securities and bank loans are examples of the type of corporate instruments secured by financial guarantees. Most corporate guarantees are heavily collateralized so that insurers have recourse to the assets underlying the debt in the event of default.

To date, there are relatively few monoline insurers of corporate obligations, although a number of the major AAA-rated multiline insurers write these sorts of guarantees. The degree of participation in the corporate market by non-AAA-rated insurers is uncertain, but the rapid rate of product innovation and premium growth in this market suggests that these smaller insurers are active in at least some product lines.

The dominant monoline participant in the corporate financial guarantee market is Financial Security Assur-

ance, Inc. (FSA). Founded in 1985 with \$188 million in capital invested by Ford Motor Credit, The Equitable, John Hancock, Transamerica and New England Mutual Life, FSA was the first monoline insurer of corporate debt.²¹ FSA currently has 25 foreign and domestic investors and receives a AAA rating from both Moody's and Standard & Poor's, as well as from Nippon Investors Service, a Japanese credit rating agency.

FSA's primary products are guarantees on structured financings and securitized debt. Approximately 75 percent of FSA's guarantees are written for asset-based transactions such as commercial mortgage-backed securities and bank-backed obligations. FSA also specializes in guarantees of receivable-backed transactions such as credit card-backed debt and auto loan-backed debt.

Although FSA is the primary monoline AAA-rated insurer in the corporate guarantee market, several major multiline companies also write corporate financial insurance. Prudential, GEICO, Continental, AIG and CNA, among others, have units which have specialized in various segments of the corporate market. Financial Insurance Risk Management (FIRM), a subsidiary of GEICO, insures smaller, privately-placed transactions such as residual value insurance for lease contracts. FIRM also assumes some reinsurance from FSA. Continental Guaranty and Credit Corporation, a subsidiary of Continental Insurance, also insures small corporate transactions. In general, Continental Guaranty insures transactions of less than \$10 million, raising unrated corporate securities to investment grade. Continental guarantees assets such as industrial development bonds, corporate debt, municipal leases and educational loans.

Unlike many corporate financial guarantee units, Dryden Guaranty Trust is a monoline subsidiary of Prudential. Dryden, which was formed in 1986, is in the process of applying for an independent credit rating. This monoline structure is designed both to protect Dryden from any change in Prudential's rating and to protect Prudential against any large losses suffered by Dryden. Dryden's primary product will be guarantees on commercial bank portfolios of unrated corporate debt. With such guarantees, banks will be able to market pools of these loans, much as mortgage guarantees permit mortgages to be pooled and securitized.

According to the SAA, the volume of direct premiums written for corporate financial guarantees was nearly \$98 million in 1985 (Table 2). Losses in this line were

²⁰Credit Markets, September 15, 1986.

Table 9

Loss Rates By Financial Guarantee Product (in thousands of dollars)

	Direct Premiums Earned	Direct Losses Incurred	Loss Ratio (percent)
Municipal Bond Guarantees			
1980	5,342	1,205	22.6
1981	10,150	-15	-1
1982	21,009	636	3.0
1983	38,727	38,712	100.0
1984	55,626	5,938	10.7
1985	60,149	-13,054	-21.7
Commercial Investment & Loan Guarantees, Corporate Debt Credit Enhanced			
1984	165	0	0.0
1985	6,351	10,002	157.0
All Other Commercial Investment & Loan Guarantees			
1984	853	0	0.0
1985	6,669	11,876	178.1
All Other Financial Guarantees			
1980	11,978	983	8.2
1981	13,367	6,781	50.7
1982	17,187	10,935	63.6
1983	33,620	5,842	17.4
1984	70,006	18,632	26.6
1985	96,405	175,492	182.0

Source: Surety Association Of America

²¹Peter E. Hoey and Theodore V. Buerger, "Financial Guarantee Insurance," *Trusts and Estates* (Insurance Information Institute, New York, 1985).

severe in 1985, however (Table 9). The loss ratio (direct losses incurred as a percent of direct premiums earned) for commercial investment plus loan guarantees and corporate debt credit enhancement was 157.0 in 1985. For "all other" commercial investment, losses were even higher, representing 178 percent of premiums earned. This record is unlikely to have improved, as defaults of limited partnerships—categorized under "all other" commercial investment — have increased as a result of the fall in oil prices and changes in the tax code.

The changes in the tax code which eliminate the tax benefits of certain limited partnerships will sharply decrease demand for this type of insurance in the future. The Tax Reform Act of 1986 stipulates that only income from passive activities such as limited partnership investments in real estate and oil and gas drilling may be offset by losses from passive activities. Since many of these partnerships purchased guarantees on the bank loans that they assumed to fund investment, the elimination of most of the tax shelter benefits of these limited partnerships significantly reduces financial guarantee demand in this area. On the other hand, investor and borrower awareness of the value of financial guarantees in corporate transactions is certainly on the rise. Unlike the municipal bond insurance market, the corporate financial guarantee market continues to be supported by noncyclical factors which offset declining interest rates and quality spreads. The demand for corporate financial guarantees resulting from innovations in securitization and structured financings in both domestic and foreign capital markets is likely to sustain growth in this market even in the current low interest rate environment.

Regulation

One of the most important issues facing the financial guarantee market today is regulation. The primary concern of state insurance regulators in reference to financial guarantees is the integrity of the insurance guaranty funds. Guaranty funds have been established in every state in order to meet the obligations of insolvent property/casualty insurers. Although procedures vary from state to state, the basic structure is that solvent insurers in a state contribute to the fund on a proportional basis after a failure has occurred. Both regulators and insurers are therefore concerned about the effects that a large financial guarantee claim would have on a given guaranty fund. The total amount raised by guaranty funds in all 50 states between 1969 and 1984 was \$528 million.²² AMBAC's losses on the WPPSS bonds were \$25.5 million in 1983 alone, nearly

5 percent of this total.²³ The magnitude of losses such as this has led to almost universal agreement among insurance regulators that the direct claims of financial guarantee policyholders should not be met from the state guarantee funds.

Instead, the regulators' concern is about the systemic effects of insolvencies due to financial guarantees. Under present regulations, property/casualty policyholders from insolvent multiline insurers have access to state guaranty funds regardless of the reason for the insurer's insolvency. A multiline firm that fails because of losses from financial guarantees would still represent a drain on guaranty fund resources even if financial guarantee policyholders had no access to the fund. It is this sort of resource drain that state agencies wish to prevent through regulation.

The most direct approach to attaining this goal has been proposed by the National Association of Insurance Commissioners (NAIC). The NAIC proposal is that financial guarantees be written only by monoline insurers. Proponents of this view argue that if the financial guarantee market is limited to monoline insurers, both the state guaranty funds and other property/casualty policyholders will be protected from the effects of large financial guarantee claims. In addition, the monoline structure permits direct monitoring of capital and reserve adequacy by regulators since all of the insurer's resources are devoted to financial guarantees.

Because the NAIC proposal imposes minimum capital requirements in addition to a monoline structure, it would effectively restrict the financial guarantee market to large insurers. New York State Superintendent of Insurance James Corcoran supports NAIC model legislation being considered by the New York State Assembly which would require that all new monoline financial guarantee insurers have at least \$50 million in startup capital and surplus.²⁴

Other regulators and industry participants dispute the need to limit the market to monoline insurers. Proponents of this view argue that the monoline restriction is unnecessary and disruptive. They contend that the requirement to dedicate capital for financial guarantees would serve to reduce capacity in other property/casualty lines since a large amount of capital would have to be diverted in order to form monoline subsidiaries. Finally, opponents of the NAIC proposal argue that requiring financial guarantees to be written by monoline firms would eliminate the benefits of diversification.²⁵

²³W. James Lopp, Financial Security Assurance, Inc. Comments before the Securities and Exchange Commission on March 16, 1987.

²⁴New York State Assembly Bill No. 11347.

²⁵*American Insurance Association Statement of Position on Regulation of Financial Guarantee Insurance* (September 30, 1986), page 9.

²²1985-86 *Property/Casualty Fact Book* (Insurance Information Institute, New York, 1985), page 41.

Instead, the American Insurance Association and others contend that risk limitations and capital and reserve requirements are sufficient to prevent insolvencies and protect the guaranty funds. Such requirements are also a prominent feature of the NAIC model legislation. In essence, these regulations limit the exposure that insurers may assume from any one source and impose mandatory contributions to contingency reserve funds based on the type of security insured. In general, municipal bonds have the lowest reserve contribution requirements and unrated corporate securities have the highest.²⁶ In New York State, municipal bond insurers are already subject to reserve requirements which stipulate that one-half of earned premiums be reserved to cover losses. The legislation adopted by New York State is likely to become the standard for legislation elsewhere in the United States.

In terms of understanding and monitoring the financial guarantee market, the most important contribution of whatever legislation is adopted will be establishing a legal definition of financial guarantees. By defining which transactions constitute a financial guarantee and by requiring these transactions to be reported, the proposed regulations will serve to uncover the activities of the second tier financial guarantee market. The lasting effects of the legislation, however, will depend upon the ability of regulators and legislators to keep pace with the rate of product innovation by insurers and the investment community.

Outlook

The future of the financial guarantee market will be shaped by this regulation as well as by other factors involving both cyclical and noncyclical influences. In the near term, the market is facing the downswing of the underwriting cycle, as interest rates and quality spreads have reached their lowest levels of the 1980s. The combination of low interest rate levels and narrow quality spreads means that the demand for financial guarantees has fallen just at the point that insurers face pressure to raise premiums to offset lower investment income. At current interest rate levels, then, the financial guarantee market is facing a period of contraction, with insurers caught between the need to raise premiums in order to be able to meet future liabilities and competitive pressures to accept lower premiums in order to

generate new underwriting business.

The question that arises is whether insurers will be adequately compensated for the risk that they assume in writing financial guarantees in this low interest rate environment. This is the first time that the fully-developed financial guarantee market has experienced the downswing of the underwriting cycle. Competitive pressures in the market are likely to be more severe than in previous cyclical contractions because of the large number of insurers that entered the market during the underwriting cycle's expansion in the first half of the 1980s. The large number of insurers competing for the relatively small amount of financial guarantee business could place pressure on insurers to lower underwriting standards. With narrow quality spreads, only less creditworthy borrowers will realize significant interest cost savings through the purchase of a financial guarantee. The pool of "insurable" securities will therefore be composed of a larger percentage of these borrowers, and insurers will face pressure to guarantee these securities in order to sustain premium income. These pressures will be most severe for the most recent entrants in the market since these insurers have a smaller volume of outstanding business and therefore smaller unearned premium reserves.²⁷

It remains to be seen whether underwriting standards will be maintained as the financial guarantee cycle runs its course. Loss ratios for some types of corporate guarantees are already quite high and a number of small insurers have failed as a result of their financial guarantees activities. This suggests that at least some financial guarantee insurers are vulnerable to a downturn in the underwriting cycle. Future losses in the market will be determined by the degree to which competition for underwriting business during this downturn affects the credit decisions made by financial guarantee underwriters.

²⁷Although financial guarantee premiums are most generally paid in a lump sum at the time that the security is issued, they are "earned" in an accounting sense over the lifetime of the guarantee. For instance, a \$1 million premium on a ten-year bond guarantee might be "earned" by the insurer in ten annual installments of \$100,000. The remainder of the "unearned premium" is placed in a reserve fund. Insurers with a large volume of outstanding insured securities would thus be likely to have large unearned premium reserves and therefore a source of accounting income that could sustain them through a period of reduced current underwriting.

²⁶New York State Assembly bills Nos. 11347, 11348, 11349, (May 28, 1986).

Beverly Hirtle

Appendix: A Model of the Financial Guarantee Market

This appendix develops in detail the model of the financial guarantee market discussed in the text. The model stresses the importance of interest rates in determining the level of financial guarantee activity and emphasizes the role of information about credit risk in creating a market for financial guarantees. Comparative static results derived from the model are used to describe the cyclical nature of the financial guarantee underwriting cycle. Finally, the relationship between credit risk and the share of financing insured by financial guarantees is explored.

Demand

To begin, it is assumed that there are N risky borrowers, each of whom wishes to borrow B dollars. Each bond issuer belongs to one of K risk classes, where a risk class is defined by the default probability of the borrowers in that class. In other words, each bond issuer in a given risk class k has default probability p_k . There are N_k bond issuers in each class, where

$$\sum_k N_k = N$$

Each bond issuer knows his own risk class and "true" default probability, p_k , but the capital market does not know the borrower's true credit risk. Instead, the market receives a noisy signal of the default probability of each bond issuer, $p_n = p_k + \mu_{kn}$, where the index n designates a specific borrower. μ_{kn} may vary by risk class and is distributed over the interval $[-p_k, 1-p_k]$ with continuous distribution function $g(\mu_{kn}, p_k)$. The limits of the distribution are determined by the fact that the market's perceived default probability, p_n , is limited to the range $[0, 1]$.

The demand for financial guarantees is derived from the interest cost savings that the guarantee provides to the bond issuer. The model assumes that with a guarantee, the bond issuer can borrow at the risk free rate, r . Without the guarantee, however, the bond issuer can borrow at rate \bar{r}_n , where $\bar{r}_n = r + qs_n$. qs_n , the "quality spread", is assumed to be a function of the level of interest rates as represented by the risk free rate, r , and the market's perception of the borrower's credit risk, p_n . The quality spread is assumed to increase with the perceived level of credit risk ($\delta qs_n / \delta p_n > 0$) and with the level of interest rates ($\delta qs_n / \delta r > 0$). This second assumption reflects liquidity effects. When interest rates rise, credit becomes scarce and lower quality bonds become significantly less liquid than riskless debt. Investors therefore require a differentially higher yield on risky debt when interest rates rise.

This quality spread qs_n represents the reduction in the bond issuer's cost of funds when he purchases a finan-

cial guarantee. To calculate an explicit expression for the total financing savings resulting from a guarantee, the following assumptions about the structure and characteristics of bonds and the capital market are made. First, the structure of all bonds in the market is assumed to be identical, with bonds having principal B , a fixed coupon rate c_n and maturity T . The yield curve is assumed to be flat and all bonds are assumed to be structured so that they sell at par. These last assumptions imply that the coupon rate on each bond, c_n , is set to be equal to \bar{r}_n if the bond is uninsured and r if the bond is insured. Under these assumptions, the reduction in coupon payments when a guarantee is purchased is

$$\bar{r}_n B - rB = qs_n B$$

This result can be used to calculate the total value of a guarantee to a bond issuer. This value, V_n , is the present value of all future interest cost savings:

$$V_n = \sum_{t=1}^T \frac{qs_n}{(1+\bar{r}_n)^t} = \frac{qs_n}{r+qs_n} [1 - (1+r+qs_n)^{-T}]$$

where, without loss of generality, B is set equal to 1. The uninsured borrowing rate $\bar{r}_n = r + qs_n$ is used to discount the flow of interest cost savings because this rate represents the borrower's opportunity cost of funds. Taking derivatives,

$$\begin{aligned} \frac{\delta V_n}{\delta qs_n} &= \frac{qs_n}{r+qs_n} [T(1+r+qs_n)^{-(T+1)}] \\ &+ \frac{r}{(r+qs_n)^2} [1 - (1+r+qs_n)^{-T}] > 0 \\ \frac{\delta V_n}{\delta r} &= \frac{qs_n}{r+qs_n} [T(1+r+qs_n)^{-(T+1)}] [1 + \frac{\delta qs_n}{\delta r}] \\ &+ \frac{r(\delta qs_n / \delta r) - qs_n}{(r+qs_n)^2} [1 - (1+r+qs_n)^{-T}] \end{aligned}$$

If $\epsilon_{qs,r} = (\delta qs_n / \delta r) (r / qs_n) \geq 1$, then $\delta V_n / \delta r > 0$

$$\frac{\delta V_n}{\delta T} \approx \frac{qs_n}{r+qs_n} [(1+r+qs_n)^{-T} - (1+r+qs_n)^{-(T+1)}] > 0$$

Finally, since $p_n = p_k + \mu_{kn}$,

$$\delta V_n / \delta \mu_{kn} = \delta V_n / \delta p_k = \delta V_n / \delta p_n = (\delta V_n / \delta qs_n) (\delta qs_n / \delta p_n) > 0.$$

Appendix: A Model of the Financial Guarantee Market (continued)

These results are important in determining characteristics of the demand curve for financial guarantees. Each bond issuer will be willing to purchase a guarantee if the premium for that guarantee is less than or equal to these total interest cost savings, V_n . Bond issuers are indifferent between purchasing and not purchasing a guarantee when V_n is exactly equal to the guarantee premium, PR. This equality defines an implicit "break-even" value for the random noise factor, μ_{kn} , within each risk class k . Terming this breakeven value $\bar{\mu}_k$, the following equation defines an implicit function for $\bar{\mu}_k$.

$$F(\bar{\mu}_k; r, p_k, T, PR) = V - PR = 0 \\ = V(r, T, q_{s,n}(r, p_k, \bar{\mu}_k)) - PR = 0$$

Within each risk class, $\bar{\mu}_k$ is a function of the risk-free rate, r , the "true" default probability, p_k , the maturity of the bond, T , and financial guarantee premium, PR. Using the implicit function theorem, it can be demonstrated that

$$\delta \bar{\mu}_k / \delta r = -F_r / F_{\mu_k} = -(\delta V_n / \delta r) / (\delta V_n / \delta \bar{\mu}_k) < 0 \\ \text{(assuming } \epsilon_{qs,r} \geq 1)$$

$$\delta \bar{\mu}_k / \delta PR = -F_{PR} / F_{\mu_k} = 1 / (\delta V_n / \delta \bar{\mu}_k) > 0$$

$$\delta \bar{\mu}_k / \delta T \approx -F_T / F_{\mu_k} = -(\delta V_n / \delta T) / (\delta V_n / \delta \bar{\mu}_k) < 0$$

$$\delta \bar{\mu}_k / \delta p_k = -F_{p_k} / F_{\mu_k} = -(\delta V_n / \delta p_k) / (\delta V_n / \delta \bar{\mu}_k) = -1$$

where F_x denotes the derivative of F with respect to x .

Using the expression for V_n , it is straightforward to demonstrate that total interest cost savings increase with μ_{kn} . Within a risk class, then, all bond issuers with μ_{kn} greater than $\bar{\mu}_k$ will have interest cost savings greater than the guarantee premium PR and will therefore be willing to purchase a guarantee. Recalling that μ_k has distribution function $g(\mu_k; p_k)$, the share of bond issuers with μ_{kn} greater than $\bar{\mu}_k$ is $(1 - G(\bar{\mu}_k; p_k))$ where $G(\mu_k; p_k)$ is the cumulative distribution function of μ_k . Using this result, the demand curve for financial guarantees in risk class k can be written as:

$$D_k = (1 - G(\bar{\mu}_k; p_k)) N_k$$

The slope of the demand curve equals

$$-N_k(\delta G / \delta \bar{\mu}_k) (\delta \bar{\mu}_k / \delta PR).$$

The position of the demand curve is determined by the four exogenous variables r , p_k , T and N_k . Taking derivatives, it can be shown that

$$\delta D_k / \delta N_k = 1 - G(\bar{\mu}_k; p_k) > 0$$

$$\delta D_k / \delta T \approx -(\delta G / \delta \bar{\mu}_k) (\delta \bar{\mu}_k / \delta T) N_k > 0$$

$$\delta D_k / \delta r = -(\delta G / \delta \bar{\mu}_k) (\delta \bar{\mu}_k / \delta r) N_k > 0 \text{ if } \epsilon_{qs,r} \geq 1$$

$$\delta D_k / \delta p_k = [\delta G / \delta \bar{\mu}_k - \delta G / \delta p_k] N_k \geq 0 ?$$

Note that in the special case when the distribution of μ_k is the same across risk classes—i.e., $\delta G / \delta p_k = 0$ —demand increases in riskier credit classes— $\delta D_k / \delta p_k > 0$. In general, however, the change in demand resulting from an increase in p_k will depend upon the form of the cumulative distribution function $G(\mu_k; p_k)$.

Supply

The supply side of the model is determined by the actions of insurers. The model assumes that there are J insurers, each of whom can write up to M_k dollars of coverage in each risk class k . This assumption is equivalent to assuming that each insurer dedicates a fixed amount of its capital to writing guarantees and maintains a fixed exposure-to-capital ratio in each risk class. The amount of capital dedicated to each risk class is taken as given in this model; a more realistic assumption would be that insurers profit-maximize by optimizing the distribution of their capital across risk classes.

Insurers are able to offer financial guarantees because they are assumed to be more effective at assessing true credit risk than other participants in the capital market. Specifically, it is assumed that each insurer can learn the true default probability of a bond issuer, p_k , at some cost c_i . This cost is a characteristic of the insurer that is known to both insurers and bond issuers. For tractability, it is assumed that c_i is distributed uniformly over $[0, C]$.

For a given default probability, p_k , insurers are able to calculate the expected loss associated with writing a financial guarantee in that risk class. For this calculation, p_k is interpreted as the "instantaneous" default probability. That is, p_k is the probability that the bond issuer defaults in a given period. p_k is assumed to be constant and independent across periods. Under these assumptions, the expected loss from a guarantee in risk class k is:

$$L_k = \sum_{j=0}^{T-1} p_k (1-p_k)^j (1+r)^{-j} B$$

$$L_k = p_k (1+r) (p_k + r)^{-1} [1 - (1-p_k)^T (1+r)^{-T}]$$

Appendix: A Model of the Financial Guarantee Market (continued)

where it is assumed that the insurer discounts at the risk free rate and B has been set equal to 1. Taking derivatives,

$$\frac{\delta L_k}{\delta r} = \frac{p_k(1-p_k)}{(p_k+r)^2} [-1 + \frac{(1-p_k)^T}{(1+r)^T} [1 - T(p_k+r)(1-p_k)^{-1}]] < 0$$

$$\frac{\delta L_k}{\delta p_k} = \frac{p_k(1+r)}{p_k+r} \left[\frac{T(1-p_k)^T}{(1-p_k)(1+r)^T} \right] + \frac{r(1+r)}{(p_k+r)^2} \left[1 - \frac{(1-p_k)^T}{(1+r)^T} \right] > 0$$

$$\frac{\delta L_k}{\delta T} \approx \frac{p_k(1+r)(1-p_k)^T}{(p_k+r)(1+r)^T} \left[1 - \frac{(1-p_k)^{dT}}{(1+r)^{dT}} \right] > 0.$$

Since insurers can distinguish among the true default probabilities of the bond issuers, there will be a financial guarantee supply curve and market equilibrium for each risk class k . Each insurer will provide a guarantee if the premium exceeds the expected loss plus the cost of discovering the true p_k . Insurers are indifferent between writing and not writing a guarantee when the premium, PR , is just equal to the expected loss, L_k , plus the information cost, c_i . This equality defines a "breakeven" value of c_i , \bar{c} :

$$\bar{c} = PR - L_k$$

All insurers with c_i less than or equal to \bar{c} will be willing to write guarantees. Recalling that c_i is distributed uniformly over $[0, C]$, the share of insurers with c_i less than or equal to \bar{c} is (\bar{c}/C) . This share implies that the supply curve for financial guarantees in risk class k is:

$$S_k = JM_k(\bar{c}/C) = JM_k((PR - L_k)/C).$$

The slope of the supply curve, $\delta S_k/\delta PR$, equals JM_k/C .

Like the demand curve, the position of the supply curve for each risk class is determined by the set of exogenous variable r , p_k , T , J , M_k and C . Taking derivatives,

$$\delta S_k/\delta r = -(JM_k/C) (\delta L_k/\delta r) > 0$$

$$\delta S_k/\delta p_k = -(JM_k/C) (\delta L_k/\delta p_k) < 0$$

$$\delta S_k/\delta T \approx -(JM_k/C) (\delta L_k/\delta T) < 0$$

$$\delta S_k/\delta J = (M_k/C) (PR - L_k) > 0$$

$$\delta S_k/\delta M_k = (J/C)(PR - L_k) > 0$$

$$\delta S_k/\delta C = -(JM_k/C^2) (PR - L_k) < 0$$

Equilibrium

The equilibrium premium rate and quantity of insured principal in each risk class can be derived from the supply and demand curves described above. Equating supply and demand, we have

$$Q_k^* = N_k [1 - G(\bar{\mu}_k(PR_k^*, r, p_k, T); p_k)]$$

and

$$PR_k^* = Q_k^*C/JM_k + L_k(r, p_k, T)$$

where the two equations define implicit functions for the equilibrium quantity, Q_k^* , and premium rate, PR_k^* :

$$Q_k^* = Q_k^*(r, p_k, T, N_k, J, M_k, C)$$

and

$$PR_k^* = PR_k^*(r, p_k, T, N_k, J, M_k, C).$$

Using the implicit function theorem, it is possible to derive comparative static results about Q_k^* and PR_k^* . For instance, defining the implicit function for Q_k^* as

$$H(Q_k^*; r, T, N_k, p_k, J, M_k, C) = Q_k^* - N_k[1 - G(\bar{\mu}_k^*; p_k)]$$

and noting that

$$H_{Q^*} = 1 + (\delta G/\delta \bar{\mu}_k) (\delta \bar{\mu}_k/\delta PR) (CN_k/JM_k) > 0$$

then the derivatives of Q_k^* and PR_k^* are:

with respect to r :

$$\frac{\delta Q^*}{\delta r} = -\frac{H_r}{H_{Q^*}} = -H_{Q^*}^{-1} N_k \frac{\delta G}{\delta \bar{\mu}_k} \left[\frac{\delta \bar{\mu}_k}{\delta PR} \frac{\delta L_k}{\delta r} + \frac{\delta \bar{\mu}_k}{\delta r} \right] > 0$$

(assuming $\epsilon_{qs,r} \geq 1$)

$$\frac{\delta PR^*}{\delta r} = H_{Q^*}^{-1} \left[\frac{\delta L_k}{\delta r} - \frac{CN_k}{JM_k} \frac{\delta G}{\delta \bar{\mu}_k} \frac{\delta \bar{\mu}_k}{\delta r} \right] \geq 0 ?$$

$$\text{if } -(\delta L_k/\delta r) (JM_k/C) < -N_k(\delta G/\delta \bar{\mu}_k) (\delta \bar{\mu}_k/\delta r)$$

$$\delta S_k/\delta r < \delta D_k/\delta r$$

$$\text{then } \delta PR^*/\delta r > 0$$

Appendix: A Model of the Financial Guarantee Market (continued)

with respect to p_k :

$$\frac{\delta Q^*}{\delta p_k} = -\frac{H_{pk}}{H_Q} = -H_Q^{-1} N_k \left[\frac{\delta G}{\delta p_k} - \frac{\delta G}{\delta \bar{\mu}_k} + \frac{\delta G}{\delta \bar{\mu}_k} \frac{\delta \bar{\mu}_k}{\delta PR} \frac{\delta L_k}{\delta p_k} \right] \geq 0 ?$$

$$\frac{\delta PR^*}{\delta p_k} = H_Q^{-1} \left[\frac{CN_k}{JM_k} \left[\frac{\delta G}{\delta \bar{\mu}_k} - \frac{\delta G}{\delta p_k} \right] + \frac{\delta L_k}{\delta p_k} \right] \geq 0 ?$$

if $\delta G/\delta \bar{\mu}_k > \delta G/\delta p_k$, then $\delta PR^*/\delta p_k > 0$ and $\delta Q^*/\delta p_k \geq 0$?

if $\delta G/\delta \bar{\mu}_k < \delta G/\delta p_k$, then $\delta Q^*/\delta p_k < 0$ and $\delta PR^*/\delta p_k \geq 0$?

if $\delta G/\delta \bar{\mu}_k = \delta G/\delta p_k$, then $\delta Q^*/\delta p_k < 0$ and $\delta PR^*/\delta p_k > 0$

With respect to N_k :

$$\frac{\delta Q^*}{\delta N_k} = \frac{-H_{Nk}}{H_Q} = \frac{1 - G(\bar{\mu}_k; p_k)}{H_Q} > 0$$

$$\frac{\delta PR^*}{\delta N_k} = \frac{\delta Q^*}{\delta N_k} \frac{C}{JM_k} > 0$$

With respect to C :

$$\frac{\delta Q^*}{\delta C} = -\frac{H_C}{H_Q} = -H_Q^{-1} \frac{\delta G}{\delta \bar{\mu}_k} \frac{\delta \bar{\mu}_k}{\delta PR} \frac{Q^* N_k}{JM_k} < 0$$

$$\frac{\delta PR^*}{\delta C} = H_Q^{-1} \frac{Q^*}{JM_k} > 0$$

With respect to M_k :

$$\frac{\delta Q^*}{\delta M_k} = -\frac{H_{Mk}}{H_Q} = H_Q^{-1} \frac{\delta G}{\delta \bar{\mu}_k} \frac{\delta \bar{\mu}_k}{\delta PR} \frac{Q^* CN_k}{J^2 M_k} > 0$$

$$\frac{\delta PR^*}{\delta M_k} = H_Q^{-1} \frac{Q^* C}{JM_k^2} < 0$$

With respect to J :

$$\frac{\delta Q^*}{\delta J} = -\frac{H_J}{H_Q} = H_Q^{-1} \frac{\delta G}{\delta \bar{\mu}_k} \frac{\delta \bar{\mu}_k}{\delta PR} \frac{Q^* CN_k}{J^2 M_k} > 0$$

$$\frac{\delta PR^*}{\delta J} = -H_Q^{-1} \frac{Q^* C}{J^2 M_k} < 0$$

The equilibrium premium volume, PM^* , is the product of the equilibrium premium rate and quantity of insurance:

$$PM^* = Q^* PR^*$$

This volume moves with changes in the exogenous variables according to:

$$\frac{\delta PM^*}{\delta x} = PR^* \frac{\delta Q^*}{\delta x} + Q^* \frac{\delta PR^*}{\delta x}$$

where $x = N_k, r, p_k, C, M_k, J, T$

For most of the exogenous variables, this comparative static is difficult to sign a priori since the derivatives of Q^* and PR^* with respect to the variable in question have opposite signs. However, under certain assumptions, it can be shown that the equilibrium premium volume moves procyclically with interest rates. That is, assuming that

$$(1) \epsilon_{qs,r} \geq 1$$

$$\text{and } (2) \delta S_k/\delta r < \delta D_k/\delta r$$

$$\text{then } \frac{\delta PM^*}{\delta r} = PR^* \frac{\delta Q^*}{\delta r} + Q^* \frac{\delta PR^*}{\delta r} > 0$$

Note that these are sufficient (but not necessary) conditions for this result to hold.

The Household Demand for Money: Estimates from Cross-sectional Data

Virtually all quantitative research on the transactions demand for money has used aggregate time-series data. More specifically, the key variables comprising the economic relationship — the dollar volume of M1, the size of GNP, and interest rates — are measured at the level of the national economy; and the data are averages over periods of time, usually a quarter of the year. The outcome of these research efforts has been rather unsatisfactory in recent years: regression analysis often shows marked instability in the demand for money, or sometimes, improbable estimates of elasticities or lagged effects.¹ Economists have reacted to the breakdown of the demand-for-money relationship by altering the specification of the relationship, questioning the econometric methods used, disputing the definition of money, or accepting the instability as reflecting structural changes in the economic and financial environment.

Our work reexamines the demand for money by taking a different approach: we estimate the household sector's demand for money using cross-sectional data. That is, the values of income, interest rates, and money pertain to individual families at a single point in time. This may be the first study to utilize this approach, since it was not feasible until the introduction of interest payments on some checking account deposits (e.g. negotiable order of withdrawal accounts). Only when the opportunity cost of these deposits varies across households

at a point in time can regression analysis estimate the impact of such costs on checking account balances. Since some individuals hold a demand deposit account, which cannot earn interest, and others a NOW account, which typically earns 5 percent or more, the necessary variation in opportunity cost is observed.

The data we use in this study were collected through a sample survey conducted by the University of Michigan's Survey Research Center specifically for the Board of Governors of the Federal Reserve System. About 1,950 households nationwide were contacted in the spring of 1984. The general purpose of this survey was to provide basic information on the use of cash, bank accounts, and credit cards as the means of payment by American families. A more specific purpose was to enable the Board staff to estimate the amount of currency held by individuals for legitimate transactions.² Fortunately, we obtained enough information from the survey to do a credible job of estimating a cross-sectional demand-for-money equation and to test some hypotheses, although more information on the banking relationships and financial position of the sampled households would have been useful.

The empirical results obtained here are broadly consistent with the standard approach to analyzing the demand for M1. The estimated income and interest rate elasticities of money demand are well within the generally accepted range and are highly significant; and the

¹For a survey through 1982, see John P. Judd and John L. Scadding, "The Search for a Stable Money Demand Function: A Survey of the Post-1973 Literature," *Journal of Economic Literature* (September 1982), pages 993-1023. Also, see numerous articles on this subject in this *Quarterly Review* and in those of the other Federal Reserve Banks, as well as papers written by the Board of Governors staff economists.

²"The Use of Cash and Transactions Accounts by American Families," *Federal Reserve Bulletin* (February 1986), pages 87-108. The survey was repeated to check the results; "Changes in the Use of Transactions Accounts and Cash from 1984 to 1986," *Federal Reserve Bulletin* (March 1987), pages 179-96.

estimated coefficients of several other explanatory variables in the regression are significant and have the expected sign. These econometric results bolster the case for using the conventional approach to the demand for money at the household level. But two problems hinder the direct application of these results to money demand at the economy-wide level: the lack of a consensus model for the business sector and the difficulty of aggregating from the level of individual firms and households to the economy as a whole. Moreover, these results, while relevant to monetary issues, do not provide estimates of shifts in the demand for money during the past ten years.

Model specification

The demand-for-money equation is formulated along conventional lines. The underlying theory is that money (M1) is held as an inventory in order to conduct transactions.³ Thus, observed checking account balances—either with or without currency holdings added—are

³David E.W. Laidler, *The Demand for Money: Theories and Evidence*, third edition (Harper and Row, New York, 1985), Chapter 6; William J. Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach", *Quarterly Journal of Economics* (November 1952), pages 545-56; and James Tobin, "The Interest Elasticity of Transactions Demand for Cash," *Review of Economics and Statistics* (August 1956), pages 241-47.

explained by income, serving as a proxy for the dollar volume of transactions; by the (marginal) opportunity cost of holding checking account balances; and by several other factors affecting checking account usage among families.⁴ We use dummy variables to incorporate many of these other factors in the regression. (See the box for a listing of the variables used.)

Notably absent from the regression equation is wealth; this survey made no inquiry as to the financial wealth of the individual households. We wanted to add wealth as an explanatory variable because of its possible role as a determinant of the demand for narrow money; and because another survey of households, conducted by a bank consulting firm, suggested that it does affect a family's money holdings.⁵

The equation is estimated in log-linear form; that is, the natural logarithms of the dependent variable, income, and the opportunity cost are used instead of their actual levels. Using the log of checking balances as the dependent variable is more consistent with the

⁴The effects of fees and minimum balance requirements are very important for determining average opportunity cost, but can probably be ignored at the margin.

⁵Synergistics Research Corporation, Atlanta, Georgia. This survey contacted about 1850 families nationwide in the spring of 1986.

Variables in the Regression Equation

Three alternative definitions of the dependent variable were used in the first set of regressions (reported in Table 1): (1) the household's balance in its main checking account, (2) its total balance across all its checking accounts (if it owns more than one), and (3) its total checking account balance plus the currency holdings of the household member responding to the survey (however they were obtained). All these variables are measured as of the day of the survey. The independent variables include:

- total household annual income;
- the household's marginal opportunity cost for holding checking account balances (the national average money-market deposit account rate shown in the Bank Rate Monitor, less the rate of interest earned on the household's checking account balance);
- the amount of currency held by that household member responding to the survey (provided that it was withdrawn out of a bank account);
- the total credit card balance of the household;
- a dummy variable taking the value of one for households holding a demand deposit account *and* normally paying a monthly service charge or other fees, and taking the value zero otherwise;
- a dummy variable exactly like the aforementioned,

except in regard to NOW accounts;

- a dummy variable taking the value one for households reporting that they paid for less than one-quarter of their total expenditures from their main checking account, and the value zero otherwise;
- a dummy variable taking the value one for households reporting that their primary worker's pay period was shorter than a month, and zero otherwise;
- a dummy variable taking the value one for those responding that there was more than one full-time worker in the household, and zero otherwise;
- a dummy variable taking the value one for households who transferred funds during the past month into their main checking account from some other bank account, and zero otherwise;
- a dummy variable taking the value one for those households holding one or more secondary checking accounts, and zero otherwise;
- a dummy variable taking the value one for households also holding a money-market account (provided by either a bank or an investment firm) *with* checkwriting privileges, and zero otherwise; and
- a dummy variable taking the value one for those households who preferred to carry extra currency in the chance of an emergency, and zero otherwise.

basic assumptions of the classical regression model. If the actual level of the checking account balance (not its log) is specified as the dependent variable, the regression equation's disturbance term could not take on a full range of values—a household's checking account balance can never be negative.⁶ Thus, the disturbance term could not take on large, negative values, a condition which violates a basic least squares assumption. Instead, the log-linear functional form is used. This specification leads to satisfactory least squares estimates because a very large negative value for the disturbance term implies that the household's checking account balance is close to, but not below zero.⁷

One additional restriction is imposed: we have included in the sample only those households whose income exceeded \$10,000. We decided to drop low-income households because for such households income is probably a poor proxy for the volume of transactions. In many of these low-income households, adults are either suffering extended unemployment or have special circumstances and have voluntarily dropped out of the full-time labor force (for example, a student in graduate school). Many of these households are running down their assets or are receiving assistance from the government, their families, or elsewhere. In any case, their transactions volume and their checking account balance may not correspond to their income, and thus these respondents should be dropped from the sample, even though doing so may introduce a selection bias.⁸

Regression results

The regression results for household money demand are statistically meaningful and reliable, and some particular coefficient estimates agree neatly with the transaction motive for holding money. The estimates of the income elasticity (falling in a range of 0.60 to 0.86, depending on the exact specification of the regression) are consistent with widely-held expectations; and they have

very high statistical significance (with t-statistics around 10). Money demand appears to have considerable elasticity with respect to opportunity cost, with estimates which are in the range of 0.37 to 0.49 and which are highly significant. The estimated effect of a household's primary worker having a shorter period between pay-days is to reduce its checking account balance—the effect predicted by the inventory model of money demand.

Although there are many significant variables appearing in the equation, the explanatory power of the regression equation may seem low, with the adjusted R^2 on the order of 0.24 to 0.36. Cross-sectional data, however, usually produce regressions with lower explanatory power than do time-series data. Moreover, there is a particular reason for the low R^2 in the case of the cross-sectional equations we estimate—the dependent variable relates to the balance in the main checking account *on the day of the survey*. And naturally, there is substantial day-to-day variation in a household's account balance over the course of a month, even though its monthly average balance may be quite stable over an entire year. Had the survey collected data on the household's monthly average balance, the explanatory power of the regression equation would look much better. To convince ourselves of this, we constructed artificial daily- and monthly-average balance data conforming to the inventory model. On this basis, the R^2 of the regression equation would be expected to rise considerably if we had used monthly-average data instead.

There were 922 observations used in the regressions. While the survey contacted about 1,950 families, many had to be dropped from the sample for any of several reasons: the household did not own a checking account, the respondent could not or would not answer a question, or the recorded response was implausible.

Coefficient estimates of the core model

The demand equation was initially estimated three times, each time with a differently defined dependent variable: main checking account balance, total balance in all checking accounts, and total checking account balance plus currency holdings. The same set of ten independent variables—the “core” model—was used. These estimates are reported in Table 1.

- The estimated income elasticity is about 0.85, within the limits of 0.5 to 1.0 implied by transactions models of money demand. It should be noted, however, that this estimate is not significantly different from unitary elasticity at the 5 percent level.
- The estimated opportunity cost (interest rate) elasticity is on the high side: 0.40 to almost 0.50.

⁶Many households (almost one-third) do have overdraft privileges, but an overdraft usually triggers credits of \$100 or some even amount, not an amount exactly equaling the overdraft.

⁷So, when using cross-sectional data, there is an *a priori* economic rationale for the choice of functional form. In research on money demand using time-series data, Zarembka developed an estimation procedure that discriminated between linear and log functional forms because of indecision between the two. See Paul Zarembka, “Functional Form in the Demand for Money,” *Journal of the American Statistical Association* (June 1968), pages 502-11.

⁸Although the income variable is defined to include unearned income, in our judgment it is better to drop these households from the sample. Another reason to do so is that they may not have sufficient assets to justify a savings account, in which case our concept of opportunity cost does not apply.

These estimates indicate considerable sensitivity of the level of checking balances to changes at the margin in the amount of interest foregone in order to hold those balances.⁹

- D1: A household whose primary worker—or the person who answered the survey, in the case of

⁹When the dependent variable is either total checking account balance or total balance plus cash, an inconsistency creeps in. The opportunity cost variable refers to the main checking account. If the main account is a NOW, then the opportunity cost of holding cash

two or more full-time workers—is paid more often than once a month (about 91 percent of the sample) tends to have lower money holdings, other factors constant. So, households paid weekly or bi-weekly have a lower average balance than households paid monthly. This is precisely what the inventory model of money demand would predict.

- D2: A household with two or more full-time workers (29 percent of the sample) also has lower money holdings on average. So, having two workers in a family is in effect similar to a shorter pay period. If one of the family's workers is paid at the beginning of the month and the other near the middle, a two-worker household is comparable in its deposit pattern to a household having one full-time worker paid bi-weekly.
- D3 and D4: Paying fees on a demand deposit account or NOW account correlates with lower money balances. (In the sample, 42 percent of the households paid a fee on a demand deposit account, and 9 percent paid a fee on a NOW account.) Our interpretation is that most households who have free checking do so because they meet a minimum balance requirement in the checking account itself, and meeting it in many cases causes them to maintain a higher average balance than they would otherwise.¹⁰
- D5: A household making relatively few payments from its main checking account (6 percent of the sample) holds a lower main account balance (or, for one with multiple accounts, lower total balance). A household in this group, however, does not tend to have lower total money holdings (checking account balance *plus* currency). Apparently, in most of these cases, cash is used for payments instead of check.
- D6: A household that during the past month transferred funds into its main checking account from one of its other bank accounts (15 percent of the sample) tends to hold less money. A household falling in this category was thought to be actively trying to maximize its interest income by keeping funds longer in its savings account and transferring them into the checking account only

Footnote 9 continued

will definitely be higher than the opportunity cost of holding balances in the main checking account, and the opportunity cost of holding balances in a secondary account may also be higher than in the main account.

¹⁰Of course, some households have absolutely free checking (no fees and no minimum balance requirement), can avoid fees by maintaining a certain savings account balance, or do not find the minimum balance requirement to be a binding constraint; but they appear to be in the minority.

Table 1

Regression Results for the Demand for Money by Households

Estimated Coefficients
(with t-statistics in parentheses)

Independent Variables	Dependent Variable		
	Main Checking Account Balance	Total of Checking Account Balances	Currency Holdings plus Total of Checking Account Balances
Income	0.85 (10.5)	0.86 (10.8)	0.82 (11.2)
Opportunity Cost	-0.49 (-4.5)	-0.42 (-4.0)	-0.40 (-4.2)
D1: Pay Period Shorter Than a Month	-0.52 (-4.8)	-0.49 (-4.6)	-0.43 (-4.3)
D2: Two or More Full-Time Workers	-0.32 (-3.3)	-0.34 (-3.6)	-0.33 (-3.9)
D3: Usually Pays Fees for Demand Deposit Account	-0.40 (-4.1)	-0.41 (-4.2)	-0.39 (-4.5)
D4: Usually Pays Fees for NOW Account	-0.53 (-3.3)	-0.48 (-3.0)	-0.49 (-3.3)
D5: Pays for Few Expenditures out of Main Checking	-0.49 (-2.5)	-0.37 (-2.0)	-0.25 (-1.4)
D6: Made a Transfer to Checking during Past Month	-0.30 (-2.5)	-0.24 (-2.1)	-0.28 (-2.6)
D7: Owns a Money-Market Savings Account	0.21 (2.0)	0.32 (3.1)	0.30 (3.1)
D8: Owns a Secondary Checking Account	0.12 (1.2)	0.91 (9.5)	0.81 (9.2)
Intercept	-1.02 (-1.2)	-1.21 (-1.5)	-0.74 (-1.0)
Adj. R ²	0.236	0.325	0.330

as needed; thus, the finding was expected.

- D7: A family holding a money-market savings account with checkwriting privileges (15 percent of the sample) tends to hold more M1-type money. On the one hand, this is surprising. Money-market accounts are so convenient and useful that—other things equal—a family with a money-market account would be expected to maintain a lower checking account balance, keeping more funds in the money-market account instead; but we observe the opposite. In light of the results from another household survey, however, the finding is much less surprising.¹¹ This survey showed that the ownership of a money-market savings account is highly correlated with a family's wealth, which is not measured in the survey used here. Ownership of a money-market savings account may be picking up the effect of wealth on money demand; so, a positive coefficient for this variable is reasonable.
- D8: Holding a secondary checking account (26 percent of the sample) has no impact on a household's main account balance, but has a positive effect on its total balance across all checking accounts. A typical household, it seems, does *not* split the same total balance among however many accounts it happens to hold. If it did, main account balance would be lower (and the variable's coefficient would be negative in the first regression), and total account balance would not be significantly higher (and the coefficient estimate would be insignificant in the second).

Variables relating to alternative payment methods

In addition to this core set of ten explanatory variables, a few others, relating to cash and credit cards, were tried. (In each of these regressions, total checking account balance is the dependent variable.) The regression results are presented in Table 2. First, the amount of cash on hand was added to the list of explanatory variables; its coefficient is positive and significant (first column of the table).¹² One might have thought that the sign would be negative, as cash and checking account balances are natural substitutes. Our estimate does not contradict this; instead, the positive coefficient would seem to be an artifact of the survey's

¹¹Synergistics Research Corporation.

¹²More precisely, cash on hand is the amount held by the household member responding to the survey, providing it was obtained by a withdrawal from a bank account. Earlier, in the regressions reported in Table 1, cash was added to checking balances and the sum was used as one form of the dependent variable. But the cash variable was defined differently in that case; it was cash holdings—however obtained.

design. The cash and checking balance information was collected, not as some average over the previous week or month, but as of the day of the survey. If that day happens to be soon after payday, cash holdings and checking account balance are both likely to be high. If that day is long after payday, they are both likely to be low.

Table 2

Regression Results for the Augmented Versions of the Demand for Money by Households

Estimated Coefficients
(with t-statistics in parentheses)

Independent Variables	Dependent Variable: Total of Checking Account Balances		
Income	0.77 (9.7)	0.72 (8.7)	0.60 (6.2)
Opportunity Cost	-0.37 (-3.6)	-0.37 (-3.6)	-0.38 (-3.2)
D1: Pay Period Shorter Than a Month	-0.45 (-4.3)	-0.44 (-4.2)	-0.40 (-3.1)
D2: Two or More Full-Time Workers	-0.25 (-2.7)	-0.24 (-2.6)	-0.15 (-1.4)
D3: Usually Pays Fees for Demand Deposit Account	-0.39 (-4.2)	-0.39 (-4.2)	-0.30 (-2.7)
D4: Usually Pays Fees for NOW Account	-0.38 (-2.5)	-0.40 (-2.6)	-0.30 (-1.7)
D5: Pays for Few Expenditures out of Main Checking	-0.35 (-1.9)	-0.33 (-1.8)	-0.48 (-1.8)
D6: Made a Transfer to Checking during Past Month	-0.21 (-1.9)	-0.21 (-1.9)	-0.16 (-1.3)
D7: Owns a Money-Market Savings Account	0.27 (2.6)	0.26 (2.5)	0.31 (2.7)
D8: Owns a Secondary Checking Account	0.92 (9.8)	0.90 (9.6)	0.94 (9.0)
Cash	0.15 (6.5)	0.15 (6.5)	0.15 (5.2)
Credit Card Balance-1*	—	0.00017 (2.1)	—
Credit Card Balance-2†	—	—	0.90 (2.1)
Intercept	-0.86 (-1.1)	-0.41 (-0.5)	0.27 (0.3)
Adj. R ²	0.354	0.357	0.339

*Credit Card Balance-1: the actual level of the balance.

†Credit Card Balance-2: the natural logarithm of the balance if the balance is positive; otherwise, the respondent is dropped from the sample.

The next step was to add to this augmented equation a variable representing attitude toward cash. This variable took the value one for those respondents who agreed with the statement, "I prefer to carry extra currency for emergencies because it is difficult to obtain currency on short notice." The variable took the value zero if the respondent disagreed. Its coefficient estimate (not shown in the table) falls far short of statistical significance; apparently attitude does not translate into identifiable extra checking account balances.¹³

The last step was to add total credit card balances to the equation. This is the sum of balances on all types of credit cards—store, gasoline company, travel and entertainment, and bank. This variable was added to the equation in three ways, with mixed and somewhat puzzling results.

- The *level* of the total balance (balance-1 in Table 2): This specification is asymmetric with respect to the income and opportunity cost variables (which enter the equation as their natural logs, not their levels), but it circumvents the problem of dealing with those households having no credit cards or a zero balance. High credit card balance corresponds with higher-than-average checking account balance (middle column of Table 2). Our interpretation is simply that credit card charges preserve checking account balances, or if the credit card balance is due, checking account balance must be built up in advance in order to pay the bill.
- The natural log of credit card balances (not shown in the table): To avoid the problem created by the fact that the log of zero is undefined, a balance of one dollar is arbitrarily attributed to those reporting a balance of zero. In this case, credit card balances are not correlated with money holdings.
- The natural log of credit card balances, but with those reporting a zero balance or not owning credit cards (297 households) dropped from the sample (balance-2 in Table 2): There are 625 households reporting a credit card balance in this reduced sample. For this equation, credit card balances have a significant effect, but by dropping one-third of the sample, the coefficient estimates for the other variables change somewhat and the significance of a few variables drops below the 5 percent level.

In sum, adding these variables somewhat improved the fit of the regression equation. We have provided our

¹³This dummy was also added to the equation explaining total M1 balances; its estimate is insignificant there as well.

interpretation of the results, but admittedly, the connections between a household's cash on hand, credit card balances, and checking account balances are indirect, complex, and difficult to determine *a priori*.

Summary and conclusions

This paper reports estimates of the household sector's demand for money obtained from regression analysis of cross-sectional survey data. In general, the estimates agree with the transactions motive for holding money and support the use of the conventional approach to the demand for M1. In the context of recent experience, these results suggest that the inability of econometric models to track the short-term movements of M1 satisfactorily is likely to have been the product of structural shifts in the demand for money, precipitated by various factors, including regulatory changes. The observed instability and unpredictability of money demand appear not to have been the fault of just the estimation methods or the definition of money. But the regression results reported here neither provide quantitative estimates of the suspected structural shifts nor identify the causes; they are only suggestive on these matters.

The empirical analysis, while important because it provides estimates of the household sector's money demand, cannot be directly applied to the setting of monetary targets. The estimates of the demand elasticities cannot be used to project the sensitivity of M1 to a change in money-market conditions. We do not know how to translate the elasticities derived from differences among individuals at a point in time into elasticities pertaining to changes over time. This is a problem parallel to converting estimates of the marginal propensity to consume derived from budgets of individual families into the marginal propensity to consume out of next year's GNP. Hence, the cross-sectional estimates cannot be used to make projections of the effect that a change in interest rates will have on the growth of M1 over a period of time, say one year.

These limitations aside, this study has the virtue of using a fresh approach to the research on money demand. In addition, the regression estimates indicate that the interest rate elasticity of the household sector's demand for money may currently be much greater than was estimated from pre-1974 aggregate time-series data. Indeed, the short- and medium-term sensitivity of M1 to interest rates may be substantially greater than economists and policymakers have thought it to be.

Lawrence J. Radecki
Cecily C. Garver

Monetary Policy and Open Market Operations During 1986

Monetary policy in 1986 sought to sustain the ongoing economic expansion against a background that included restrained and often uneven economic growth and declining inflation. Indeed, as measured by the implicit gross national product (GNP) deflator, prices rose at their slowest pace since 1964, thanks in good part to the collapse of oil prices, a factor that many regarded as temporary. The monetary aggregates grew rapidly, lifting M1 well above its target range and taking the broader measures to the upper ends of their ranges, but the growth did not seem to have the same interpretation as it had in earlier times. In this instance, the increases seemed less likely to foster excessive economic growth or inflation. Hence, the Federal Open Market Committee (FOMC) accommodated the rapid M1 expansion and judged appropriate policy in the context of the growth of the broader aggregates, economic activity, inflation, financial market developments, and the foreign exchange value of the dollar. Total reserves grew a record 20 percent over the year, reflecting the unprecedented expansion of transactions balances. The relatively generous provision of reserves in combination with a series of discount rate

cuts accomplished a gradual reduction in the degree of pressure on reserve positions.

The financial markets responded with falling interest rates to the combination of modest economic expansion, low rates of inflation, and adjustments to the stance of monetary policy. Long-term rates fell sharply near the start of the year, and the rally extended to the short-term sector once the discount rate was cut in March. Interest rate movements were mixed later in the year, but rates, nonetheless, finished substantially lower.

M2 and M3 grew slowly near the start of the year, but accelerated during the spring, and each was generally near the 9 percent top of its annual range during the latter months of the year. Nominal income expanded just over 4 percent over the four quarters of 1986, which meant that M2 and M3 velocity—the ratio of nominal GNP to money—declined significantly. The declines in market interest rates apparently contributed to the increased demand for the broader aggregates by attracting some funds that might otherwise have been held in market instruments. In these circumstances, the FOMC judged growth near the upper ends of their ranges to be acceptable.

M1 grew a record 15 percent between the fourth quarter of 1985 and the fourth quarter of 1986, far exceeding the range that had been set at the February meeting. As the year proceeded, it became increasingly apparent that the demand for M1 was rising sharply and that its movements had become more interest-rate sensitive. The declines in interest rates made NOW account rates reasonably competitive with market rates when interest-rate ceilings on these deposits were phased out at the beginning of the year.

Adapted from a report submitted to the Federal Open Market Committee by Peter D. Sternlight, Executive Vice President of the Bank and Manager for Domestic Operations of the System Open Market Account. Ann-Marie Meulendyke, Manager, Open Market Operations Department, and Sandra Krieger, Chief, Open Market Analysis Division, were primarily responsible for preparation of this report. Other members of the Open Market Analysis Division assisting in the preparation were Jeremy Gluck, Economist; Connie Raffaele and Robert Van Wicklen, Senior Statisticians; and Debra Chrapaty and Martin Gonzalez, Assistant Economists. Barbara Walter, Assistant Vice President, and Samuel Foxman, Special Assistant, Dealer Surveillance Department, also participated in preparing the report.

A number of factors outside direct Federal Reserve control continued to serve as background to the policy process. Among the most important of these were the ongoing Federal budget and international current account deficits. The Gramm-Rudman (GR) deficit reduction process encouraged some steps to shrink future deficits but, in fiscal 1986, the deficit grew. Likewise, the current account deficit widened, even though the exchange value of the dollar had dropped substantially since its peak level in February 1985. Further declines in the value of the dollar in 1986 were viewed as acceptable. However, there were concerns at times that the dollar could fall too sharply with the declines feeding upon themselves, thereby promoting domestic inflationary pressures. In that context, the Federal Reserve was aware that it needed to be sensitive to the consequences of its monetary policy actions for the foreign currency markets.

The Trading Desk continued to take a flexible approach to implementing policy in the face of the uncertainties about the behavior of the monetary aggregates as the year went along. With the reserve pressures being generally maintained at relatively low levels, it met reserve needs promptly during much of the year. Reserve pressures were lowered near the end of 1985 and early in 1986 through reductions in the expected amount of discount window borrowing to \$300 million, an amount considered to be only modestly above frictional levels. Thereafter, further easing of reserve pressure was accomplished with four one-half-percentage-point cuts in the discount rate, which lowered the rate to 5½ percent by August.

The monetary aggregates

The broader monetary aggregates behaved about in line with the objectives during 1986 while M1 once again grew much more rapidly than anticipated. M1 velocity declined very sharply during 1986, making its behavior difficult to interpret. The FOMC was cautious in its reading of the growth of this measure and moved to deemphasize it as a policy indicator. The Committee tended to place its emphasis on the broader aggregates, economic expansion, inflation, domestic and international financial market conditions, and the exchange value of the dollar.

At its February meeting, the FOMC set growth rate ranges for fourth quarter 1985 to fourth quarter 1986. The ranges for the broader aggregates, M2 and M3, were left at 6 to 9 percent, the same as the tentative ranges set the preceding July. The Committee noted that growth in 1985 had been generally in line with expectations and that the behavior of M2 and M3 seemed to have been less affected than M1 by institutional and interest rate changes. The broader aggregates include

an array of deposit and money market instruments that have often exhibited offsetting movements. The range for M1 growth was widened by 2 percentage points to 3 to 8 percent to reflect the uncertainties already apparent in February about the appropriate behavior of that aggregate. The 1986 range for M1 was well below the actual 12 percent increase in 1985.

In evaluating the prospective growth of M1, the Committee assumed that its velocity would not decline so substantially as it had in 1985, when it had dropped 5 percent. The Committee recognized the possibility that velocity could decline rapidly in 1986 if there were a continuation of the recent trends, which might make it appropriate for M1 to run above its annual range. Of particular concern were factors shifting the public's allocation of savings, including the deregulation of interest-bearing NOW accounts. The Committee believed that it was appropriate to continue to be guided by all three monetary measures, as collectively they seemed to have more significance than they did individually.

Against a backdrop of low inflation and declining short- and long-term interest rates, M1 did not return to its traditional relationship to economic activity or to the broader aggregates. M1 appeared to have become more interest-sensitive than it had been when market rates were far above the regulated rates on M1 deposits. M1 grew 15.3 percent from the fourth quarter of 1985 to the fourth quarter of 1986, substantially above the upper end of its range (Chart 1).¹ M1 growth started out slowly, barely rising in January after rapid expansion in the last few months of 1985. Growth accelerated and M1 moved above the upper limit of its cone in March. Once short-term rates dropped in the wake of discount rate cuts in March and April, M1 growth accelerated further. By May, M1 exceeded the upper end of its parallel band. The above-path growth continued without pause for the rest of the year, with a further acceleration in December.

Both of the broader aggregates closed the year just about at the tops of their target ranges, with M2 growth of 9.1 percent, on a fourth quarter to fourth quarter basis, and M3 growth of 8.9 percent (Charts 2 and 3). M2 started 1986 somewhat below the lower bound of its cone, but soon quickened, and during the latter half

¹All money growth rates cited in this report are based on the data available before the benchmark and seasonal revisions in February 1987. The earlier data were used because they more closely represent the information available to the FOMC members at the time that their decisions were being made. The revisions were generally small for 1986 and had M1 growth at 15.2 percent over the four quarters. The fourth quarter to fourth quarter growth of M2 was lowered 0.2 percentage points to 8.9 percent. Growth of M3 was lowered from 8.9 percent to 8.8 percent. The quarterly growth patterns of the aggregates were modified slightly by the revisions. In particular, growth rates for M1 and M2 early in the year were raised modestly, while growth rates for subsequent months were lowered very slightly on balance.

Chart 1

M1: Levels and Target Ranges

Cones and tunnels

Billions of dollars

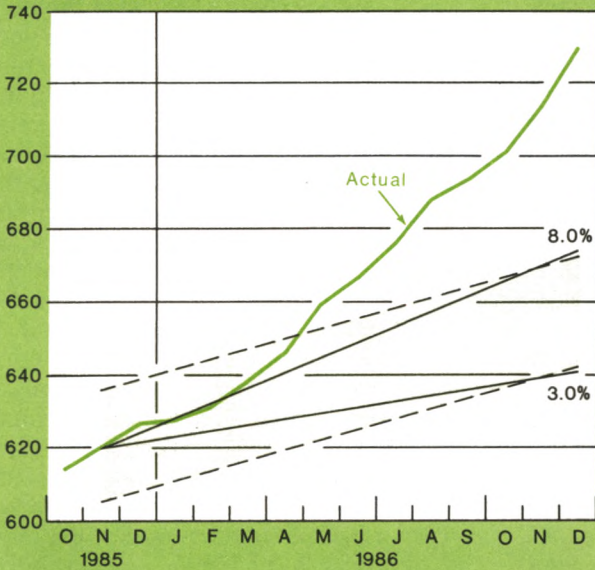


Chart 2

M2: Levels and Target Ranges

Cones and tunnels

Billions of dollars

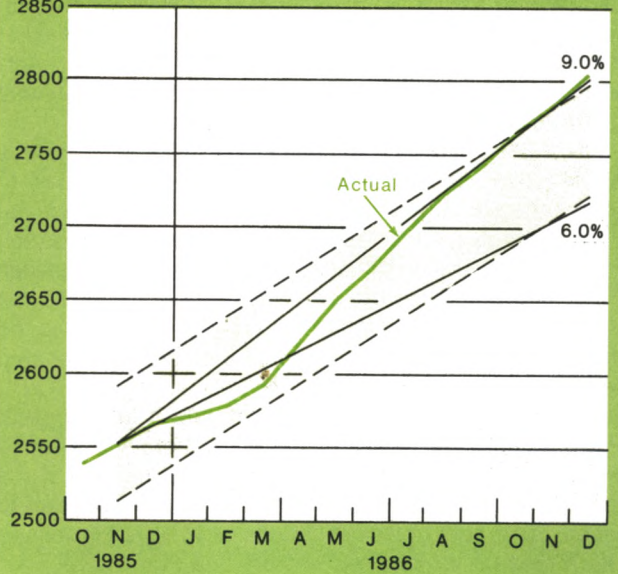


Chart 3

M3: Levels and Target Ranges

Cones and tunnels

Billions of dollars

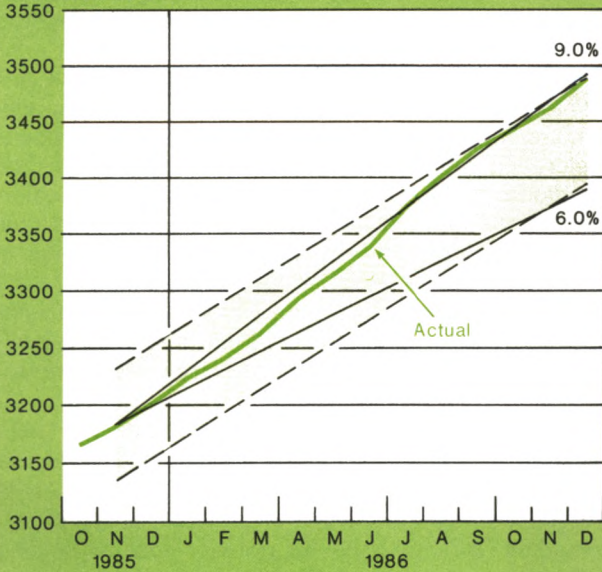
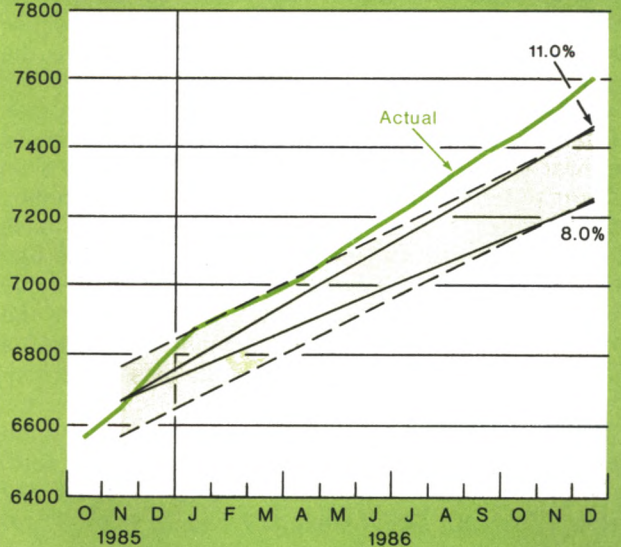


Chart 4

Total Domestic Nonfinancial Debt Levels and Monitoring Ranges

Cones and tunnels

Billions of dollars



of the year was generally around the upper end of its designated cone range. M3, meanwhile, showed a pattern of moderate growth and remained comfortably within its cone until the summer. It moved slightly above it for a time in late summer although it stayed within the parallel bands. The expansion of domestic nonfinancial debt continued to outpace the growth of GNP, registering a 13.2 percent increase over the four quarters and running above the Committee's 8 to 11 percent monitoring range for the year (Chart 4).

The FOMC confronted the question of how to handle the M1 overshoot at the May meeting. It decided to accept the rapid growth that had already occurred, but it set a range for the March-to-June period that anticipated a deceleration in money growth over the balance of the quarter. While the desired slowing in M1 did not occur, the pace of economic activity seemed to be slowing, giving further evidence that the relationship between M1 and GNP had changed.

By the time the Committee met in July, it took account of the mounting evidence that the relationship of M1 to income had been significantly altered by changes in the composition of the aggregate, making it very difficult to assess or predict the implications of M1 growth for the future course of economic activity and the rate of inflation. It believed that the operational significance of M1 could only be judged in the perspective of concurrent economic and financial developments, including the behavior of the broader aggregates. The Committee decided to retain the annual range for M1 for its continued information value for policy, even though the range were used only as a benchmark for measuring deviations. It rejected raising or rebasing the range, since such an adjustment might imply greater certainty about the future performance of the measure than in practice existed. The FOMC indicated that growth above the existing range would be acceptable for the year.

Both of the broader aggregates were well within their ranges at the time of the July review. The growth ranges set near the beginning of the year continued to be seen as consistent with the Committee's overall policy objectives, so those ranges were retained. Growth rates for both measures accelerated somewhat over the balance of the year. They, nonetheless, ended near the upper ends of their annual target ranges, despite the explosive growth in the M1 component, reflecting the slow growth or declines in some of the less liquid nontransactions components.

All three measures outpaced GNP growth during the year, resulting in velocity declines. From the fourth quarter of 1985 to the fourth quarter of 1986, M2 velocity fell 4.5 percent while M3 velocity fell 4.3 percent. The velocity declines in the broader aggregates held them below their long-term trends (Charts 5 and

6), but the distortion was far less than that to M1. Much of the below-trend performance reflected the weakness in M1 velocity. To some extent, the declining velocity may have reflected shifts from market instruments to liquid nontransactions components of M2 and M3. As spreads of market rates over those available on more liquid nontransactions M2 components narrowed, increased inflows to these accounts became apparent.

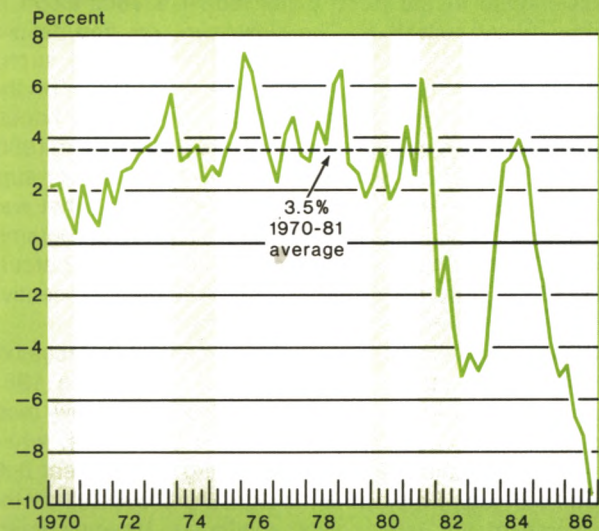
There was also a shift in the composition among the nontransactions components within M2, as interest rates on various components were adjusted at different speeds, creating incentives for customers to change the mix of their deposit holdings. Interest-rate ceilings on passbook savings accounts were eliminated April 1, by which point market rates had fallen enough that the ceilings were no longer binding. As market rates fell further, bank and thrift institutions were reluctant to lower their passbook savings rates below previous interest-rate ceilings since rates had been at the ceiling level for so many years. There was concern that any bank that led such a move could lose previously loyal customers and market share. Rates on time deposits, meanwhile, were adjusted more promptly as market rates fell, leading to a decline in the spread of the rates on small time deposits over those on passbook accounts. These changes were associated with a surge in savings deposits and a net runoff in small time deposits (Chart 8). Some of the dropoff in small time deposits may have been associated with inflows to money market deposit accounts (MMDAs) which were sought for their liquidity (minimum balances on these accounts were eliminated at the start of the year). MMDAs showed a more modest narrowing of the yield spread to Treasury issues as compared to time deposits over the course of the year.

M3 velocity fell more than it had in 1985 when it was only slightly below its declining trend. Growth of its non-M2 components was mixed, with large time deposits decelerating while term Eurodollar deposits, RPs, and institutional money market mutual funds were accelerating. Inflows into institution-only money market mutual funds (MMMFS) increased at times when declines in short-term market interest rates outpaced those on the MMMFS and periodically made yields on these investments relatively more attractive (offering rates on institution-only MMMFS leveled off and moved into alignment with market yields in September).

M1 velocity declined about 9 $\frac{1}{2}$ percent during 1986, more steeply than it had in 1985 (Chart 7). The decline during 1986 was again attributed to the interaction of lower interest rates with the changed composition of M1. As market rates fell, the opportunity cost of holding wealth in transactions form declined, which caused increases in consumer holdings of checkable deposits.

Chart 5

M1 Velocity Growth*



*Data from four quarters earlier.

Shaded areas represent periods of recession, as defined by the National Bureau of Economic Research.

Corporate treasurers also had less incentive to keep demand deposits at minimal levels since the interest foregone was reduced. Furthermore, many banks raised compensating balances required to pay for bank services to offset the impact of earnings lost from lower rates.

The effect of declining rates on flows into NOW accounts was even more pronounced than in 1985 because market rates fell below the previous ceilings on these accounts. These ceilings and the minimum balance requirements on Super NOW accounts were eliminated at the start of 1986. Depository institutions were slow to reduce NOW account interest rates below these ceilings for fear of an adverse customer reaction. The lower levels of market rates made NOW account rates competitive with other short-term instruments. This minimized the incentive for the public to separate savings from transactions balances and inspired transfers from time and savings accounts and money market instruments into NOW accounts.

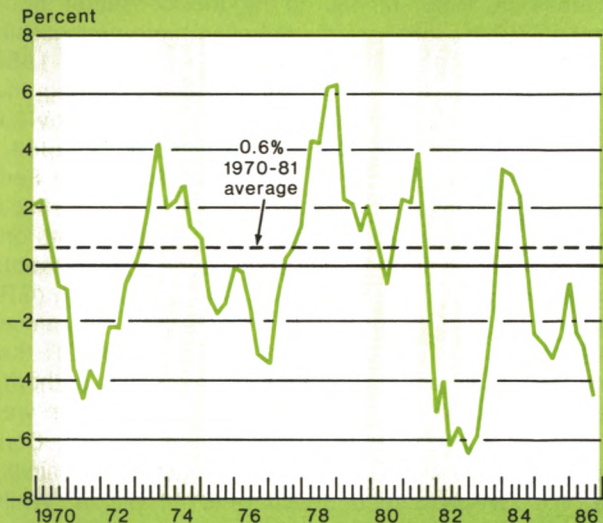
The economy and financial markets

Economy

Economic growth continued at a modest pace in 1986, the fourth year of an expansion that is now one of the

Chart 6

M2 Velocity Growth*

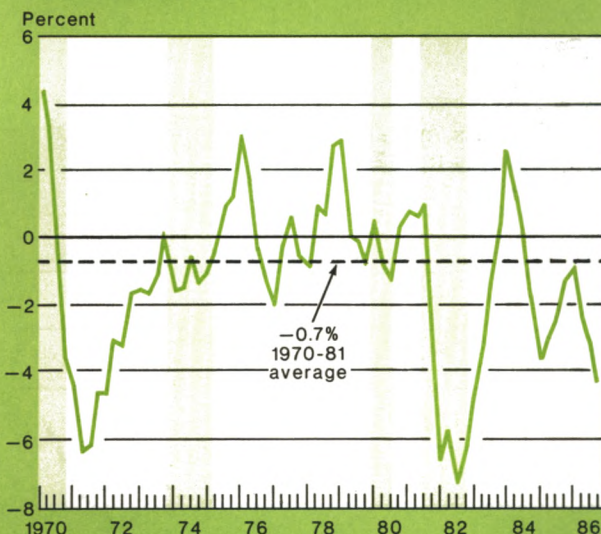


*Data from four quarters earlier.

Shaded areas represent periods of recession, as defined by the National Bureau of Economic Research.

Chart 7

M3 Velocity Growth*



* Data from four quarters earlier.

Shaded areas represent periods of recession as defined by the National Bureau of Economic Research.

longest in peacetime. From the fourth quarter of 1985 to the fourth quarter of 1986, real GNP expanded 2.0 percent, somewhat below the 2.9 percent growth rate in 1985. For the year as a whole, growth was spurred by personal consumption expenditures, residential construction, and inventory investment. But as in 1985, the more rapid growth of imports than exports was a drag on the economy, as was weak business fixed investment. Growth was uneven both over the year and across different sectors of the economy.

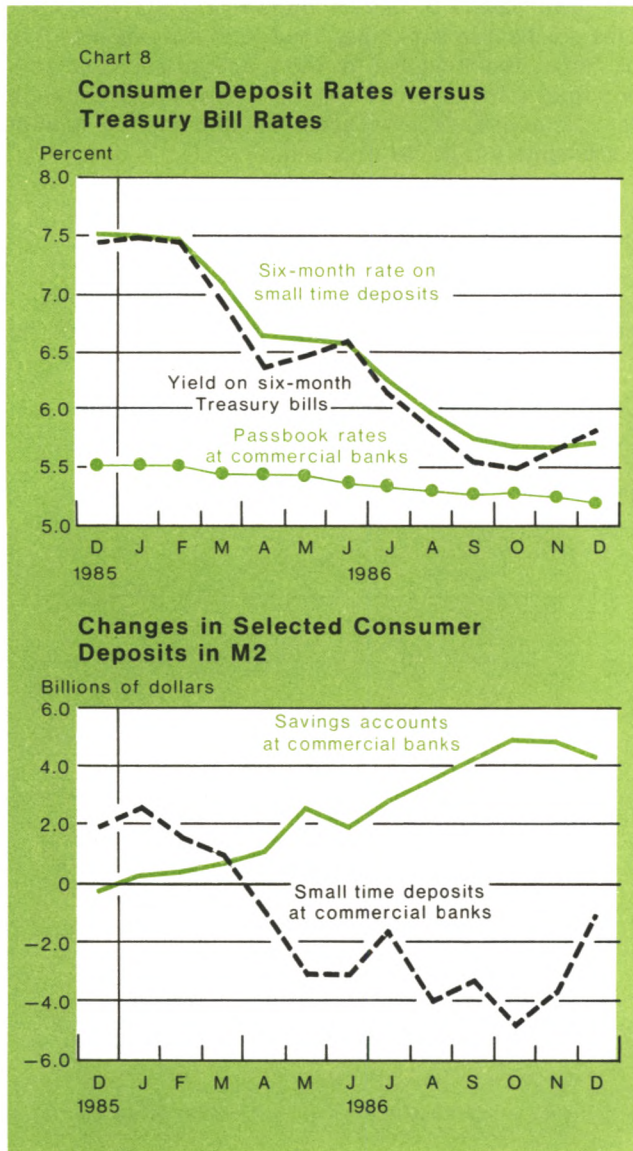
In the first quarter, strong private construction, inventory accumulation, and a temporary pick-up in net exports helped the economy grow at a robust 3.8 percent

rate,² considerably ahead of the 1985 fourth-quarter pace. Real GNP growth slowed to an almost negligible 0.6 percent rate in the second quarter of 1986, as the dramatic plunge in the price of oil led to a contraction in energy-related industries. The slowdown occurred despite an increase in consumer spending and continued strong residential construction. Having absorbed much of the negative impact on the energy sector of falling oil prices, economic activity rebounded in the third quarter of 1986, expanding at a 2.8 percent rate. This growth was supported by particularly strong consumer spending that was partly attributable to automobile sales incentive programs. Growth in the final quarter decelerated to a 1.1 percent rate, inhibited by the termination of automobile incentive programs and weak inventory investment.

Civilian employment rose by 2.3 percent from December 1985 to December 1986, somewhat above the 1985 growth rate. In absolute terms, employment grew most rapidly in the retail trade and service sectors, while manufacturing and mining saw declining employment until late in the year. Employment in agriculture also fell as the problems of the farm sector continued. Unemployment receded only slightly during 1986 as labor force expansion nearly kept pace with job creation. The unemployment rate hovered around the 7.0 percent mark for most of the year, dropping to 6.7 percent in December.

The inflation picture continued to improve in 1986 as falling energy costs restrained the growth of both consumer and producer prices. Measured by the broad implicit GNP deflator, prices increased by 2.1 percent in 1986 (1985-IV to 1986-IV), compared to a 3.3 percent increase in 1985. Measured by the consumer price index (CPI), the inflation rate fell even more dramatically from 3.7 percent in 1985 to 1.1 percent in 1986 (December to December). However, excluding the energy component, 1986 consumer prices rose by 3.8 percent, just below the 4.0 percent increase in 1985.

Little progress was made towards reducing the Federal budget deficit. It came in at \$221 billion for fiscal 1986, up \$9 billion from fiscal 1985 (including both on- and off-budget items). The year began with doubts about the constitutionality of the Gramm-Rudman (GR) budget reduction measure that was signed in December 1985. Indeed in February, a key provision of GR that gave the Comptroller General budget-cutting authority was struck down in a Federal court. The decision was later upheld by the Supreme Court. In October, Congress approved a fiscal year 1987 budget that nominally met the GR-prescribed deficit of \$144 billion. While achievement of the target relied on a variety of one-time revenue-raising and bookkeeping measures, it should be



²All monthly and quarterly data referred to in this section, with the exception of foreign trade figures, are seasonally adjusted. The data reflect revisions made through mid-April 1987.

noted that in the first quarter of the new fiscal year, October-December 1986, the deficit was running appreciably below the year-earlier level. This partly reflected temporary tax law effects, but it encouraged some observers to expect a noticeably smaller deficit for fiscal year 1987.

The foreign trade deficit also remained high in 1986. Despite a 15.3 percent decline in the trade-weighted dollar over the year, following a 15.7 percent decline in the previous year, the merchandise trade deficit swelled to \$166 billion from \$140 billion in 1985.³ While the value of exports increased by \$3.8 billion over the 1985 level, growth in demand for U.S. exports was limited by sluggish economic growth abroad. Signs of a reduction in imports that emerged in the spring were contradicted by a sharp deterioration in July, leading to a record third-quarter trade deficit. Though the nominal fourth-quarter trade deficit was little changed from that of the third quarter, real net exports picked up substantially, offering some hope of a turnaround in the trade picture.

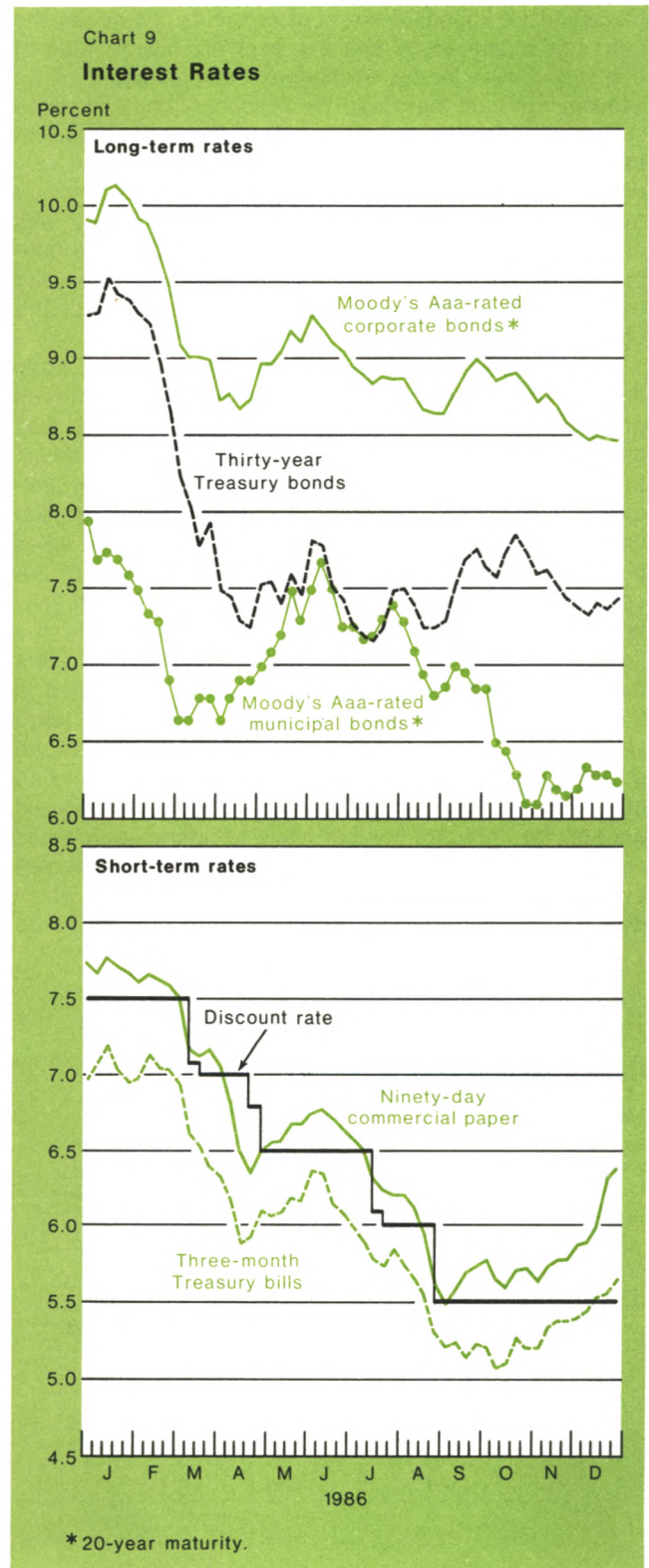
Domestic financial markets

Both long- and short-term interest rates fell substantially in 1986. The rally in the long-term bond market that began in 1984 continued until April (Chart 9). Long-term Treasury bond rates declined by about 250 basis points from mid-January until mid-April, while corporate yields fell less sharply. From mid-April until the end of the year, long-term yields changed little, on balance. A springtime run-up in coupon rates was reversed by the end of June. For the year as a whole, long-term Treasury rates eased by roughly 180 basis points.

Although short-term yields fell as well, the patterns were a little different. Short-term rates fell in March-April and again in June-August in association with discount rate cuts (Chart 9). For the year, the decline in short-term yields was less abrupt than long-term yield decline. Three- and six-month Treasury bill rates fell by about 145 basis points in 1986. Hence the Treasury yield curve became flatter than in 1985 (Chart 10). Interest rates on short-term private securities showed similar patterns to Treasury bills for much of the year, but rose sharply at year-end in the face of extraordinary credit demands.

The spectacular decline in oil prices was the dominant market influence in early 1986 and, on and off, through much of the year; from the beginning of the year until April, the spot price of Texas crude oil fell from more than \$25 per barrel to less than \$10 per barrel (Chart 11). The drop in energy prices contributed to the bond market rally by diminishing inflationary expectations and increasing the

³The reported dollar depreciation (December to December) is based on the Federal Reserve Board's trade-weighted index. The merchandise trade figure is on a revised Census basis.



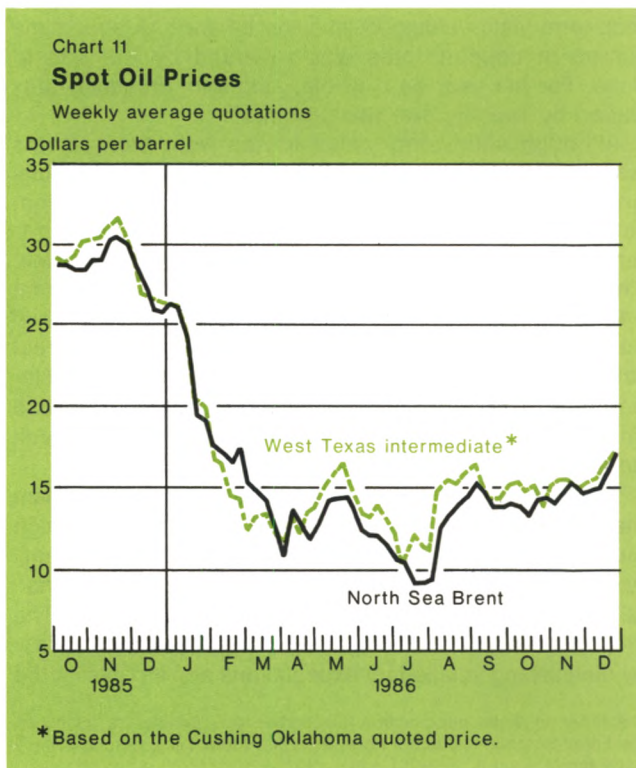
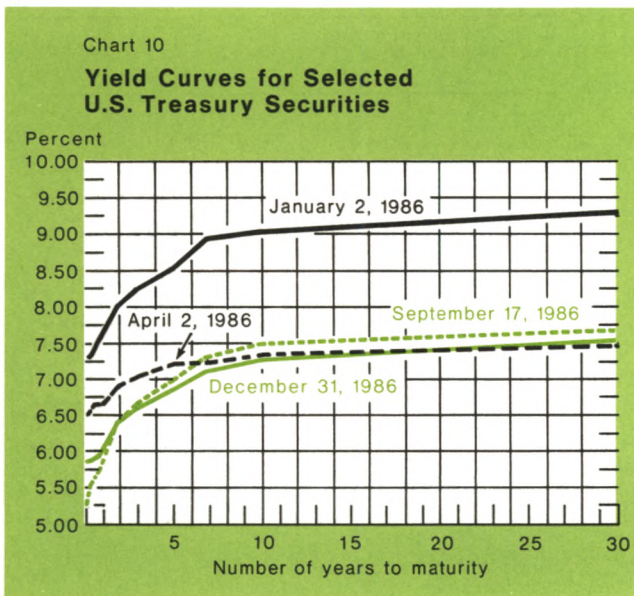
perceived likelihood of discount rate cuts. However, the rally was tempered by concern over the falling value of the U.S. dollar in the exchange markets, signs of an economic pick-up that could be inflationary once oil prices stopped falling, and the fate of the GR budget reduction measure. Short-term issues did not participate in the rally until early March when a coordinated discount rate cut by the United States, Japan, and West Germany was announced. Before the discount rate reduction, the 200-basis-point spread between 10-year Treasury issues and three-month Treasury bills that had prevailed at the beginning of the year was roughly halved.

The increase in yields between mid-April and early June was prompted by a temporary back-up in oil prices, indications of stronger economic growth, and renewed concerns about inflation and the sagging dollar. In particular, a reported 3.7 percent growth rate of first-quarter GNP (as of mid-May) was surprisingly large and was followed by reports of stronger production and sales in April. The Treasury announced the suspension of 20-year bond sales in late April, which meant the 30-year bond auctions held at midquarter would provide the Treasury's only new long-term debt. There were fears that Japanese investors would limit their participation in the Treasury's May refunding in the face of the large yield declines since February. However, Japanese demand for 10- and 30-year issues was reported to be quite strong. Moreover, Japanese and other holders did not sell the February 30-year issue to finance purchases of the new 30-year bond to the extent that was expected by dealers; hence a "short squeeze" developed in which dealers found it difficult to deliver the February issue

and some market participants experienced delivery fails and significant losses.

The decline in rates resumed in early June as new data contradicted the view that economic activity was heating up. These included reports of weak May employment growth and a downward revision of first-quarter GNP announced in mid-June. Although first-quarter GNP was revised back upwards in July, very slow second-quarter growth reported in late July reaffirmed the impression of economic sluggishness. While two discount rate cuts helped short-term rates to continue falling until the end of August, yield changes on longer term securities were mixed. Market participants were initially hopeful that debt-ceiling limitations would reduce the size of the Treasury's August refunding and then disappointed when the issue size was not cut. Concern over the willingness of Japanese investors to continue buying Treasury issues in view of the dollar's weakness and a bottoming out of oil prices in July also led to uneasiness among investors.

From the beginning of September until the end of the year, long-term rates were nearly unchanged while short-term rates rose moderately. Coupon rates rose somewhat through mid-October after evidence of faster growth emerged, especially the broad-based employment gains in August. The soaring price of gold and



moderate increases in other commodity prices aroused greater inflationary concern. Long-term rates drifted a bit lower near year-end after the Bank of Japan lowered its discount rate and economic data pointed to a sluggish economy. Price movements often reflected oil price changes, particularly as the December OPEC agreement to limit production approached, which helped lift prices from the \$15-per-barrel area to around \$18 per barrel by year-end. The dollar also staggered in the second half of December in thin trading. It fell sharply on December 31 following the report of a record trade deficit for November.

Short-term rates drifted higher from October until year-end as strong credit demands emerged. Lower 1986 capital gains taxes encouraged sales of appreciated assets and stimulated corporate mergers and acquisitions and leveraged buyouts before 1987. The new tax law also prompted automobile purchases in 1986 before the elimination of sales tax deductibility. Except for Treasury bills, which were heavily in demand for dressing up balance sheets, short-term rates rose quite sharply in December in response to these pressures.

Private foreign investors modestly expanded net purchases of U.S. financial instruments in 1986 above the 1985 level. However, the pattern of investment changed. Private foreigners cut back on net investment in U.S. Treasury issues and sharply increased acquisitions of equities; net purchases of corporate bonds and U.S. Government agency securities were slightly ahead of 1985 levels.⁴

The current account deficit grew more than private foreign capital inflows, contributing to the dollar weakness. When dollar declines became excessive in the eyes of official foreign institutions, they intervened to buy dollars, placing the proceeds in a mix of Treasury securities and bank deposits. Mostly in connection with foreign exchange market intervention, official foreign investors acquired at least a net of \$36 billion of Treasury bills and coupon issues.

In the Federally sponsored agency market, the Federal Farm Credit Banks System (FFCB) continued to suffer losses as a result of weakness in the agricultural sector. In the second and third quarters of 1986, losses exceeded earlier estimates, but did not significantly affect spreads of FFCB issues over Treasury issues. As demand for the FFCB's longer term issues waned, the agency reduced the average maturity of its offerings; the FFCB has not offered bonds with maturities exceeding one year since July 1986.

Early in the fall, Congress passed a bill that liberalized the FFCB's accounting rules with respect to amortization of loan losses and costs of outstanding high coupon debt. Despite the FFCB's troubles, its issues continued to attract enough demand to retain fairly narrow spreads against Treasury issues. This was partly because the FFCB reduced outstanding debt by \$6.5 billion over the year, and partly because investors largely retained confidence that "something would be done," perhaps through direct Federal assistance, to keep the entity solvent.

Corporate bonds

A record volume of corporate bonds was issued in 1986. According to the Federal Reserve Board, gross issuance in the United States totaled \$232 billion, nearly double the 1985 figure. But as interest rates fell to the lowest levels since 1979, some of the gross volume represented the refinancing of outstanding debt; net issuance was nearly \$100 billion below gross. Because of the increased risk to investors of bond calls, the spread between high-grade corporate securities and Treasury bonds (which offer better call protection) increased in 1986. Investors also grew wary of potential downgradings of outstanding debt should a firm announce take-over plans to be financed by additional bond sales.

Of the more than \$130 billion net corporate volume in 1986, a substantial proportion consisted of below-investment-grade "high-yield" or "junk" bonds. Many of these issues arose from merger and acquisition (M&A) and leveraged buyout activity; companies that financed take-overs by issuing debt often found that their outstanding debt issues were downgraded. The high-yield bond market suffered two major shocks in 1986. The first was the filing for Chapter 11 bankruptcy by the LTV Corporation in mid-July. The filing, which resulted from weaknesses in the energy and steel industries rather than M&A activity, caused a sharp decline in high-yield bond prices. Rising oil prices led to a partial reversal of the decline. The second major shock was the insider-trading scandal in November involving Ivan Boesky. The episode threatened to curtail M&As in general and brought into question the ability of a major underwriter of high-yield bonds to continue its active market-making role. After a plunge in high-yield bond prices, the market recovered some of its losses and activity picked up a bit. Still, some of the year-end financing of M&As that was supplied by banks would probably have been supplied by bond investors if the Boesky affair had not occurred.

The trend towards asset securitization continued in 1986. According to market estimates, new asset-backed issues totaled nearly \$70 billion in the year, about two-thirds of them collateralized by mortgages. But as falling long-term rates encouraged mortgage prepayments and the retirement of mortgage-backed securities, the

⁴According to Treasury data, private foreigners stepped up net purchases of U.S. corporate and municipal securities from \$40 billion in 1985 to \$44 billion in 1986 and more than tripled net equity investments to reach a level of \$19 billion. Private foreigners reduced their net acquisition of marketable Treasury issues from \$17 billion in 1985 to \$9 billion in 1986. Other sources suggest that the Treasury data understate net purchases by foreigners.

spreads between mortgage-backed issues and Treasuries widened to more than 200 basis points. After rates leveled off and substantial mortgage refinancing had already taken place, apparent prepayment risk diminished and spreads over Treasuries declined. The first security collateralized by credit card receivables appeared in 1986, and securities backed by automobile loan receivables were issued in substantial volume. In fact, the largest corporate offering of the year was a \$4.0 billion issue secured by General Motors Acceptance Corporation automobile and truck loans.

Municipal bonds

Changing perceptions of the impact of tax-reform legislation dominated the municipal bond market in 1986. This uncertainty and ultimate restrictions on municipal issuance contributed to the roughly 30 percent decline in the 1986 volume of new tax-exempt issues from the 1985 level, to perhaps \$160 billion; however, the rush of issues at the end of 1985 in advance of potential tax law changes made the slowdown look particularly dramatic. Until the tax reform bill took shape in August and September, uncertainty about the status of tax-exempt bonds weighed heavily on the market. In the first half of the year, the call risk that resulted from falling long-term interest rates added to investor uneasiness. Early in the year, a spread developed between bonds issued before January 1, 1986, and those issued afterwards since it appeared that post-January 1 issues might retroactively be subject to the alternative minimum tax. This spread disappeared in March as the Treasury and Congress dropped the notion of differential treatment.

Late in July, it appeared likely that bank investors would face restrictions on their ability to deduct the interest cost of financing municipal bond purchases. In the tax legislation that finally emerged, banks did indeed lose the deductibility of carrying costs. In addition, the legislation established three classes of municipal bonds: "public purpose" issues that remain tax-exempt, "private activity" (or industrial development) issues that are subject to the alternative minimum tax and volume limitations based on state population, and fully taxable securities. Shortly after the tax bill was passed, the first "stripped" municipal bond appeared in the market. Prior to the passage of the bill, tax-exempt issues could not be stripped without effectively losing their tax-exempt status.

Both tax-exempt bond mutual funds and property/casualty insurance firms stepped up their net purchases of municipal securities, particularly late in the year. According to Federal Reserve data, the bond funds increased their holdings by about \$60 billion over the year as few alternative tax shelters remained for household investors. Property/casualty insurance companies returned to the municipal bond market as major

investors for the first time in this decade; these firms increased their holdings of tax-exempt securities when improved profit performance gave rise to a need to shelter income.

Policy implementation

Open market operations

The FOMC prescribed essentially the same approach to implementing policy in 1986 as it had since 1983 (modified in February 1984 with the implementation of contemporaneous reserve requirements). The Desk targeted levels of nonborrowed reserves over two-week reserve maintenance periods that were believed to be consistent with achieving the degree of reserve pressure sought by the FOMC. Specifically, an indicated level of adjustment plus seasonal borrowing at the discount window was estimated to be associated with the degree of reserve pressure sought by the Committee. A reduction in the borrowing level would mean that banks would be able to meet an enlarged share of their reserve needs away from the discount window. Since access to the window has been restricted by frequency, amount, and reason for borrowing, declines in the pressure for banks to use the window have tended to lower money market rates.

For each maintenance period, nonborrowed reserve objectives were constructed by estimating bank demands for total reserves to meet requirements and to provide a cushion of excess reserves. From that demand for total reserves, the intended amount of borrowing was subtracted. What remained was the nonborrowed reserve objective. The Desk received daily estimates of what nonborrowed reserves would be for the period in the absence of any additional open market operations beyond those already undertaken. The difference between these estimates and the nonborrowed reserve objective was an indication of the reserves to be added or absorbed during the period.

In formulating the strategy for achieving the nonborrowed reserve objective during a maintenance period, the Desk took account not only of the overall direction and size of reserve adjustments, but also the estimated distribution of reserves within the maintenance period and the likelihood of revisions to the estimates. These latter considerations encouraged the relatively heavy use of short-term self-reversing reserve transactions.

To meet the objective, the Desk chose an approach that tried to assure that reserves were not so scarce on any given day that banks would have great difficulty in avoiding overdrafts. Such days occurred even in periods when reserves were sufficient, on average, for banks to meet their requirements easily. If reserves were not provided on those days, the efforts of banks to avoid running overdrafts would introduce unusual

upward pressures on the Federal funds rate and unusual demands for accommodation at the discount window. On the other side, if reserves were exceptionally high relative to requirements on particular days, there was a risk that banks would try to get rid of unwanted reserves and would push down the Federal funds rate in a manner that could be misleading as to the general intent of policy. While there were no restrictions on holding excess reserves, a bank's ability to work them off on other days was limited by the need to maintain a positive daily balance in its Federal Reserve account.

Usually, the reserve variation within a period was modest enough that the Desk did not have to plan to both add and drain reserves in the same period. Generally, it was able to meet a period's reserve need by adding reserves on those days when they were especially deficient while taking no actions on the other days. Similarly, in periods of overabundant reserves, the Desk sought to drain reserves on those days when reserves were particularly plentiful. On occasion, however, it was necessary to both add and drain reserves within a period in response to very large swings in market factors or major revisions to projected reserve needs.

Another consideration in planning a reserve strategy was the likelihood of revisions to staff estimates of reserve demands and supplies during the period. The staff made estimates of required reserves, the largest factor underlying reserve demand, by estimating levels of transactions deposits subject to reserve requirements and applying a reserve ratio. Estimating required reserves proved to be particularly difficult because of the unexpected strength in transactions deposits. The errors in required reserve forecasts grew on an absolute basis during 1986, and on average the forecasts tended to underpredict the final number for required reserves. Comparing the path estimate at the start of the maintenance period to the actual level showed an average absolute miss of \$400 million, well above the \$260 million absolute error in 1985. An unusually large \$1.8 billion underestimate in the period ended December 31, 1986, contributed to the miss.⁵ Excluding that period would reduce the average absolute error to \$340 million. On average there was an underprediction in 1986 of \$200 million, or \$135 million if the final period is excluded. While maintenance periods were in progress, the forecasts were revised as new data became available. The average absolute error in the required reserve estimates made on the final day of the maintenance period, the last time open market operations would be possible, was \$110 million, a bit higher than the \$70 million average in 1985.

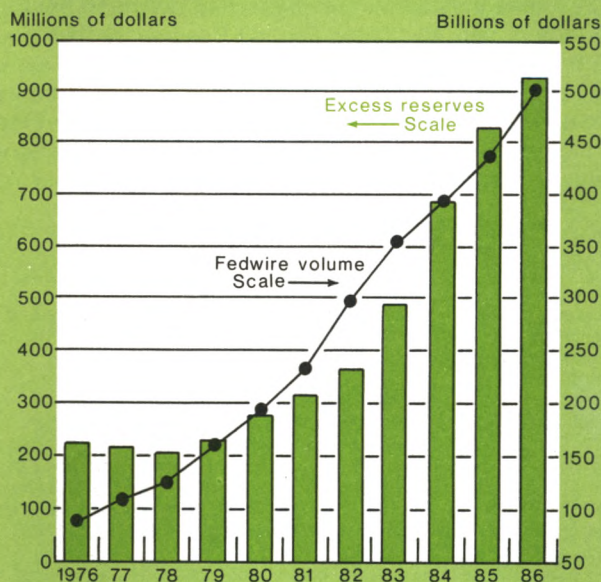
⁵Some revisions to required reserves at small institutions are matched by revisions to applied vault cash—that portion of vault cash that meets requirements. For the larger institutions, vault cash is

Forecasting excess reserves, the other component of demand, continued to be a challenge in 1986. Average excess reserves, which had been increasing annually since 1980, rose somewhat further in 1986, showing a rise of \$100 million, or \$75 million excluding the maintenance periods with midyear or year-end statement dates. A variety of factors apparently played a role in the increase. The volume of reserve transactions continued to expand as shown by the growing volume of clearing over Fedwire (Chart 12). The increased volume probably added to the banks' uncertainty about closing reserve positions and prompted them to hold higher reserve balances to avoid overdrafts.

The demand for excess reserves was probably raised very little if at all during the initial phase of the Federal Reserve's new policy to reduce "daylight" overdrafts,

Footnote 5 continued
predetermined based upon holdings two periods earlier and is known at the start of the period. However, for banks that have excess vault cash, applied vault cash is equal to their requirements. For those institutions, revisions to required reserves, which change the nonborrowed reserve objective, result in revisions to applied vault cash, which change the volume of reserves available to meet the objective. Hence, such revisions to required reserves do not change the amount of reserves needed to meet the objective. For the final maintenance period of 1986, applied vault cash turned out to be \$300 million higher than the initial estimate, providing some offset to the large miss in the required reserve forecast.

Chart 12
Growth of Fedwire Activity and Excess Reserve Levels
Daily averages



which began in March 1986. "Daylight" overdrafts occur when more funds are sent out over Fedwire than the institution has in its account at the Federal Reserve.⁶ The new policy encouraged participants to establish debit caps or limits on the amount of funds they could send to other banks in excess of funds received. These caps, based upon a self-evaluation of creditworthiness, were expressed as a multiple of capital, ranging up to three times capital for a single day. Institutions which did not follow the self-evaluation procedure were not allowed to incur overdrafts on Fedwire. Concern about incurring outside overdrafts could have influenced behavior even though the incidence of such overdrafts was minimal. All but a handful of banks had no difficulty staying well within the initial relatively generous guidelines. The few banks that ran close to their limits did not increase their excess reserves.

The Monetary Control Act of 1980 (MCA) and the Garn-St Germain Act of 1982 had contributed to the rise in excess reserves in earlier years but probably played only a limited additional role in 1986.⁷ Both the MCA and the Garn-St Germain Act provide for annual upward indexing of the zero and low reserve tranches for all institutions.⁸ The automatic rises in these limits are, in effect, reserve requirement reductions, which have tended to result in higher excess reserves.

Between 1980 and 1984, the MCA gradually reduced reserve requirements of member banks. It also imposed reserve requirements on nonmember institutions which have risen in annual increments. The process is to be completed in September 1987. The initial impact of the phase-up of reserve requirements for nonmember banks and thrifts was to raise excess reserves. Before the MCA, these institutions' reserves had not been held in the form of deposits at the Federal Reserve so they had not been counted in the total. Initial requirements were low, and only the larger institutions had requirements that exceeded their holdings of vault cash.⁹ Each step in the phasing up of reserve requirements on nonmember institutions brought a new group of banks'

⁶Daylight overdrafts can also arise on the Clearing House Interbank Payments System (C.H.I.P.S.) if a bank sends more funds over C.H.I.P.S. than it has received.

⁷For greater detail on these developments see "Monetary Policy and Open Market Operations in 1985," this *Quarterly Review* (Spring 1986), and other sources cited there.

⁸The MCA imposes a reserve requirement of 3 percent on transactions deposits up to a size limit (and 12 percent over that limit). The Garn-St Germain act exempts from reserve requirements reservable liabilities up to a lower size limit. Both of these limits are linked to deposit growth. The 3 percent tranche under the MCA rose from \$29.8 million in 1985 to \$31.7 million in 1986, while the exempt level under the Garn-St Germain Act rose from \$2.4 to \$2.6 million.

⁹Vault cash in excess of requirements is not treated as part of total or excess reserves.

requirements above their normal vault cash holdings so that they had to begin holding balances with the Federal Reserve. As they opened reserve accounts and used them for clearing purposes, they became candidates to hold excess reserves. Initially, they often needed more balances for clearing than to meet requirements. However, with the phase-in well along, some of the larger nonmember institutions that had been maintaining reserve accounts for some time found that reserves needed to avoid overdrafts no longer exceeded requirements by a wide margin. Thus, they were able to reduce excess reserves.

The variability and uncertainties affecting the demand for reserves have been mirrored on the supply side. Factors other than open-market operations that affect the supply of nonborrowed reserves, often called "market factors," have varied both from day to day and from period to period. The average absolute period-to-period change in the sum of all market factors in 1986 came to \$1.9 billion. At times market factors have been difficult to forecast. In 1986, overall forecast accuracy improved, with about a \$510 million average absolute error in the estimates made the first day of maintenance periods, compared to \$770 million in 1985. By the final day it had been reduced to \$90 million, similar to 1985.

As in past years, the Treasury balance at the Federal Reserve was responsible for a sizable share of both the overall market factor variation and the forecast errors. In 1986, the period-to-period absolute changes in the Treasury balance averaged \$1.7 billion, and the average absolute forecast error on the first day of the maintenance period was \$510 million. The forecast error for the first day was substantially smaller than the \$760 million figure for 1985, even though variability increased by about \$300 million. Forecasting in 1985 had been hampered by disruptions to the regular patterns of Treasury cash flows during the protracted Congressional impasse over the debt ceiling which extended through the debate on GR legislation.

Currency in circulation also was subject to sizable period-to-period variation with absolute first differences averaging \$1.2 billion in 1986. Nonetheless, currency was easier to forecast than the Treasury balance, as recurring seasonal patterns played a dominant role. The average absolute miss in the first day's forecast was \$225 million, similar to the previous year.

The first-day forecasts of float and extended credit borrowing also improved from 1985, making more modest contributions to the reduced overall error. Float predictability was aided by improved communications between Federal Reserve Banks and the Desk as to the timing of reserve adjustments to offset previous float-distorted reserve transfers. Extended credit borrowing (which is treated as a market factor) became less

variable, making forecasting easier. Other factors showed minor net offsetting changes.

To accomplish the desired reserve adjustments while taking account of both the variability and uncertainties in the reserve estimates, the Desk made heavy use of temporary transactions, arranging \$202 billion of System repurchase agreements and passing through to the market \$160 billion of customer-related RPs, both representing significant increases over the previous year's totals. In contrast, the Desk made limited use of matched sale-purchase agreements, arranging only \$21 billion in the market.

The Committee made only one policy adjustment to the assumed level for adjustment plus seasonal borrowing during the year, lowering it from \$350 million to \$300 million following the February FOMC meeting, which brought it more into line with recent experience. Planned borrowing was then only modestly above what was considered to be frictional levels,¹⁰ so there was little room to cut it further. Instead, when additional changes were contemplated, the Committee planned its reserve strategies on the expectation that reductions in reserve pressures would be accomplished with cuts in the discount rate. The rate was cut one-half percentage point on each of four occasions, in March (in the context of a coordinated move with other central banks), April, July, and August. This means of reducing reserve pressures was viewed as more feasible than lowering the path level of borrowing to the frictional range.

Operating with a borrowing assumption around frictional levels could have presented some difficulties. A one-day spike in borrowing could make it impossible to achieve the desired average borrowing level because borrowing on other days of a maintenance period could never go below zero. When there is not much room within the reserve specifications for borrowing to vary from day to day, the banks are effectively prevented from reducing aggregate reserve availability. That situation can make the Federal funds rate sensitive to very small misses either of the nonborrowed reserve objective or of estimates of the demand for reserves. A small overabundance could introduce unwanted excess reserves which, collectively, the banks could not eliminate. Their attempts to do so would tend to drive the Federal funds rate close to zero. On the other hand, a small shortfall of reserves relative to the desired level would require banks to step up their

borrowing, and would lift the funds rate above the discount rate. Thus, relatively small misses in reserve availability could lead the funds rate to bounce around within a relatively wide range.

Even with the borrowing objective around \$300 million, the Desk occasionally faced a situation where banks overborrowed early in the period, precluding achievement of the intended borrowing level. Sometimes the Desk did see an abundance of excess reserves drive down the funds rate, while at other times it chose to miss the nonborrowed reserve objective to avoid that outcome.

Actual borrowing ran below path more often than not in the first half of the year. However, there was one large overshoot in February, reflecting weekend wire problems at large banks. Borrowing ran above path over most of the summer and fall. It was boosted in the summer by technical adjustments as banks in regions dependent on oil encountered difficulties and turned to the discount window. Informally this "special situation" borrowing was thought of as nonborrowed reserves (at first only partly but later entirely). In late August, such borrowing was formally classified as extended credit borrowing and treated as nonborrowed reserves. The above-path borrowing in the fall reflected either higher-than-intended borrowing before the settlement day that could not be reduced to the path average or reserve shortfalls on the settlement day. Exceptionally strong reserve demands on and before the year-end statement date led to very high borrowing in the final period.

With policy generally accommodative of the bulges in M1 and required reserves during 1986, the Desk tended to be in a reserve-adding posture. Excluding brief periods in May and again in early September, when a combination of strong growth in the broader monetary aggregates and signs of a strengthening in economic activity led to a more cautious approach, the Desk was generally prompt in meeting estimated reserve needs and cautious in accomplishing drains. It was often willing to permit overshoots of the nonborrowed reserve objective if it appeared that the demand for excess or required reserves might be exceeding the estimates used to build the path.

Nonborrowed reserves ran well above the final day's objective in 10 of the 26 maintenance periods. The overshoots reflected mostly a tendency for the Desk to meet excess reserve demands when they seemed to be running above the formal path allowance or to provide more reserves when the money market suggested reserves were less plentiful than forecast. Late in the year in particular, these decisions were vindicated by sizable upward revisions to required reserves after the period ended. Significant reserve misses on the low side of the objective occurred in six periods scattered around spring and summer. At those times, there tended to be

¹⁰Frictional borrowing is defined as the borrowing that would occur even if the Federal funds rate were generally at or below the discount rate. Borrowing takes place in such circumstances because individual banks make miscalculations of their reserve positions and because reserve transfer systems are subject to periodic disruptions that may leave reserves poorly distributed. It is difficult to estimate exactly how much borrowing would occur on a routine basis if the Federal funds rate were below the discount rate. It would probably vary over the year and might depend upon how long the banks expected the rate relationship to last.

downward revisions to required reserves, below path excess reserves, and shortfalls in reserve estimates.

With discount window borrowing generally low and the demand for total reserves growing dramatically to support the rapid expansion of M1, nonborrowed reserves expanded an unprecedented \$12.5 billion in 1986, slightly outpacing the \$11.7 billion increase in required reserves (measured between year-end statement period averages). To support the increase in nonborrowed reserves and a \$14.1 billion increase in currency, the System's portfolio of Treasury and agency securities rose by a record \$20.2 billion. The remaining supply of reserves came from several sources. The RPs arranged during the last maintenance period of 1986 provided \$3.5 billion more reserves on average than those arranged in the corresponding period the year before. Over the year, growth in applied vault cash provided \$1.8 billion. Foreign currencies provided most of the balance. The revaluation of the Federal Reserve's foreign currency holdings provided \$1.9 billion while holdings themselves rose by about \$500 million, over half of which represented interest earned on the currencies. The biggest offset was the foreign RP pool which drained an additional \$900 million in the last period of 1986 compared to the previous year.

The net increase in the System portfolio was accomplished by adding \$19.1 billion of Treasury bills and \$1.5 billion of coupon issues, while running off \$400 million of maturing Federally sponsored agency issues. In adjusting its portfolio, the Desk leaned toward shorter maturities during the year, thus tending to assure the ample liquidity of the portfolio. It bought coupon issues in the market only once, compared with two or three market entries in recent years. When rolling over maturing coupon issues, it weighted its tenders for the new issues more heavily than in the recent past toward the shorter maturities while cutting back in its takings of longer term issues.

This emphasis on increasing the liquidity of the portfolio continued a tendency already under way in the last few years, which saw the average maturity of the System's portfolio of Treasury issues decline from 55 months at the end of 1980 to 49 months at the end of 1985. During 1986 there was a further shortening to 46 months. At the end of 1986, \$109 billion of the System's \$202 billion portfolio of Treasury and Federally sponsored agency securities was in Treasury bills.

Dealer surveillance developments

The major developments in 1986 were the significant changes to the list of primary dealers, including the addition of several new foreign-owned firms, and the passage of the Government Securities Act of 1986

(GSA) that will result in federal regulation of all brokers and dealers in government securities.

During 1986, five new firms were added to the list of primary dealer firms. This represented the largest addition to the list since 1976. These firms report daily to the Federal Reserve Bank of New York. The group of firms with which the Bank conducts business on behalf of the System Open Market Account is drawn from the primary dealer list. Among the 40 primary dealer firms, about half are diversified securities firms or affiliated with such securities firms, seventeen are banks or are affiliated with banks, and others are firms that specialize in government securities. Thirty-two are controlled by U.S. interests and eight are foreign owned. Five different countries are represented by the foreign-owned firms, reflecting the increased international character of the market and increased importance of foreign investors as holders of dollar-denominated assets in general, and U.S. Government securities in particular.

In October, Congress enacted the GSA to provide for the first time federal regulation of all government securities brokers and dealers. Congress designated the Treasury Department as the rulemaker for government securities brokers and dealers, in consultation with the Federal Reserve Board and the Securities and Exchange Commission. The Act provided that the Treasury rely on existing SEC or depository institution regulations where appropriate and assigned enforcement and examination responsibilities to existing depository institution supervisors and to the SEC and self-regulatory organizations for securities firms. The Treasury published proposed rules for comment on February 24, 1987; the final rules will become effective July 25, 1987.

Conducting open market operations

January to late August

Monetary policy over the first eight months of the year generally accommodated the strong demand for reserves associated with the growth in the demand for transactions balances. The degree of pressure on bank reserve positions was eased gradually in view of apparently sluggish economic growth, well-contained price pressures and moderate growth in the broader monetary aggregates within the Committee's desired long-run ranges. The initial move toward easing began in late December 1985 with a \$100 million decrease in the path allowance for seasonal plus adjustment borrowing and was followed by an additional \$50 million downward adjustment in mid-February 1986. Subsequent adjustments to the stance of monetary policy took the form of four 50-basis-point cuts in the discount rate in early March, late April, mid-July, and late August. However, in late May, the Desk met reserve needs a bit more cautiously as money growth

exceeded expectations and data suggested that economic growth was accelerating.

At its December 1985 meeting, the FOMC directed the Desk to decrease somewhat the degree of pressure on reserve positions. Specifications from the FOMC directives, including guidelines for intermeeting period adjustments to the reserve posture, are presented in Table 1. The allowance for adjustment and seasonal borrowing used in construction of the nonborrowed reserve path was lowered to \$350 million from \$450

million. During that intermeeting period, the usual allowance for excess reserves was raised from \$700 million to \$800 million to reflect recent actual levels. In addition, the allowance was raised temporarily in the maintenance period ended January 1 to accommodate year-end pressures.

Overnight borrowing declined to fairly low levels relative to the path allowances in January and the first part of February. At times, against a background that included light borrowing, very firm conditions in the

Table 1

Specifications from Directives of the Federal Open Market Committee and Related Information

Date of Meeting	Short-term Annualized Rate of Growth Specified for Period Indicated			Borrowing Assumption for Deriving Nonborrowed Reserve Path	Discount Rate	Notes
	M1	M2	M3			
	(percent)			(millions of dollars)	(percent)	
12/16 to 12/17/85	7 to 9*	November to March 6 to 8	6 to 8	350	7 1/2	The Committee sought to decrease somewhat the existing degree of pressure on reserve positions. Somewhat greater reserve restraint might, and somewhat lesser reserve restraint would, be acceptable depending on the behavior of the aggregates, the strength of the business expansion, developments in foreign exchange markets, progress against inflation, and conditions in domestic and international credit markets.
2/11 to 2/12/86	7*	November to March 6	7	300	7 1/2 7 on March 7†	The Committee sought to maintain the existing degree of pressure on reserve positions. Somewhat greater or somewhat lesser reserve restraint might be acceptable depending on behavior of the aggregates, the strength of the business expansion, developments in foreign exchange markets, progress against inflation, and conditions in domestic and international credit markets.
4/1/86	7 to 8*	March to June 7	7	300	7 6 1/2 on April 18†	The Committee sought to maintain the existing degree of pressure on reserve positions. Somewhat greater or somewhat lesser reserve restraint might be acceptable depending on behavior of the aggregates, the strength of the business expansion, developments in foreign exchange markets, progress against inflation, and conditions in domestic and international credit markets.

*It was noted that the behavior of M1 continued to be subject to unusual uncertainty.
†Announcement date.

money market, uncertainties in the reserve projections, and indications that the demand for excess reserves would be higher than formally allowed for, the Desk provided more nonborrowed reserves than suggested by the paths. Such provision was designed to avoid excessive pressures in the money market and to alleviate the need for borrowing to bulge on settlement days. As a result, in two of the first three periods of the year, nonborrowed reserves averaged above the formal objectives while borrowing averaged below path.

Table 2 presents period average levels of the reserve components.

The year began with a projected need to drain reserves as the year-end bulge in money unwound. However, the seasonal need to absorb reserves was delayed until early February, mostly because of unusually high levels of the Treasury's balance. The balance rose beyond the capacity of the Treasury tax and loan accounts when January tax revenues were added to balances already swollen by year-end sales of securities

Table 1

Specifications from Directives of the Federal Open Market Committee and Related Information (continued)

Date of Meeting	Short-term Annualized Rate of Growth Specified for Period Indicated			Initial Borrowing Assumption for Deriving Nonborrowed Reserve Path (millions of dollars)	Discount Rate (percent)	Notes
	M1	M2	M3			
5/20/86	12 to 14*	March to June 8 to 10	8 to 10	300	6 1/2	The Committee sought to maintain the existing degree of pressure on reserve positions. This action was expected to be consistent with a deceleration in money growth over the balance of the quarter. If the anticipated slowing in monetary growth did not develop, somewhat greater reserve restraint would be acceptable in the context of a pickup in growth of the economy, taking account of conditions in domestic and international financial markets and the behavior of the dollar in foreign exchange markets. Somewhat lesser reserve restraint might be acceptable in the context of a marked slowing in money growth and pronounced sluggishness in economic performance.
7/8 to 7/9/86	n.s. ‡	June to September 7 to 9	7 to 9	300	6 1/2 6 on July 10 †	The Committee sought to decrease somewhat the existing degree of pressure on reserve positions, taking account of the possibility of a change in the discount rate. Somewhat greater or lesser reserve restraint might be acceptable depending on the behavior of the aggregates, the strength of the business expansion, developments in foreign exchange markets, progress against inflation, and conditions in domestic and international credit markets.

*It was noted that the behavior of M1 continued to be subject to unusual uncertainty.

†Announcement date.

‡It was noted that while growth in M1 was expected to moderate from the exceptionally large increase during recent months, that growth would continue to be judged in light of the behavior of M2 and M3 and other factors.

n.s. Not specified.

Table 1

Specifications from Directives of the Federal Open Market Committee and Related Information (continued)

Date of Meeting	Short-term Annualized Rate of Growth Specified for Period Indicated			Initial Borrowing Assumption for Deriving Nonborrowed Reserve Path	Discount Rate	Notes
	M1	M2	M3			
8/19/86	n.s.†	(percent) June to September 7 to 9	7 to 9	300	6 5½ on August 20†	The Committee sought to decrease slightly the existing degree of pressure on reserve positions. Somewhat greater or lesser reserve restraint might be acceptable depending on the behavior of the aggregates, the strength of the business expansion, developments in foreign exchange markets, progress against inflation, and conditions in domestic and international credit markets.
9/23/86	n.s.†	August to December 7 to 9	7 to 9	300	5½	The Committee sought to maintain the existing degree of pressure on reserve positions. Slightly greater reserve restraint would, or slightly lesser reserve restraint might, be acceptable depending on the behavior of the aggregates, taking into account the strength of the business expansion, developments in foreign exchange markets, progress against inflation, and conditions in domestic and international credit markets.
11/5/86	n.s.†	September to December 7 to 9	7 to 9	300	5½	The Committee sought to maintain the existing degree of pressure on reserve positions. Slightly greater or slightly lesser reserve restraint might be acceptable depending on the behavior of the aggregates, taking into account the strength of the business expansion, developments in foreign exchange markets, progress against inflation, and conditions in domestic and international credit markets.
12/15 to 12/16/86	n.s. Growth in M1 will continue to be appraised in light of the behavior of M2 and M3 and other factors in the directive.	November to March 7	7	300	5½	The Committee sought to maintain the existing degree of pressure on reserve positions. Slightly greater reserve restraint or somewhat lesser reserve restraint would be acceptable depending on the behavior of the aggregates, taking into account the strength of the business expansion, developments in foreign exchange markets, progress against inflation, and conditions in domestic and international credit markets.

†Announcement date.

‡It was noted that while growth in M1 was expected to moderate from the exceptionally large increase during recent months, that growth would continue to be judged in light of the behavior of M2 and M3 and other factors.

n.s. Not specified.

to state and local government entities. The Treasury balance ran as high as \$19.1 billion on January 22, creating massive reserve needs in a period that normally would involve seasonal draining. Uncertainties about reserve levels were compounded by wide swings in the size of the foreign investment pool. Against this background, the Desk provided reserves in January mostly through a combination of overnight and term System repurchase agreements and customer-related repurchase agreements. On occasion, the Desk preannounced a System RP to enlarge the feasible size. The Desk also arranged one 15-day RP operation for a customer to keep the order from unduly inflating the daily foreign investment pool.

The seasonal need to absorb reserves materialized in February and was accomplished primarily with sales of Treasury bills to foreign accounts totaling \$2.5 billion and redemptions of \$1 billion. The net decline in System holdings over the month of February was about \$3.5 billion. Matched sale-purchase transactions were

arranged on a number of occasions to reduce temporary reserve overages. The Federal funds rate hovered around 8 percent over much of January but moved into a range of 7³/₄ to 7⁷/₈ percent in early February as the heavy absorptions from market factors lessened.

In accordance with the decision of the Committee, Desk operations in February and March sought to maintain reserve conditions similar to those that prevailed in the weeks immediately preceding the February 11-12 meeting. At that meeting, there was concern that short-term rates had shown little tendency to decline and the Federal funds rate remained significantly above the discount rate despite the more accommodative policy stance since the previous meeting. With this in mind, it was noted that the discount rate might need to be reduced to permit or accommodate a market tendency toward lower rates and that such a move would be a desirable complement to open market operations, depending on evolving economic and financial circumstances; in light of the risks for the dollar in foreign exchange markets, there was particular concern that any

Table 2

1986 Reserve Levels

In millions of dollars, not seasonally adjusted

Period Ended	RR current	RR first published	ER current	ER first published	TR	Adj. & Seas. BR	NBR plus Extended Credit BR current	NBR plus Extended Credit Br first published	NBR Interim Objective*	Extended Credit BR
Jan. 1	47,644	47,620	1,307	1,306	48,950	866	48,084	48,060	48,252	472
15	48,294	48,489	1,276	1,252	49,570	143	49,427	49,598	48,875	471
29	45,743	45,873	921	792	46,663	374	46,289	46,291	46,306	529
Feb. 12	45,629	45,701	1,187	1,186	46,815	182	46,633	46,706	46,216	480
26	45,408	45,399	1,038	1,003	46,445	594	45,851	45,808	45,917	506
Mar. 12	46,142	46,241	976	909	47,118	229	46,889	46,921	46,861	475
26	46,187	46,412	926	804	47,113	234	46,879	46,981	47,007	535
Apr. 9	47,479	47,571	622	621	48,101	298	47,803	47,894	48,145	576
23	48,703	48,646	873	956	49,575	190	49,386	49,413	49,134	671
May 7	47,612	47,548	888	928	48,500	344	48,156	48,131	48,148	637
21	47,554	47,481	688	739	48,241	256	47,985	47,964	48,060	571
June 4	47,600	47,558	1,014	1,074	48,613	305	48,308	48,327	48,123	566
18	49,627	49,482	636	707	50,262	193	50,070	49,997	50,087	526
July 2	48,755	48,733	1,247	1,324	50,002	354	49,648	49,703	49,465	525
16	50,871	50,882	679	599	51,550	316	51,234	51,166	51,539	442
30†	49,528	49,472	1,117	1,182	50,644	408	50,236	50,246	50,085	294
Aug. 13†	50,592	50,557	585	589	51,177	386	50,791	50,760	51,149	373
27†	50,279	50,351	867	790	51,146	395	50,751	50,747	50,896	515
Sept. 10	51,268	51,343	793	752	52,061	519	51,542	51,576	51,966	592
24	52,964	53,001	706	649	53,670	412	53,258	53,238	53,537	569
Oct. 8	53,287	53,140	660	849	53,946	364	53,583	53,626	53,708	538
22	54,170	54,122	751	775	54,921	283	54,638	54,615	54,689	488
Nov. 5	53,947	53,827	814	908	54,761	423	54,338	54,313	54,365	476
19	55,599	55,468	916	1,067	56,515	374	56,141	56,161	55,959	437
Dec. 3	55,865	55,758	1,130	1,330	56,995	242	56,753	56,846	56,255	368
17	57,511	57,366	740	823	58,251	204	58,048	57,985	57,865	310
31	59,369	59,292	2,048	2,345	61,417	904	60,513	60,733	60,314	282

*As of final Wednesday of reserve period.

†Special situation borrowing raised average adjustment borrowing in the July 30, August 13, and August 27 periods by about \$120 million, \$175 million, and \$102 million, respectively. It was classified as extended credit borrowing beginning August 21.

such measure be taken in the context of similar action by other important industrial countries to avoid a decline in the dollar that might feed upon itself. On March 7, following discount rate cuts in West Germany and Japan, and sizable declines in most market interest rates in recent weeks, the discount rate was reduced to 7 percent from 7½ percent.

Consistent with the February directive and the lower average level of borrowing after year-end, the nonborrowed reserve paths were built with an allowance for \$300 million of adjustment plus seasonal borrowing subsequent to the February meeting. Borrowing was inflated by technical factors associated with wire transfer problems in the period following the meeting but was light in the two periods in March. The usual allowance for excess reserves was raised by \$100 million to \$900 million in late February to reflect recent experience.

Reserve availability in March fluctuated within a moderate range. Reserves were managed with relatively few temporary transactions and small purchases of bills from foreign accounts at the end of the month. The Federal funds rate generally ran close to expectations, occasionally drifting to the firm side, especially when there were wire problems. The funds rate eased at other times, including when the March discount rate cut was anticipated and when reserves were temporarily quite abundant. Over the first half of the February-March intermeeting period, Federal funds traded mostly in a range of 7¾ to 8 percent; following the discount rate reduction in early March, the rate moved into a range around 7⅞ percent.

At its April 1 meeting, the Committee voted to maintain, at least initially, the existing degree of pressure on reserve positions. On April 21, after the announcement of a reduction of the discount rate to 6½ percent, the Committee held a telephone conference and agreed to maintain this directive. Recognizing that partial data suggested a strengthening in all monetary aggregates in recent weeks, it was understood that in carrying out open market operations within the framework of the directive, a degree of caution should be exercised to avoid an impression that a further change in the discount rate was sought over the period immediately ahead.

The Desk faced generally large needs to add reserves over April and May reflecting, at various times, increases in required reserves, currency, the foreign RP pool, and the Treasury balance. The Treasury balance was subject to wide swings and proved difficult to predict. Mindful of the Committee directive and against the background of a frequently soft money market, weakness in the dollar in the foreign exchange markets, and uncertainty regarding the Treasury's balance, the Desk at times adopted a particularly cautious approach to timing its reserve injections.

The Desk addressed these reserve needs through a combination of Treasury bill purchases and repurchase agreements. Treasury bill purchases included purchases in the market in early April of \$1.95 billion and purchases from foreign accounts over April and May totaling \$1.7 billion. Both System and customer-related repurchase agreements were arranged to increase reserve supplies temporarily and were particularly large over a brief period between late April and May 1 when both the Treasury balance and foreign RP pools swelled to very high levels. On one occasion early in the first maintenance period, a round of matched sale-purchase agreements was arranged in the market when reserve injections proved to have been overdone.

Borrowing mostly averaged close to the path allowance in April and May, but was somewhat below the allowance in the April 23 period, in part because of exceptionally light use of the discount window around midperiod when the market anticipated a discount rate reduction. Also in that period, reserve needs were satisfied on the final day by an unanticipated bulge in float and a large shortfall in the Treasury balance. The Treasury ended with an unplanned overdraft of about \$300 million, despite having substantial cash in the tax and loan accounts. The balance was brought back above zero using cash inflows the next day. Excess reserves fell to low levels in early April and mid-May but were otherwise close to the path allowances.

Expectations of a discount rate cut caused the funds rate to move erratically around mid-April and the rate dropped sharply prior to the actual announcement of a rate reduction. Overall, the funds rate declined about one-half percentage point from the rate prevailing around the time of the previous meeting and funds generally traded in a range of 6¾ to 7 percent between late April and late May.

At the May 20 FOMC meeting, the Committee voted to maintain the prevailing degree of reserve restraint but, against a background of greater than anticipated growth in all of the aggregates, a majority of the members felt that policy implementation over the intermeeting period should be alert to the potential need for some firming of reserve conditions, especially if business indicators gave a clear signal of a pickup in the rate of economic expansion and monetary growth did not slow in line with expectations. Shortly after the meeting, in the face of stronger growth in both M1 and M2 than had been anticipated, the Desk was a bit cautious in the way it met reserve needs. However, in June, as economic data indicated that business activity was growing at a slower pace rather than picking up, the Desk moved to meet reserve needs a bit more promptly.

Borrowing averaged close to the path allowance over the May-July intermeeting period with occasional

misses. Borrowing was somewhat below the path in mid-June when the need to borrow was reduced by a much lower than normal demand for excess reserves. In the July 2 period, borrowing averaged above path as a result of a pickup near the close associated with wire problems and the quarter-end statement date. The Desk deliberately overshot the nonborrowed reserve objective to alleviate undesirably firm conditions in the money market. As a result, the excess reserve allowance, which had been temporarily raised to \$1.1 billion to accommodate heavy quarter-end and statement date demands, was also exceeded in that period.

The Desk continued to face sizable reserve needs in June. Required reserves showed more than seasonal strength reflecting the strong growth in checkable deposits. Currency demand was seasonally strong throughout the interval. Also absorbing reserves were higher than normal levels of the foreign overnight investment pool.

The Desk met the reserve needs by purchasing Treasury bills and arranging repurchase transactions. It bought \$2.5 billion of bills in the market in late May and another \$1.9 billion from foreign accounts gradually over the period. Desk plans for additional market purchases of bills were postponed as persistent shortfalls in the Treasury's balance reduced the projected reserve needs for late June and July. The Federal funds market was often on the comfortable side, with funds trading in a narrow range around $6\frac{7}{8}$ percent, although conditions were occasionally firmer when statement and Treasury note settlement date pressures or wire problems developed.

At the July meeting, against the background of a sluggish expansion in economic activity and a subdued rate of inflation, most Committee members believed that some easing was desirable. Taking account of the likelihood that the discount rate would be reduced within a few days after the meeting, a majority indicated a preference for implementing the easing, at least initially, through a lower discount rate rather than through open market operations. The discount rate was reduced to 6 percent shortly after the meeting.

In the periods between late July and mid-August, borrowing averaged about \$100 million above the \$300 million path allowance, in part as a result of special situation borrowing by banks experiencing problems related to oil industry loans. The special situation borrowing not classified as extended credit averaged about \$120 million in the late July maintenance period and about \$175 million in the next period. Nonborrowed reserves also diverged from path levels, reflecting informal adjustments for swings in the demand for excess reserves as well as unanticipated movements in market factors late in each period. However, in the mid-August period, most of the reserve miss was

deliberate, after taking into consideration the special borrowing and expected low excess reserve demand. Excess reserves were either moderately above or below the path allowance in each maintenance period, reflecting unusually large swings in reserve carryover positions as well as the nonborrowed reserve misses.

The seasonal need to add reserves tapered to a moderate size in the second half of July. The Desk addressed the reserve needs primarily by arranging customer-related repurchase agreements in the market, although System repurchase agreements were arranged early in the intermeeting period when the need was still considerable. In addition, the Desk purchased a total of \$1.4 billion of bills from foreign accounts as opportunities developed. Federal funds generally traded in the $6\frac{1}{4}$ to $6\frac{3}{8}$ percent area after the July 10 announcement of the discount rate cut, down from $6\frac{7}{8}$ percent at the time of the July meeting.

Late August to year-end

Open market operations over the final four months of the year were generally directed toward implementing the slightly more accommodative stance adopted at the August FOMC meeting and embodied in the 50-basis-point reduction in the discount rate that closely followed that meeting. While average borrowing exceeded the path allowances in September and early October, the desired easing was reflected in the money market, where Federal funds traded mostly around $5\frac{7}{8}$ percent or a shade lower. The borrowing overages generally reflected reserve needs that did not show through to the market until late on settlement day, or a clearing need resulting from an unexpected late-day outflow. However, over November and much of December, while nonborrowed reserve objectives were mostly achieved or even exceeded and borrowing averaged close to the \$300 million allowance, the Federal funds rate tended to firm. Desk efforts to alleviate the unusual money market pressure and keep pace with reserve needs were repeatedly frustrated by relentless upward revisions to required reserves, a lessened use of the discount window, and unpredictably high demands for excess reserves.

At the August FOMC meeting, the Committee issued a directive that called for a slight decrease in reserve pressure, taking account of the possibility of a change in the discount rate. The reduction in the discount rate to $5\frac{1}{2}$ percent shortly thereafter accomplished the desired easing and the Desk operations continued to aim for \$300 million of seasonal plus adjustment borrowing and \$900 million of excess reserves. However, in early September, the Desk was a shade more cautious in injecting reserves to meet projected needs against a background that included continuing strength

in the monetary aggregates, scattered indications of a pickup in economic growth, and increased market concern about inflation.

Borrowing tended to exceed the formal path allowance between late August and late September. In the August 27 period, special situation borrowing raised daily borrowing above path until the second week when it was reclassified as extended credit borrowing. Excluding the special borrowing, borrowing was very close to the path objective. Average borrowing in the next period was lifted about \$200 million above path, largely because an upward revision to required reserves of \$400 million on the last day of the period introduced a need that could not be completely met (total propositions for the Desk's RP operation that day fell short of the desired injection), and the demand for excess reserves exceeded expectations. In the September 24 period, unexpected late-day outflows caused a bulge in borrowing which contributed to another borrowing overage.

In allowing for excess reserves over the August-September intermeeting period, the Desk took into account the likelihood that demand would fall below path. The lower demand was suggested by money market conditions, the distribution of excess reserves as the maintenance periods progressed and, in the September 24 period, the phase-up of reserve requirements at non-member institutions. However, downward revisions to required reserves after the periods ended lifted excess reserves somewhat closer to path allowances.

The Desk faced fairly sizable reserve needs in September as first currency, and then the Treasury balance, rose. A large portion of the reserve needs was met by the Desk's purchase of \$2.1 billion of Treasury bills in the market in late August and purchases from foreign accounts totaling about \$900 million. Temporary transactions supplemented these reserve injections.

With the Desk making informal allowance for low excess reserve demand, nonborrowed reserves fell somewhat short of path in the periods between late August and late September. On a number of occasions, nonborrowed reserves averaged somewhat below the level expected on the final day, partly as a result of reserve shortfalls. Federal funds generally traded in a narrow range around $5\frac{7}{8}$ percent following the August 20 announcement of the discount rate cut to $5\frac{1}{2}$ percent.

At the September FOMC meeting, the Committee adopted a directive that called for maintaining the prevailing degree of pressure on reserve positions but indicated that it would be more likely to move toward slightly greater rather than lesser reserve restraint depending on monetary, economic, and foreign exchange conditions. In the absence of further developments calling for adjustment of reserve positions, no changes were made to the path allowance for borrowing. The typical allowance for excess reserves was

lowered by \$50 million to \$850 million on October 22 to reflect the recent behavior of excess reserves.

Over the September-November intermeeting period, borrowing frequently averaged higher, and excess reserves lower than expected, in part because underestimates of required reserves repeatedly understated reserve needs. Nonborrowed reserves averaged modestly below the objectives, mostly as a result of the lower than anticipated levels on the last day of the maintenance periods.

Overnight borrowing ran above path in late September but then tapered down to very low levels in October, except on settlement days, as small banks made less use of the window and as seasonal borrowing worked lower. Heavy settlement day use of the discount window raised average borrowing considerably above its objective in the early October and November periods. Upward revisions to required reserves after the maintenance periods ended more than offset the effects of these unexpected borrowings on the level of excess reserves and reduced average excess reserves below expected levels. The comfortable tone in the money market until very near the periods' ends suggested that the level of reserve needs may have been underestimated by bank reserve managers as well.

High levels of the Treasury's balance continued into early October, which, together with an increase in the foreign investment pool, created a sizable need. Reserve needs were more moderate later in the month. Over the intermeeting period, guided by the size and duration of the reserve needs, the Desk arranged both System and customer-related repurchase agreements, with a number of the former extending over multiple days. The Desk also purchased a total of \$1.3 billion of Treasury bills from foreign accounts. Federal funds generally traded close to $5\frac{7}{8}$ percent although the range of trading was quite broad at the quarter-end and on most settlement days.

Over the fall, economic activity continued to show signs of moderate growth while growth of the broader aggregates tempered somewhat. Against this background, at its November and December meetings, the Committee voted to maintain the existing degree of reserve restraint. However, in December, economic data suggested a greater possibility for slower rather than faster growth over the near term. With this in mind, while the Committee called for no immediate change in reserve pressure, it expressed a slightly greater willingness to move toward lesser rather than greater restraint, depending on the behavior of the monetary aggregates, taking account of the strength of the economy, developments in the foreign exchange markets, domestic and international financial market conditions, and the outlook for inflation.

Policy was implemented over the final two months of the year against a background of persistently stronger than expected demands for reserves. Hence, while nonborrowed reserve supplies on average were about in line with or above the objectives, the pressures on reserve positions were sometimes greater than intended. Extraordinarily strong credit demands and accelerating growth in deposits subject to reserve requirements helped push overnight and other short-term interest rates far above normal levels earlier and more persistently than in recent years. The strong credit demands, particularly for commercial, industrial, and real estate loans from large banks, added to the volume of flows through reserve accounts and to the uncertainty about reserve levels. These developments may have made banks a little hesitant to use up their access to the discount window, especially those banks that had borrowed in recent periods. Aggressive foreign agency bank buying of term Federal funds to cover year-end needs, which were enlarged by strong credit demands, may have contributed to the firmness as early as mid-November. During November, Federal funds traded mostly in a range around $5^{15}/16$ percent. December trading conditions were generally firmer with the funds rate most frequently between 6 and $6^{1}/2$ percent.

The demand for bank loans soared over the final weeks of 1986 as businesses and investors rushed to complete transactions which would receive less favorable tax treatment beginning in 1987. The loans may have been the dominant factor underlying the unusual acceleration in deposit growth as some loans were taken in the form of demand deposits. The higher balances may have been retained to handle the increased transactions volume and to meet increased compensating balance requirements.

The extraordinary growth of bank loans and reservable deposits made it very difficult to estimate reserve demands. Often, upward revisions to required reserve levels were as big as \$500 million during a period and pushed another \$100 million to \$150 million higher after the period ended. The required reserve revisions in the year-end period cumulated to \$1.6 billion during the period, and to \$1.8 billion when final reserve requirements were known shortly thereafter. It was also difficult to project the desired levels of excess reserves because banks, uncertain of their needs, became more cautious about releasing funds.

Between mid-November and year-end, nonborrowed reserves exceeded the formal objectives, but most of the overages were intended. Against the background of special seasonal and technical factors, the Desk made frequent allowances for higher excess reserve demands.

In the December 17 period, the Desk provided more reserves than formally called for because of a string of shortfalls during the period and a taut money market which suggested the need might be greater than projected. Borrowing until the final day averaged only \$90 million, and the Desk was willing to mitigate the bulge in settlement day borrowing that would have been needed to attain the path objective.

In the year-end period, although the nonborrowed reserve objective allowed for \$1.4 billion of excess reserves (\$100 million more than occurred in the equivalent period a year earlier), the Desk provided more reserves than formally indicated in light of the extreme money market pressures. While the very generous overage was reduced somewhat by a much higher than anticipated Treasury balance on the final day, reserve supplies more than met the banks' needs and the funds rate plunged from 38 to 0 percent over the course of the final day. Some banks actually paid a brokerage fee to have the excess reserves, an obvious nonearning asset on their year-end balance sheets, taken off their books, even though the funds had value on January 1, 1987, the first day of a new maintenance period.

While excess reserves initially appeared to end most periods substantially over the levels anticipated on the final day, later upward revisions to required reserves placed excess reserve levels more in line with those expectations. However, in the year-end period, even after taking account of subsequent upward revisions to required reserves, excess reserves averaged \$2.0 billion, far above the expected level. A number of banks turned to the discount window in that period to satisfy these extraordinary demands, particularly near year-end, raising the average level of borrowing in that period to slightly over \$900 million.

The large reserve needs over the final two months of the year were addressed with a combination of outright and temporary transactions. On an outright basis, the Desk purchased about \$10.2 billion of Treasury securities, including about \$6.2 billion of bills and \$1.5 billion of coupon issues in the market, and \$2.5 billion of bills from foreign accounts. The coupon purchase was the first in almost a year and tended to emphasize the short and intermediate maturity range more than past coupon issue purchases, reflecting the Committee's preference for portfolio liquidity. Temporary transactions were also used to provide reserves. Large System RP operations were necessary on a number of occasions. At the close of the year, a record \$16.0 billion of System RPs was on the books, including \$9.2 billion of RPs arranged that day.

*(This report was released to Congress
and to the press on May 29, 1987)*

Treasury and Federal Reserve Foreign Exchange Operations

February—April 1987

The dollar traded rather steadily in February and early March, and then moved lower through the end of April. It closed the period down more than 8 percent against both the Japanese yen and the British pound, down roughly 2 percent against the German mark and most other continental currencies, and unchanged on balance against the Canadian dollar. The U.S. authorities intervened in the market at various times during the three-month period under review.

After declining almost continuously for nearly two years (Chart 1), the dollar steadied as the period opened. Market participants were reassured by a coordinated U.S.-Japanese intervention operation undertaken in late January following a joint statement by Secretary Baker and Finance Minister Miyazawa in which they reaffirmed their willingness to cooperate on exchange rate issues. Talk that the financial authorities of the major industrial countries would soon meet encouraged expectations that multilateral efforts might be forthcoming to prevent the dollar from declining further. In addition, reports of extensive Japanese participation in the February refunding operations of the U.S. Treasury reassured the exchange markets by seeming to suggest that Japanese investors would continue to make substantial investments in dollar-denominated assets.

Meanwhile, economic statistics being released suggested that the underlying economic fundamentals were

clearly moving in directions that would lead to adjustment of external imbalances. To be sure, there were still few signs that the dollar's two-year decline had reduced the nominal U.S. trade deficit. However, GNP data for the fourth quarter of 1986, together with information becoming available on export and import volumes, showed that the nation's trade deficit was declining in volume terms and that the nation's external sector was beginning to contribute to economic growth (Chart 2). Japan's trade surplus, though still high in nominal terms, had been declining in volume terms since the beginning of 1986. As for Germany, weak export volumes and strong import volume gains carried a similar indication that earlier exchange rate movements were working to reduce external imbalances. In these circumstances, the dollar rose from its lows of late January to trade within a narrow range through mid-February against both the yen and the mark, around ¥153 and DM1.82, respectively.

Then on February 22, following meetings held at the Louvre in Paris, finance ministers and central bank governors of six major industrial countries stated that, given the economic policy commitments they were making, their currencies were now "within ranges broadly consistent with underlying economic fundamentals." In the announcement, the authorities of Germany and Japan stated that they would provide greater stimulus to their economies, and the U.S. government said that it would resist protectionism and substantially reduce the budget deficit for the fiscal year 1988. The statement noted that "further substantial exchange rate shifts among their currencies could damage growth and adjustment prospects in their countries." The officials

A report by Sam Y. Cross, Executive Vice President in charge of the Foreign Group at the Federal Reserve Bank of New York and Manager of Foreign Operations for the System Open Market Account. Christopher Rude was primarily responsible for preparation of the report.

of the six major industrial countries also announced that they had agreed "in current circumstances to cooperate closely to foster stability of exchange rates around current levels." Although many market participants regarded previous promises of domestic policy actions by the major industrial nations with skepticism, the prospect of increased cooperation and the more explicit association of the U.S. Treasury with a call for greater exchange rate stability reassured the market about the near-term outlook for the dollar. Remarks by some foreign officials attending the Paris meeting suggested that there had also been an agreement for coordinated intervention in the exchange market.

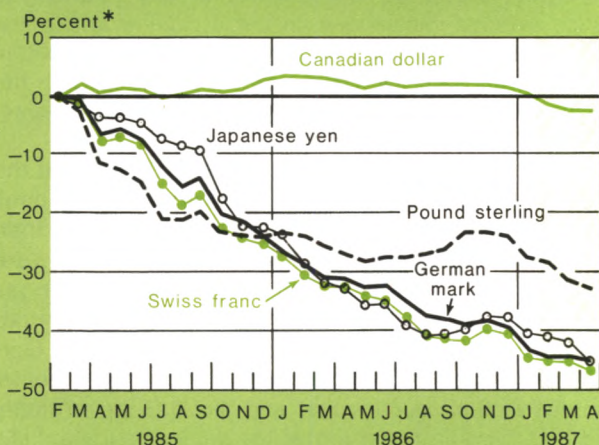
During the first several weeks following the Paris agreement, the dollar strengthened, especially against the German mark and other continental currencies. Although many market professionals expressed doubt, given the continuing pressures of large international trade imbalances, that further declines in the dollar could be avoided over time, there was less sense of downside risk in holding dollars in the near-term. As a result, some corporations began to unwind costly hedges against their dollar positions. This commercial demand gave the dollar a buoyancy which some market professionals suspected was the result of central bank intervention, an impression which added to the dollar's firmness.

The dollar continued to trade narrowly against the yen around ¥153 after the Paris meeting. Japanese

exporters took advantage of any firming of the dollar against yen to convert export proceeds into yen—an activity that accelerated ahead of Japan's fiscal year-end in March. Japanese investors took advantage of any easing of the dollar against the yen to increase their holdings of U.S. and other foreign assets. They perceived relatively little near-term exchange rate risk in investing abroad, expecting the authorities to prevent any significant further appreciation of the yen against

Chart 1

The dollar has declined against most major foreign currencies for more than two years.

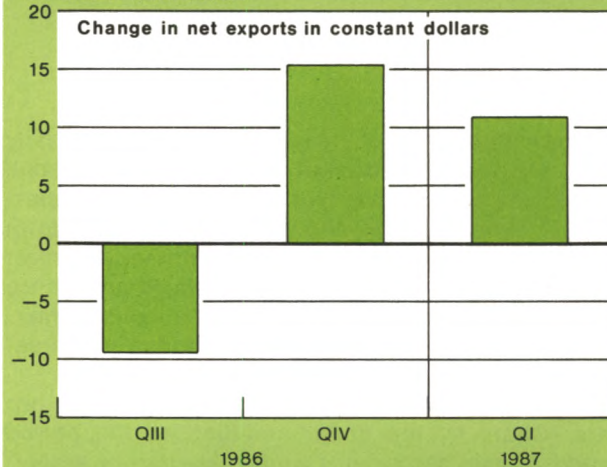


*Percentage change of monthly average rates for dollars from the average for the month of February 1985. All figures are calculated from New York noon quotations.

Chart 2

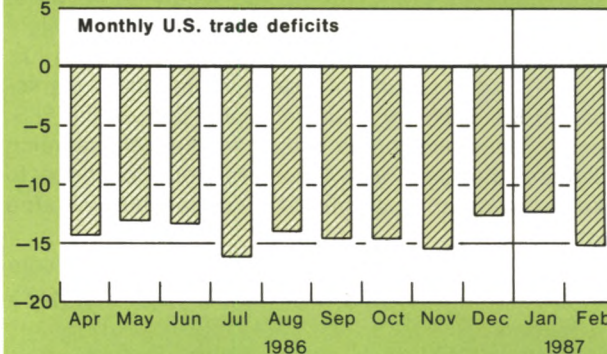
The U.S. trade performance continued to improve in real terms and contributed to U.S. economic growth . . .

Billions of 1982 dollars



but the adjustment of the trade deficit in nominal terms lagged as the price effects of the dollar's decline masked the changes in volumes.

Billions of dollars



The charts show Department of Commerce data released through April.

the dollar.

Meanwhile, greater stability in dollar exchange rates in February, together with the subsequent Paris commitment to foster exchange rate stability, was seen in the market as reducing exchange rate risk more generally and thereby enhancing the relative attractiveness of assets denominated in currencies with relatively high interest rates. Sterling, which also benefited from a number of other economic and political developments, rose strongly against all major currencies in February and early March, amid reports of strong demand by foreign investors. There were also signs of increased investor interest in the Australian and Canadian dollars, the Swedish krone, the French franc, and the Italian lira to take advantage of the high interest rates available in those currencies.

In that environment, investors found that a number of currencies offered more attractive investment opportunities than the German mark. Traders viewed economic activity as somewhat stronger in the United States and somewhat weaker in Germany than previously thought. Also, expectations persisted that short-term interest rate differentials would continue to favor the dollar relative to the mark. Moreover, market participants were aware that there remained outstanding large positions, long of marks and short of dollars; any generalized move to trim these positions was expected to result in considerable bidding for dollars. In these circumstances, the dollar continued to rise gradually against the mark in late February and early March.

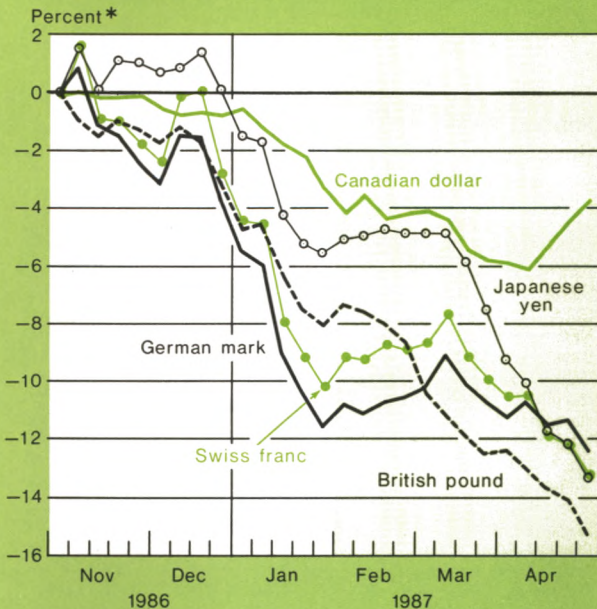
Around mid-March, speculative buying started to push the dollar up more rapidly against the mark. A number of stop-loss orders to buy dollars and sell marks were triggered, and the resulting bidding for dollars in otherwise thin trading propelled the dollar rate up as high as DM1.8745 on March 11 in New York. Under these circumstances, the Desk entered the exchange market, selling \$30 million against marks. The intervention operation, which was undertaken to foster greater exchange rate stability as envisaged in the Paris agreement was quickly talked about in the markets. Dealers imagined that the Desk had sold a much larger amount and interpreted the action as signaling that major countries would seek to limit any significant rise in the dollar, as well as any significant decline. As a result, market participants calculated that there was little need to protect themselves against the possibility that the dollar might continue to advance. In view of their long-standing expectation that the dollar would decline over time, bidding for dollars quickly subsided, and dollar rates started to drift down (Chart 3).

As the dollar started to decline after mid-March, the focus of market attention shifted from the mark to the yen. The expectation that short-term interest rate dif-

ferentials would move in favor of the dollar against the mark and fear of central bank intervention limited the dollar's decline against the mark. But against the yen, the dollar was trading only slightly above the ¥150 level that many market participants, especially in Japan, believed represented at least an important psychological benchmark and perhaps constituted the lower limit of the yen-dollar exchange rate range they thought had been agreed to in conjunction with the Paris agreement. Although Japanese economic growth was weaker than it had been in many years, market participants evidently judged that the Japanese government, embroiled in a debate concerning tax reform, would not take early and significant policy actions to spur domestic demand and reduce its trade surplus as promised in the Paris agreement. Moreover, the announcement that the United States would impose trade sanctions on selected Japanese products following a dispute over semiconductor products fueled fears of protectionism. In Europe, con-

Chart 3

The dollar traded steadily against most major foreign currencies during February and early March but subsequently declined sharply, especially against the Japanese yen.



* Percentage change of weekly average rates from the week ending October 31, 1986. All figures are calculated from New York noon quotations.

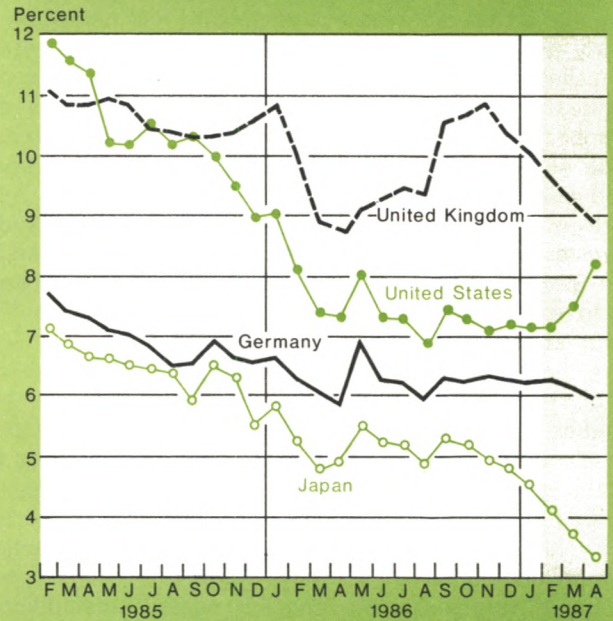
cern was growing that the Japanese were diverting their exports from other markets to Europe. With the weakness of the German economy seemingly confirmed by figures then becoming available, market participants were sensitive to the possibility that trade friction between Japan and Europe was also intensifying. Market concerns increased that there might be renewed calls for a lower dollar as a response to these trade problems. A clear bearish sentiment reemerged towards the dollar against the yen.

On March 23, the dollar moved below ¥150. Japanese investment houses, insurance companies, and corporations sold dollars aggressively, stop-loss orders were activated, and the dollar began to move down sharply. To restrain the dollar's decline, the Desk made daily purchases of dollars against yen in a series of operations between March 23 and April 6, purchasing a total of \$3,007.7 million. The operations by the U.S. authorities were coordinated with operations by the Bank of Japan and several European central banks.

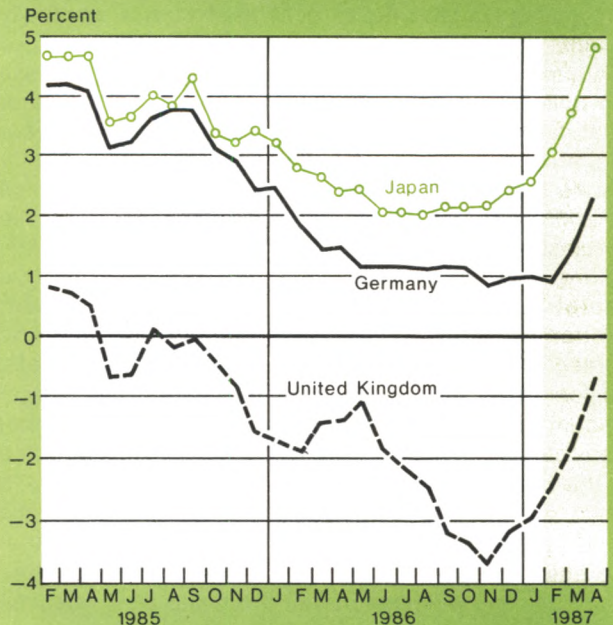
By the end of March, the dollar appeared to be settling in a range around ¥147. But concern over the stability of the dollar had spread from the foreign exchange to other financial markets. The dollar's depreciation precipitated sharp declines in prices of U.S. bonds and equities. It contributed to sharp increases in the prices of gold and silver. And as investors sought alternatives to dollar-denominated assets, the prices of

Chart 4

Interest rates rose in the United States and declined abroad . . .



so that interest differentials moved sharply in favor of the dollar.



The top chart shows long-term government bond yields and the bottom chart shows the differentials between U.S. Treasury bonds and foreign government securities.

Table 1

Federal Reserve Reciprocal Currency Arrangements

In millions of dollars

Institution	Amount of Facility April 30, 1987
Austrian National Bank	250
National Bank of Belgium	1,000
Bank of Canada	2,000
National Bank of Denmark	250
Bank of England	3,000
Bank of France	2,000
German Federal Bank	6,000
Bank of Italy	3,000
Bank of Japan	5,000
Bank of Mexico	700
Netherlands Bank	500
Bank of Norway	250
Bank of Sweden	300
Swiss National Bank	4,000
Bank for International Settlements:	
Dollars against Swiss francs	600
Dollars against other authorized European currencies	1,250
Total	30,100

bonds denominated in other currencies rose. As a result of the divergent forces in the world's bond markets, long-term interest rate differentials moved strongly in favor of the dollar (Chart 4).

Meanwhile, market participants came to believe that new incentives would be needed to maintain the credibility of official efforts to stabilize exchange rates and halt the dollar's decline. As a result, they looked forward to a scheduled meeting of the G-7 finance ministers and central bank governors in Washington on April 8 for evidence that the authorities were firmly committed to exchange rate stability.

The G-7 ministers and governors welcomed the proposals announced by the governing party in Japan for substantial measures to stimulate Japan's economy. But market participants were disappointed that additional new initiatives were not announced. Also, U.S. trade statistics for February, released on April 14, left the impression that the adjustment in the world's trade imbalances, at least in nominal terms, was still disappointingly small. Under these circumstances, sentiment towards the dollar remained bearish. Market participants questioned whether interest differentials favoring the dollar were sufficient to maintain foreign investors' appetite for dollar-denominated assets. As a result, the dollar was again heavily offered in early April, especially against the yen but also against other currencies that provided attractive capital market outlets for foreign investors. The U.S. authorities continued to intervene

on occasion, buying dollars at times to foster exchange rate stability. They operated on three of the nine business days between April 7 and April 17, buying \$532 million against yen. As before, these operations in yen were closely coordinated with those undertaken by the Bank of Japan and several European central banks.

Statements by U.S. and Japanese officials in mid-April were interpreted as indicating that the officials were genuinely concerned about the risks of further sharp downward movements in dollar rates and that other action might be forthcoming to enhance efforts to stabilize exchange rates. Comments by Bank of Japan Governor Sumita and other Japanese officials suggested that new arrangements were under consideration to finance concerted intervention operations. In a speech before the Japan Society in New York, Treasury Secretary Baker, making specific reference to the dollar-yen rate, said that U.S. and other authorities intended to cooperate closely to foster exchange rate stability despite trade difficulties and that a further decline of the dollar against other major currencies could be counter-productive. Also around mid-April, U.S. short-term interest rates firmed, and this was taken by some market participants as an indication that U.S. monetary policy might be tightening somewhat to ease the pressures on the dollar.

Even so, many in the market continued to doubt that the authorities were sufficiently committed to exchange rate stability to make major adjustments to domestic

Table 2

Drawings and Repayments by Foreign Central Banks under Regular Reciprocal Currency Arrangements

In millions of dollars; drawings (+) or repayments (-)

Central Bank Drawing on the Federal Reserve System	Outstanding as of February 1, 1987	February	March	April	Outstanding as of April 30, 1987
Bank of Mexico	61.4	-61.4	0	0	0

Data are on a value-date basis

Table 3

Drawings and Repayments by Foreign Central Banks under Special Swap Arrangement with the U.S. Treasury

In millions of dollars; drawings (+) or repayments (-)

Central Bank Drawing on the U.S. Treasury	Amount of Facility	Outstanding as of February 1, 1987	February	March	April	Outstanding as of April 30, 1987
Bank of Mexico	273.0	61.6	-61.6	*	*	*
Central Bank of Argentina	225.0	0	0	+225.0	0	225.0

Data are on a value-date basis

*No facility

economic policies. Thus, the dollar again came under strong selling pressure during the last full week of April as hopes of more economic policy convergence faded. In Japan, official comments suggested that there would be no further easing of credit policy, and there seemed to be little evidence of movement toward a more expansionary budget. Doubts developed that the Federal Reserve had much scope to tighten monetary policy, given the decline in U.S. final domestic demand as reported in the first quarter GNP data. Moreover, reports emerged from U.S.-Japanese trade negotiations indicating little progress, and, towards the end of the month, the U.S. House of Representatives added to its trade bill a provision calling for mandatory restrictions on U.S. imports from countries with large trade surpluses.

Thus, the dollar was again subject to episodes of intense selling pressure in the third week of April. Against the yen it declined below ¥140, reaching a 40-year low of ¥137.25 on April 27. The dollar also declined against the European currencies, easing below DM1.80 to trade as low as DM1.7710 against the German mark. The Desk intervened on three more occasions in late April, both in yen and marks, purchasing \$424.9 million against yen and \$99 million against marks.

In the final days of April, comments by Chairman Volcker and by Prime Minister Nakasone during his visit to Washington indicated that the central banks of the two countries were making more adjustments in their monetary policies. Mr. Nakasone announced that the Bank of Japan would act to ease short-term market rates, and Mr. Volcker stated that the Federal Reserve had "snuggled up" monetary policy in light of the exchange rate pressure. With the market perceiving that

monetary authorities were acting to widen interest rate differentials in favor of the dollar, the currency recovered from its lows against the yen and the mark to close the period at ¥140.85 and DM1.7925, respectively. At these levels, the dollar was down 8 3/8 percent against the yen from both its opening in February and its level in mid-March. Against the mark, the dollar closed the period down 2 1/8 percent from its opening in February and down 4 3/8 percent from its highs in mid-March. On a trade-weighted basis as measured by the Federal Reserve Board index, the dollar declined 3 7/8 percent against all G-10 currencies between the opening in February and the end of April.

For the three month period as a whole, intervention dollar purchases by the U.S. monetary authorities totalled \$4,063.6 million, while dollar sales totalled \$30 million. All intervention was financed out of foreign currency balances. The bulk of the authorities' dollar purchases, or \$3,964.6 million, was against sales of yen, of which \$1,962.3 million equivalent was drawn from the Treasury's balances and \$2,002.3 million equivalent was drawn from the Federal Reserve. In addition, the Federal Reserve and the Treasury each sold \$49.5 million equivalent of German marks. On one occasion in the period, as indicated above, the Federal Reserve and the Treasury each sold dollars by purchasing \$15 million equivalent of German marks.

During the three-month period, foreign central banks also bought dollars in extraordinary amounts in the exchange markets. In part, these purchases reflected operations of the Bank of Japan, the Bundesbank, and several other European central banks which purchased dollars against yen and other currencies in accordance with the understandings of the Paris Accord and the April G-7 statement to foster exchange rate stability. But in part, these reflected the purchases of a number of European central banks that took advantage of the relative firmness of their currencies against the mark, the dollar, or both, to replenish official reserves by purchasing dollars.

* * *

During the three-month period, the Treasury Department through the Exchange Stabilization Fund (ESF) joined with other central banks to provide a multilateral short-term credit facility totalling \$500 million for the Central Bank of the Argentine Republic in support of Argentina's economic program to achieve sustainable growth and a viable balance of payments position. The ESF's portion of the facility was \$225 million. The facility was established on March 5, and the full amount was drawn by the Central Bank of the Argentine Republic on March 9.

Table 4

**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
February 1, 1987 - April 30, 1987	+688.1	+571.9
Valuation profits and losses on outstanding assets and liabilities as of April 30, 1987	+1,981.3	+1,809.8

Data are on a value-date basis.

Meanwhile, Mexico fully repaid on February 13 the \$61.6 million drawing on the ESF and \$61.4 million drawing on the Federal Reserve that were outstanding under a two-tranche \$1.1 billion multilateral near-term contingency support facility provided jointly by the U.S. monetary authorities, the Bank for International Settlements (acting for certain central banks), and the central banks of Argentina, Brazil, Colombia, and Uruguay. The facility has now lapsed. As noted in previous reports, the first tranche of \$850 million had been made available to Mexico on August 29, 1986, with the Federal Reserve providing \$210.2 million and the ESF providing \$211.0 million. On December 8, after Mexico had become eligible to draw the second tranche of \$250.0 million, Mexico had drawn \$61.8 million from the Federal Reserve and \$62.0 million from the ESF. Drawings on the first tranche were fully repaid in the previous reporting period.

In the period from February 1 through April 30, the Federal Reserve and ESF realized profits of \$688.1 million and \$571.9 million, respectively, on sales of

foreign currency balances. As of April 30, cumulative bookkeeping or valuation gains on outstanding foreign currency balances were \$1,981.3 million for the Federal Reserve and \$1,809.8 million for the Treasury's ESF. These valuation gains represent the increase in the dollar value of outstanding currency assets valued at end-of-period exchange rates, compared with the rates prevailing at the time the foreign currencies were acquired.

The Federal Reserve and the ESF invest foreign currency balances acquired in the market as a result of their foreign operations in a variety of instruments that yield market-related rates of return and that have a high degree of quality and liquidity. As of April 30, 1987, under the authority provided by the Monetary Control Act of 1980, the Federal Reserve held investments totalling \$1,091.1 million equivalent of its foreign currency holdings in securities issued by foreign governments. In addition, as of the same date, the Treasury held the equivalent of \$2,566.1 million in such securities.

*(This report was released to Congress
and to the press on March 9, 1987)*

Treasury and Federal Reserve Foreign Exchange Operations

November 1986 – January 1987

After trading fairly steadily throughout November and the first half of December, the dollar moved sharply lower until the end of January. It closed the period down more than 11 percent against the German mark and most other Continental currencies, about 7 percent against the Japanese yen and the British pound, and almost 4 percent against the Canadian dollar. There were large dollar purchases by foreign central banks during the period. The U.S. authorities intervened on one occasion in late January.

As the period opened, the dollar had moved up from the lowest levels reached against the yen and the mark in the third quarter. Many market participants were beginning to believe that the dollar, after a long decline, was entering a stage of greater near-term stability (Chart 1). There were some indications that the favorable side of depreciation was starting to show through in the U.S. economy. The trade deficit seemed to have stabilized at last, though remaining large at \$14 billion a month. Output growth in the third quarter also appeared to have been a little stronger than many market participants had previously expected, suggesting some strengthening of export demand.

Meanwhile, the cumulative effects of the dollar's prolonged depreciation were seen in financial markets to be exerting pressures in other countries for more exchange rate stability. Although Japan's trade surplus

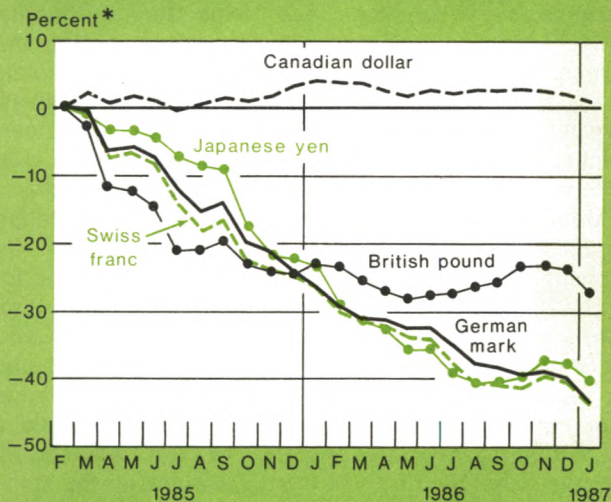
remained high in nominal terms, the yen's sharp appreciation was eroding competitive positions, resulting in some production cutbacks for overseas markets, and contributing to a rise of unemployment rates. Questions arose whether Japanese domestic demand would remain strong enough to sustain the modest rate of economic growth forecast for the current year. In late October, there had been an announcement of a 1/2 percentage point cut in the Bank of Japan's discount rate and of an economic policy accord between U.S. Treasury Secretary Baker and Japanese Finance Minister Miyazawa. The monetary policy action, together with the accord's assurances with respect to Japanese and U.S. fiscal policies, was seen as supportive of more favorable prospects for the Japanese economy and for a reduction in the two nations' external imbalances. At the same time, understandings reached in the Baker-Miyazawa agreement—that the exchange-rate realignment already accomplished between the two currencies was "now broadly consistent with the present underlying fundamentals" and that the two nations were reaffirming their willingness to cooperate on exchange rate issues—took pressure off the yen in the exchange market. The accord seemed to imply agreement that the yen's appreciation was sufficient, at least for the time being. Many market participants also believed that, henceforth, official intervention—perhaps on a coordinated basis—would be used if necessary to counter a new rise in the yen.

In the case of Germany, the mark's appreciation was seen in the market as increasing pressure on German authorities to take steps to ease currency strains within

A report presented by Sam Y. Cross, Executive Vice President in charge of the Foreign Group at the Federal Reserve Bank of New York and Manager of Foreign Operations for the System Open Market Account. Christopher Rude was primarily responsible for preparation of the report.

Chart 1

The dollar's eighteen month decline paused during the autumn of 1986.



* Percentage change of monthly average rates for dollars from the average for the month of February 1985. All figures are calculated from New York noon quotations.

Japanese investors not only bought new dollar-denominated securities, they also repaid loans used to finance previous investments. In early December, when dollar interest rates began to rise, largely for seasonal and tax-related reasons, the costs of dollar-borrowings increased and Japanese investors unwound their hedges further.

The dollar was not as strong against the European currencies as it was against the yen. After the dollar reached its high against the mark in early November, market professionals began to build up their mark positions, and many European-based investors who had hedged their dollar assets earlier in the year were content to retain their protection against a renewed dollar decline. In addition, market participants came to the view that the agreement between Secretary Baker and Minister Miyazawa was not relevant for the dollar/mark exchange rate. In these circumstances, the dollar eased back against the mark in November and early December. It subsequently rose against the mark in mid-December, however, when reports of a trip by Secretary Baker to Europe generated expectations that the German authorities would join in an agreement on exchange rate stability similar to the Baker-Miyazawa accord. By the middle of December, the dollar was trading near DM 2.03, down a modest 1½ percent against the mark since the end of October; it was virtually unchanged against the yen at about Y 163.

the European Monetary System (EMS). Since the mid-September Economic Community (EC) meeting in Gleneagles, Scotland, central banks participating in the EMS monetary arrangements had used exchange market intervention to try to protect the EMS from tensions associated, in part, with the decline in the dollar. Although there was little evidence that Germany's internal economy was suffering heavily from the effects of the mark's appreciation, many market participants expected the Bundesbank to buy dollars in the exchange market if the dollar resumed a significant downward movement.

Under these circumstances, market professionals moved in early November to cover short dollar positions assumed earlier. This bidding for dollars helped push up dollar rates to their highs of the three-month period, around DM 2.08 against the mark and Y 165 against the yen. The dollar continued for a time to be reasonably well bid, especially against the Japanese yen as institutional investors from Japan bought a broad variety of dollar-denominated assets, including equities and real estate investments. The continuing firmness of the dollar vis-à-vis the yen took on a self-reinforcing character; with the dollar standing well above Y 160 after announcement of the Baker-Miyazawa accord, confidence grew that the dollar would stay around these levels. Consequently,

Table 1

Federal Reserve Reciprocal Currency Arrangements
In millions of dollars

Institution	Amount of Facility
	January 30, 1987
Austrian National Bank	250
National Bank of Belgium	1,000
Bank of Canada	2,000
National Bank of Denmark	250
Bank of England	3,000
Bank of France	2,000
German Federal Bank	6,000
Bank of Italy	3,000
Bank of Japan	5,000
Bank of Mexico	700
Netherlands Bank	500
Bank of Norway	250
Bank of Sweden	300
Swiss National Bank	4,000
Bank for International Settlements:	
Dollars against Swiss francs	600
Dollars against other authorized European currencies	1,250
Total	30,100

While the view that the dollar was in a period of stability dominated trading until mid-December, a number of developments were taking place at the same time that gradually undermined the market's confidence in that view. Many market participants were becoming convinced that U.S. domestic demand was slowing and that any signs of strength would prove temporary, reflecting shifts in the timing of transactions before new

tax laws took effect at the start of the year. The prospects for 1987 were increasingly seen as dependent on a turnaround in the U.S. trade position.

At the same time, U.S. Congressional elections resulted in a Republican loss of the Senate majority. This outcome was interpreted as complicating the Administration's efforts to maintain control of economic policy, most especially to resist pressure for protectionist legislation or calls for a lower dollar. Political uncertainties intensified following revelations that some U.S. officials had participated in controversial arms sales.

Meanwhile, developments in Germany and Japan indicated that the major industrial countries might be moving away from the economic conditions needed for greater exchange rate stability. In Germany, short-term interest rates rose markedly in November and December. While some of the tightness was attributed to seasonal factors, there was concern in the market that the German central bank might have adopted a more restrictive monetary stance to curb above-target expansion in central bank money. Comments by some German officials seemed to support this view. In Japan, the government adopted a budget late in December for the fiscal year beginning in April 1987 that did not appear to provide the degree of fiscal support to the economy expected after the Baker-Miyazawa accord.

Although the dollar started to soften during the second half of December in response to these developments, market forces did not turn decidedly against the dollar until year-end. On December 31, preliminary U.S. trade statistics were released showing a massive deficit for November of \$19.2 billion (Chart 2). Several days later, Secretary Baker and other Administration officials commented that special and temporary factors distorted the figures for November and that some of these factors could also influence December trade flows, which might show a similarly large gap.

The preliminary November trade figures were a severe disappointment to the market. They dispelled the belief that a favorable shift in U.S. trade performance had begun and cast an even more pessimistic shadow on

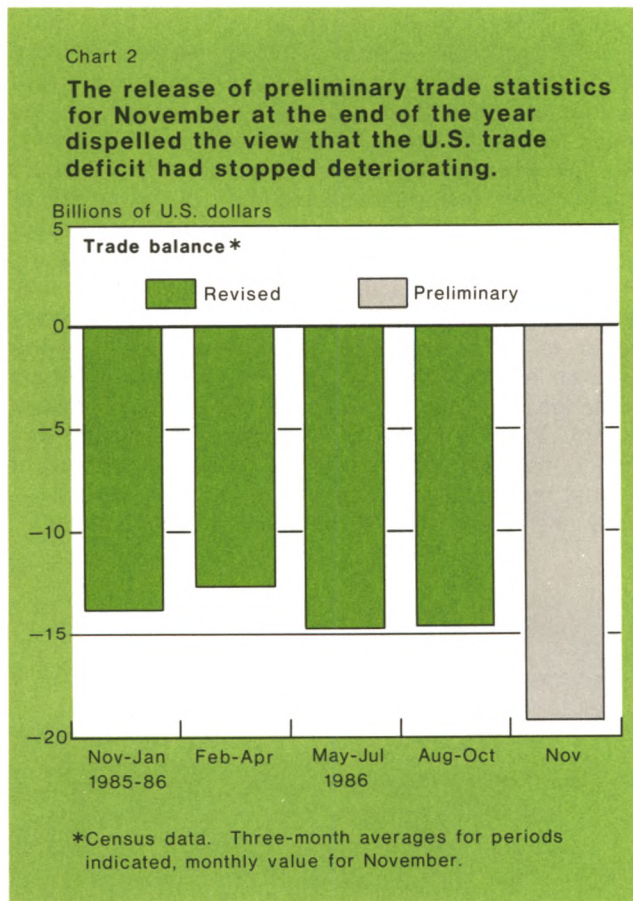


Table 2

Drawings and Repayments by Foreign Central Banks under Regular Reciprocal Currency Arrangements

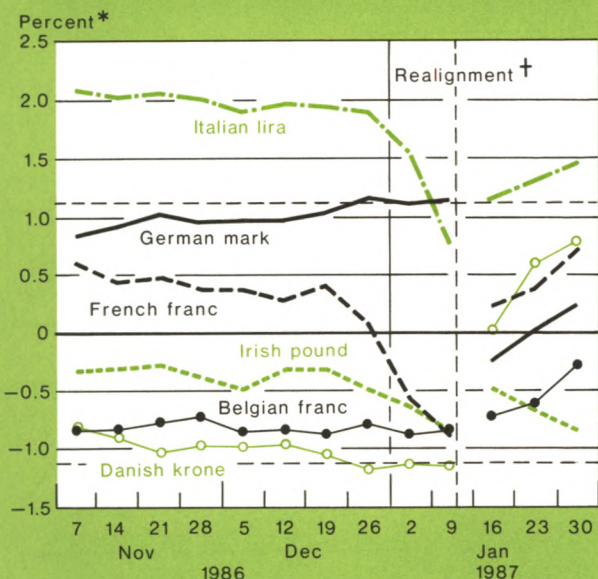
In millions of dollars; drawings (+) or repayments (-)

Central Bank Drawing on the Federal Reserve System	Outstanding as of November 1, 1986	November	December	January	Outstanding as of January 30, 1987
Bank of Mexico	143.4	-66.8	-39.6 +61.8	-37.4	61.4

Data are on a value-date basis.

Chart 3

Tensions within the EMS increased in November and December, prompting a realignment over the January 10 weekend.



Weekly averages of 9 a.m. rates in New York for the weeks ending on dates shown.

* Percentage deviation of each currency from its ECU central rate. Dotted lines correspond to the System's 2½ percent limit on movement from bilateral central exchange rates for all participating currencies except the Italian lira. The lira may fluctuate 6 percent from its central rates against other EMS currencies.

† The bilateral central rates of the German mark and Netherlands guilder were revalued by 3 percent and those of the Belgian franc by 2 percent against the other participating currencies.

the outlook for economic growth in the new year. Moreover, the figures enhanced the position of those arguing that the United States needed to take an aggressive approach to improving its trade position. The debate on trade policy gained new attention with the reopening of Congress early in January. Against this background, statements attributed to several U.S. officials were interpreted by market participants as being consistent with the view that the United States now welcomed a lower dollar. By the start of the new year, market sentiment towards the dollar had turned clearly bearish, and dollar rates moved sharply lower—to DM 1.92 and Y 158, down more than 5 percent and 3 percent since mid-December against the mark and the yen, respectively.

In early January, the selling of dollars against the mark subsided temporarily as the market focused its attention on a rapidly changing situation within the EMS (Chart 3). As the mark was rising against the dollar and emerging at its top intervention limit within the EMS arrangement, some other EMS currencies were being weakened by concerns about underlying competitiveness and the sustainability of balance of payments positions. Earlier, market participants had widely assumed that no adjustment of EMS parities would take place before national elections in Germany in late January. But as pressures within the EMS intensified and intervention to preserve existing parities ballooned, the prospect of an earlier realignment developed. During the first weekend in January, press commentary suggested that the German authorities would accept an immediate realignment rather than face several weeks of massive intervention which might undermine the Bundesbank's efforts to maintain control over monetary growth. The next week, the EMS currencies were caught up in a speculative whirlwind as residents of EMS countries other than Germany sought to hedge their mark commitments. The EMS exchange rate structure was maintained by intervention until the January 10 weekend

Table 3

Drawings and Repayments by Foreign Central Banks under Special Swap Arrangement with the U.S. Treasury

In millions of dollars; drawings (+) or repayments (-)

Central Bank Drawing on the U.S. Treasury	Amount of Facility	Outstanding as of November 1, 1986	November	December	January	Outstanding as of January 30, 1987
Bank of Mexico	273.0	144.0	-67.0	-39.8 +62.0	-37.6	61.6
Central Bank of Nigeria	37.0	22.2	-7.4	-14.8	*	*

Data are on a value-date basis.

*No facility.

when a realignment was agreed upon. After the realignment, reflows out of marks back into other EMS currencies were slow to materialize.

Once the EMS realignment was over, traders perceived the Bundesbank as unlikely to intervene in dollars to prevent movements in dollar exchange rates from aggravating EMS strains. Thus, the dollar came under sharp selling pressure when trading resumed following the realignment, pressure that was to continue for most of the rest of the month (Chart 4).

Selling of dollars against yen also built up rapidly. With the dollar below Y 160 against the yen, market participants questioned whether the Baker-Miyazawa accord would indeed assure exchange market stability. Finance Minister Miyazawa and Bank of Japan Governor Sumita were reported to have made it known, in order to reassure the markets, that the Japanese central bank would intervene to prevent the dollar from depreciating further, almost regardless of cost. At the same time, market participants commented that there were no similar statements by U.S. officials. On January 13, after the dollar broke through Y 158, Japanese exporters rushed to sell dollars, and Japanese investment houses and pension funds flooded the market with forward sales to hedge their dollar exposures. The dollar declined by more than 1 percent against the yen that day in heavy trading. The Japanese press reported that the Bank of Japan had bought huge amounts of dollars. Traders interpreted the report as indicating that the pressure on the dollar was so strong that official intervention without the participation of the U.S. authorities would fail.

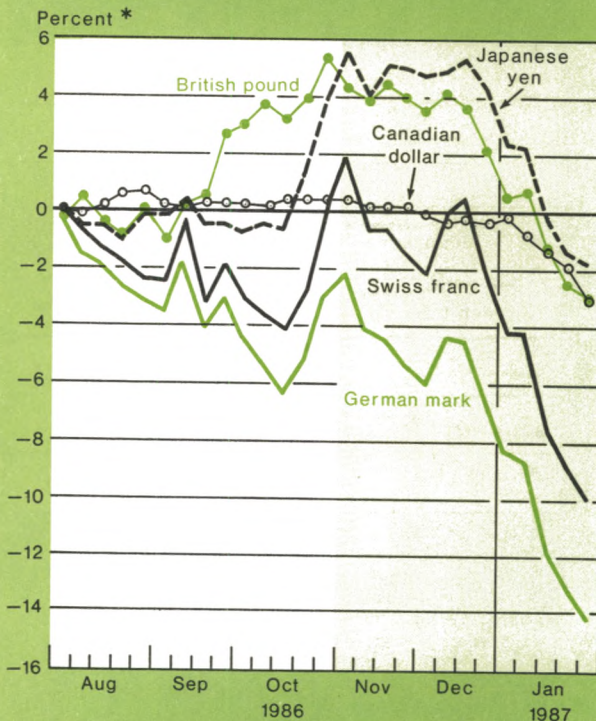
Against this background, a news report on January 14, citing an unidentified U.S. official as stating that the U.S. Administration wanted the dollar to decline further, unleashed new selling of dollars against both the mark and the yen. The dollar fell by more than 3 percent against both currencies in a few hours of extremely nervous trading.

The dollar's decline continued throughout most of January as strong selling pressure mounted on three additional occasions. Each occurred in response to various statements, attributed to Administration officials, that market participants believed reflected a continuing lack of official concern about the dollar's decline. The dollar hit a post-World War II low of Y 149.98 against the yen on January 19, and a seven-year low of DM 1.7675 against the mark on January 28.

On January 21, a consultation between Secretary Baker and Finance Minister Miyazawa resulted in a joint statement that, among other things, reaffirmed their willingness to cooperate on exchange rate issues. When the dollar moved down on the morning of January 28, after the President's State of the Union Message, U.S. authorities intervened in yen, in a manner consistent

Chart 4

During the second half of the period under review, the dollar moved sharply lower.



* Percentage change of weekly average rates from the week ending August 1, 1986. All figures are calculated from New York noon quotations.

Table 4

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
November 1, 1986-January 30, 1987	+8.0	+6.6
Valuation profits and losses on outstanding assets and liabilities as of January 30, 1987	+2,322.8	+1,975.0

Data are on a value-date basis.

with the joint statement. Operating in coordination with the Japanese monetary authorities, the Foreign Exchange Trading Desk purchased \$50 million against the sale of yen, financed equally by the Federal Reserve and the U.S. Treasury.

During the final days of the month, pressures against the dollar subsided. Reports of the U.S.-Japanese intervention operation and talk of an upcoming meeting of financial authorities of the major industrial countries encouraged expectations for broader cooperation on exchange rate and economic policy matters. Also, release of preliminary U.S. trade data for December, showing a much smaller deficit of \$10.7 billion, and a substantial downward adjustment in the revised data for November revived the view that the U.S. trade deficit had stabilized (Chart 5).

Moreover, doubts had developed about the future course of U.S. interest rates. The swift decline in dollar exchange rates raised questions in the market whether the Federal Reserve would let short-term rates ease. Market participants also noted that U.S. market interest rates had not completely fallen back to the levels prevailing before year-end (Chart 6). Interest rates in

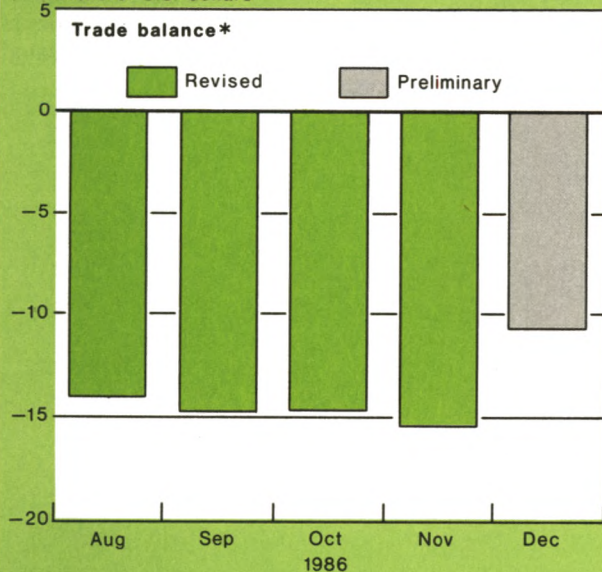
other countries were, by contrast, below late November levels, especially in Germany after the Bundesbank announced on January 22 cuts of 1/2 percentage point in its discount and Lombard rates to 3 percent and 5 percent, respectively, effective January 23, in conjunction with other monetary policy measures.

Thus, the dollar firmed from its lows against both the mark and the yen to close the period at DM 1.8320 against the mark and Y 153.70 against the yen. As measured by the Federal Reserve Board's trade-weighted index,

Chart 5

At the end of January, the trade deficit reported for December was narrower than expected and the revised November shortfall was reduced.

Billions of U.S. dollars

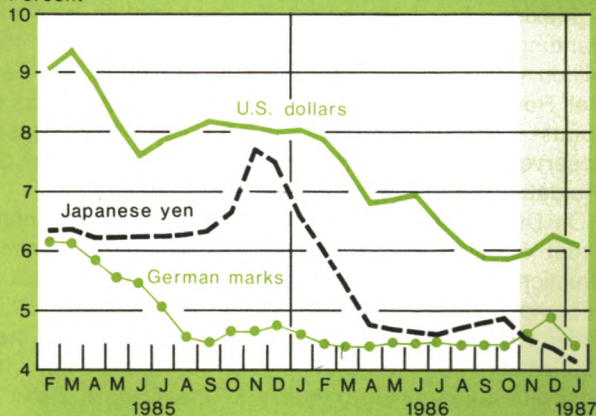


*Census data.

Chart 6

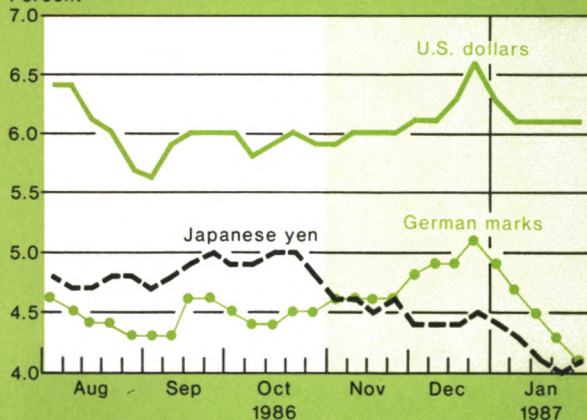
Interest differentials favoring the dollar have tended to narrow through most of the period since early 1985 . . .

Percent



. . . but have widened during the period under review.

Percent



The two panels show interest rates for three-month Eurocurrency deposits, monthly averages on the top and weekly averages on the bottom.

it had declined 9 percent since the beginning of the three-month period.

* * * *

At the beginning of the three-month period, Mexico and Nigeria had drawings outstanding on short-term financing facilities of the U.S. Monetary Authorities.

Mexico. As noted in the previous report, \$850 million of a \$1.1 billion multilateral near-term contingency support facility for Mexico's international reserves was made available jointly by the U.S. Monetary Authorities, the Bank for International Settlements (acting for certain central banks), and the central banks of Argentina, Brazil, Colombia, and Uruguay on August 29. On that date, the Central Bank of Mexico drew \$211 million from the U.S. Treasury through the Exchange Stabilization Fund (ESF) and \$210.2 million from the Federal Reserve through its regular swap facility with the Bank of Mexico. As of November 1, \$144 million was outstanding from the drawings on the ESF and \$143.4 million was outstanding from the drawings on the Federal Reserve. The Central Bank of Mexico repaid its August 29 drawings from the ESF and the Federal Reserve in three installments starting on November 26, liquidating them by January 5.

On December 8, after Mexico received disbursements under loans from the International Bank for Reconstruction and Development, the Central Bank of Mexico became eligible to draw the remaining \$250 million under the multilateral facility. On this date, Mexico drew \$62 million from the ESF and \$61.8 million from the Federal Reserve. On January 5, the Central Bank of Mexico repaid the ESF and the Federal Reserve each \$0.4 million in connection with its other repayments, leaving \$61.6 million outstanding on its December

drawing from the ESF and \$61.4 million outstanding on its drawing from the Federal Reserve at the end of the period. After the period closed, Mexico fully liquidated these outstanding commitments.

Nigeria. At the beginning of the period, Nigeria had a \$22.2 million swap drawing outstanding from a \$37 million short-term facility provided by the ESF. This facility was part of a \$250 million short-term credit facility organized under the leadership of the Bank of England. The Central Bank of Nigeria repaid \$7.4 million on November 28 and the remaining \$14.8 million on December 10.

* * * *

In the period from November 1 through January 30, the Federal Reserve and ESF realized profits of \$8 million and \$6.6 million, respectively. As of January 30, cumulative bookkeeping or valuation gains on outstanding foreign currency balances were \$2,322.8 million for the Federal Reserve and \$1,975 million for the Treasury's ESF. These valuation gains represent the increase in the dollar value of outstanding currency assets valued at end-of-period exchange rates, compared with the rates prevailing at the time the foreign currencies were acquired.

The Federal Reserve and the ESF invest foreign currency balances acquired in the market as a result of their foreign 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, as of January 30, the Federal Reserve held \$3,103.6 million equivalent in securities issued by foreign governments. As of the same date, the Treasury held the equivalent of \$4,265.5 million in such securities.

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