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*The Quarterly Review is published by the Research and Statistics Function of the Federal Reserve Bank of New York. Remarks of ANTHONY M. SOLOMON, President of the Bank, on unresolved issues in monetary policy begin on page 1. Among the members of the staff who contributed to this issue are M. A. AKHTAR and R. SPENCE HILTON (on effects of exchange rate uncertainty on German and U.S. trade, page 7); and ARTURO ESTRELLA (on corporate use of pension overfunding, page 17).*

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# Unresolved Issues in Monetary Policy

It is an honor and a pleasure to join the distinguished list of speakers who have appeared here in the George Eccles lecture series. The pleasure has to be especially pointed for a Federal Reserve official since George's brother, Marriner, was, of course, one of the great figures in our central banking history.

I want to talk today on the interrelated topics of inflation and the strategy of monetary policy in dealing with it. By the beginning of this decade, inflation had reached its highest peacetime level in American experience. This represented the culmination of an irregular upward movement of some fifteen years' standing. The main task of monetary policy over the past four years or so has been to bring this inflation under control. Monetary policy has had no significant help from other types of policy in this fight. The climate has not been right for any type of incomes policy. And fiscal policy has not, to say the least, been of much help either!

We have nevertheless had a major success on the inflation front. As of 1983, most measures of prices and wages suggested that 15 years of acceleration have been reversed. Inflation last year was pushed back to the lowest levels since the mid-1960s. There has, of course, been some step-up from the extremely low rates prevailing right around the trough of the recession. This was inevitable. And some further acceleration is likely this year. Nevertheless the basic situation is far better than it has been for a long time.

Remarks of Anthony M. Solomon, President of the Federal Reserve Bank of New York, at the George S. Eccles Distinguished Lecture at Utah State University on Thursday, April 12, 1984.

To be sure, the cost of this success, in the form of a deep recession, has been heavy. But that price has been paid and is behind us. We are obviously having a very good economic expansion and I think the prospects for its continuation are also good. Indeed, the principal worry at this point is that it may not have settled down yet to a sustainable rate.

In the meanwhile, the highly volatile interest rate environment that prevailed while inflation was being brought down seems to have disappeared over the last year and a half. Interest rates have of course fluctuated, rising most recently. But the range of variation day-to-day, week-to-week, and quarter-to-quarter has been much narrower in the past year and a half than it was from late 1979 to late 1982.

Needless to say, people worry as much about the average level of interest rates as about their volatility. And there is no denying that interest rates remain high in longer historical perspective. There are still some people, probably a minority by now, who lay the blame for high interest rates at the door of monetary policy. This complaint is unjustified. For one thing, despite the progress on inflation, the inflation premium in long-term rates remains exceptionally high. Some of the available evidence suggests that the long-term inflation expectations of financial market participants may be still as high as 6<sup>3</sup>/<sub>4</sub> percent as they look out over the next several years. These kinds of inflationary expectations are, of course, reflected in the yields on long-term debt instruments.

The skepticism that markets show about the future prospects for price stability reflects mainly two things. The first is our whole checkered history on inflation. The

markets wonder if the inflationary experience we have had doesn't point to a basic weakness of modern industrial democracies in coping with this problem. But skepticism about our ability to deal with inflation has been greatly intensified by our problem with the Federal budget. The level of anxiety about the deficit and its longer run implications for inflation has clearly heated up again in the markets this year. The fears of future inflation that are holding up interest rates will only come down, I am convinced, in the face of protracted experience with actual low inflation and with clear signs that the budget has come under control.

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Obviously everybody would prefer a world with lower Federal deficits and lower interest rates. But some seem to be suggesting that we can get the lower interest rates and their attendant blessings without progress on the fiscal front. The "solution" they seem to be proposing is much faster growth in money engineered by a more expansionary monetary policy. In my view, such an approach would be nothing short of calamitous. Such a policy would represent precisely the combination of budgetary disorder and monetary complicity that has produced most of the world's classic examples of runaway inflation. Instead, the solution to high interest rates has to come from the fiscal side. For monetary policy to abandon the approach that has made possible our progress on inflation would be a very sad mistake after all we have been through in the last few years.

But while we can take satisfaction in the results of policy in calming inflation, the conceptual and strategic underpinnings of monetary policy have to some degree become less clear over the past two or three years. By the mid- to late-1970s, protracted experience with inflation had convinced the Federal Reserve and other central banks that we needed to find a way to refocus attention on the primary, indeed the only possible longer run objective of central banks: stability in the value of money.

The result of the search for a new approach here and abroad was something new in central banking practice: annual growth rate targets for monetary and credit aggregates. The reasons for turning to this approach are straightforward. Thus it was clear when monetary targeting was first introduced—as it remains clear now—that control of inflation requires, as a necessary con-

dition, slowing in money growth. There may be, and certainly are, many underlying causes for inflation. And there are many kinds of policies that may help in its control. But restoration of money growth rates to levels consistent with the economy's longer run capacity to produce is the essential monetary condition for reasonable price stability. Moreover, when the monetary targeting approach was adopted, there was a general belief that a reasonably stable relationship existed, at least over the intermediate to longer run, between money growth and nominal aggregate demand. So the long-run strategy was framed in terms of seeking steady but fairly gradual reduction in money growth rates to bring nominal demand into line with our real capacity to produce.

While inflation has indeed been brought down, the events of the last two or three years have somewhat undermined confidence in this formulation of monetary strategy. And, indeed, actual monetary behavior has not been altogether consistent with it. The year-to-year path of monetary growth has not always followed the script of steady but gradual decline.

Implementation problems aside, the basic reasons for deliberate departure from this strategy are well-known. At root, they basically reflect the wave of financial innovation and deregulation affecting the markets for money and near money instruments we have been experiencing. Innovation and deregulation have been significantly changing the character of the money measures. The narrow money measure (M-1) has been affected by the spread of NOW accounts, by the introduction of Super NOWs and by other developments. The broad money measures, M-2 and M-3, have been radically transformed by the spread of the money market funds and by the virtually complete deregulation of time deposit interest rates that has proceeded in stages over the last several years.

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The result of these developments has been changed relationships between the money measures and the economy. One obvious sign of this change was the unusual weakness of velocity, especially of M-1 velocity, during the recession and early recovery periods. The velocity of M-1 showed an unusually sharp decline during the recession and a delayed and unusually weak rise during the early quarters of recovery.



Another sign of change is the much-weakened response of the broader money measures to changes in interest rates. Over much of the postwar period, the cyclical performance of these measures was deeply affected by the rise and fall of interest rates above and below regulation-imposed ceilings on time deposit rates. Growth in the broader aggregates would be slowed sharply when market rates rose above the ceiling rates, and would accelerate sharply when rates once again fell below these ceilings. These so-called "disintermediation" and "re-intermediation" phenomena, once such a dominant feature of broad money growth patterns, have largely disappeared. Consequently, the recent behavior of these money measures has been far different from what would have been expected in the past under similar interest rate conditions.

Now it is possible that the departures from past norms in the behavior of the various money measures are purely transitional. In that case, we might expect a return to past patterns once the recent institutional changes have been fully absorbed. I think this is hardly likely in the case of the broader money measures and I am skeptical even in the case of M-1. But even if only a transition period is involved, it may be a long one. For one thing, further interest rate deregulation is due—under current law for regular NOW and savings accounts, and under proposed regulation, even for demand deposits. And just as important, it may take substantial experience with the new money measures as they evolve to get a firm sense of what has become "normal" once the transition has been completed.

So in continuing to use the framework of monetary targeting we in the Federal Reserve have labored—and are laboring—under some difficulty. At the level of monetary strategy we have responded to these problems over the past 1½ years with some modifications in the settings of our target ranges, with some adjustments in the base periods to which the growth rate targets refer, and with some shifts in the relative importance attached to the various money measures. Moreover, in 1983, we added a monitoring range for a broad credit measure to the ranges for the money measures we target.

At the level of tactics, we have also made some modifications in our operating procedures. Thus the procedures adopted in October 1979 provided for some automatic response of interest rates to short-run movements in the money measures, especially in M-1, when these measures seemed to be deviating from their target paths. Under this approach, above-path money growth would automatically result in upward pressures on short-term rates. Similarly, below-path growth would tend to result in some easing of rates. The aim was of course to quickly set countervailing pressures in motion

whenever money growth strayed from path. Not surprisingly, this approach added to short-run interest rate volatility. And with the apparent loosening of the relationship between the money measures and the economy in 1982, automatic responses to short-run movements in these measures no longer seemed appropriate. Consequently, since late 1982 we have been using a day-to-day approach that neither targets interest rates directly—as we did before October 1979—nor causes them to respond automatically to short-run movements in money.

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But despite the various modifications we have made, both in the targets themselves and in our tactical approach to hitting them, we have retained the basic framework of monetary target ranges in formulating our monetary strategy. The basic appeal of this approach remains. It is just as true now as it was when this approach was introduced that we need a procedure for focusing attention—both our own and the public's—on the long-run objective of reasonable price stability. And it is just as true now as before that price stability in the long-run requires slowing money growth to rates compatible with our real growth potential. The problem is that recent changes in the character of the money measures have increased the difficulties of translating this approach into concrete numerical ranges. The increased uncertainty about the economic results that can be expected from any given rate of money growth means that we shall continue to have to respond flexibly to emerging changes in the behavior of the money measures. And as we gain further experience, we may want to change the menu of measures we target or further adjust the weight we give to the different measures.

In particular, some have advocated that we give major weight not to any of the money measures, but to a broad measure of credit. The broad credit measures clearly have some advantages. They are pretty much immune to the recent innovation and deregulation problems that have affected the money measures. And their statistical relationship to GNP seems to be not demonstrably inferior to that of the money measures. Moreover, movements in the growth of the broad credit measures appear to be less volatile than that of the money measures. So this is a proposal that deserves further consideration.

But the drawback of the broad credit measures is that they are little more directly controllable by the main instruments of monetary policy than is GNP itself. Indeed, they can be thought of as basically a somewhat imperfect proxy for nominal aggregate demand. So perhaps we need to confront the issue of nominal GNP targets for monetary policy head on. This is a concept that has been attracting increasing attention lately, and not just in this country. Interestingly, it is an idea that gets a lot of support from academics and from some journalists and Congressmen. But in my experience, the response of central bankers, both here and abroad, tends to be less than enthusiastic.

The conceptual case for nominal GNP targets is easy enough to state. Monetary policy seeks over the longer run to provide reasonably stable nominal values. And GNP, as a measure of nominal aggregate demand, has a more powerful and direct impact on nominal values generally than do any of the intermediate financial measures, whether of money or credit. You don't have to worry about the velocity problem with nominal GNP targets, or about such related matters as innovation and deregulation in financial markets. And at least at a conceptual level, you could frame a long-run anti-inflationary strategy in terms of gradually declining growth in nominal GNP, ultimately to a rate in line with long-run real growth trends.

But the problems with nominal GNP are just as clear. The first is that the central bank cannot deliver on a GNP target. To be sure, it cannot deliver in any very direct way on some of the money and credit measures either—especially the broader ones. But the order of magnitude and nature of the control problem is different with respect to GNP. The financial magnitudes are at least determined in markets where central bank instruments impinge directly. GNP outcomes of course depend on policy levers not under the control of the central bank—most notably on fiscal policy—as well as on many things outside of policy control. Central bankers, understandably, do not want to be held to objectives on which they can't deliver.

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But perhaps even more fundamentally, under our system of central bank independence, it is simply not appropriate for the Federal Reserve to set broad eco-

nomical goals. That is the task of elected officials. The anomaly involved in the Federal Reserve setting broad goals for the economy would become even more painfully obvious if GNP targeting were to further evolve toward setting separate objectives for the price and real output components of GNP—and I am afraid such an evolution would be hard to resist.

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However this latter problem were resolved, the tendency to set GNP goals chronically too high would be very strong. Nobody would want to set forth a set of figures as a target that said, in effect: "If we don't get restraint on inflation, we're going to aim for subnormal or even negative real growth." And yet history suggests there may well be times when this kind of tough stance will be needed.

Finally, I think GNP targeting would risk the loss of longer run objectives in a futile chasing of short-term goals. We have to remember that monetary policy operates on GNP only with a lag. And these lags may be, as Milton Friedman has argued, "long and variable." If this quarter's GNP growth is below its target path, the temptation would be to push on the gas pedal hard enough to get quick and visible results. In fact, the outcome is likely to be overshooting and instability.

So to me, it is far better for our central bank to seek a general financial environment compatible with long-run objectives for financial and monetary stability than to be loaded down with the impossible task of seeking to hit specific economic outcomes on a year-by-year basis.

Of course this doesn't mean we don't have to keep an eye on the actual performance of the economy as we go about our business. The need for explicit attention to ongoing developments in the economy is exactly the lesson taught by our recent problems with velocity. But I believe formal GNP targets—whether determined by the Federal Reserve itself or imposed on it by the Congress—could ultimately undermine the institutional conditions in which an overall climate of monetary stability is possible.

Let me be a bit more specific about what I think we have to do in the circumstances we find ourselves. First, we should continue to set and use money and credit target ranges, but only with a willingness to make adjustments in them whenever we see our expectations about their "normal" behavior going awry. Obviously I

am no fan of making the policy levers respond automatically to short-run developments in the aggregates. But longer run deviations from target, when the targets themselves continue to seem valid, clearly do require a response.

Second, interest rates are obviously very important, both operationally and in the way we think about our impact on the economy. But even granting the problems with the monetary aggregates, interest rate objectives are just no way to structure monetary policy. We simply don't know at all what interest rates will prove to be appropriate under given circumstances. The recent ability of the economy to rebound vigorously while rates have remained historically high is clear evidence of this.

Third, the one place where interest rates may help us in formulating long-run monetary strategy is, I think, in the valid general rule that short-term interest rates should normally be above the current inflation rate. In other words, real short-term rates should be positive. When they are not, as was often the case in the 1970s, the result is almost certainly going to be inflationary since credit demands are sure to explode. On the other side, however, I do not think we can state an appropriate upper bound for real interest rates. In normal times, with a budget that is in rough balance, historical experience may be a reasonably good guide. But under present conditions, it almost certainly is not.

Fourth, as I have already said, I do not think formal GNP targets are helpful, but I do think we have to keep our eyes on the economy. Indeed under current conditions, the performance of the economy has to be a matter of first-rank importance. Experience has shown us that we can't have enough confidence in the aggregates to focus on them alone, blind to all other considerations.

Finally—and on this I may depart from some of my colleagues—I think we have to pay more attention to the international implications of domestic monetary policy. We are only beginning to grasp in this country the implications of the foreign sector—of trade and exchange rates—for our domestic real growth, our financial markets and our inflation performance. In other countries, the trade and exchange rate implications of any and all monetary policy decisions are likely to get prime attention. In this country, international considerations have most of the time been put in a separate compartment labeled “exchange market intervention.” We can't afford this kind of thinking anymore. Domestic monetary policy has a far more powerful influence on exchange rates and the international economy generally than does exchange rate intervention when its potential money supply effects are sterilized. This is certainly true at the present highly restricted scale of intervention, and it may well be true at *any* practical level of intervention.

Overall, the approach to monetary strategy we take should provide the needed degree of longer run discipline. Money and credit targets can continue to fill that role, as long as appropriate allowance is made for their changing characteristics when and as these emerge. More generally, I think there is an increasing, and unfortunate tendency to think that the problem of creating a reasonably noninflationary world is mainly a problem of devising the right kind of monetary strategy. The proponents of monetary rules—whether of strict monetary targeting or of some mechanical response to changes in the price of gold or of some commodity price index—seem to think our problems with inflation are mainly technical. They are not. They are rooted in major structural features of our modern world, both economic and political. These features tend to make policies that will ultimately prove inflationary attractive in the short-run. On the other side, inflation, once begun, is very expensive to bring under control—as we have certainly seen.

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A basic feature of our economy is that most prices and wages respond only sluggishly to changing demand conditions. So when monetary policy is used to slow aggregate demand, the main initial response is not slower prices and wages, but reduced output and employment. The improvement on prices comes only later, and only after real activity has been slowed. Under these conditions, slowing inflation always imposes a cost, temporary but sometimes heavy. Much of the public discussion of the inflation problem, at least until fairly recently, gave proper emphasis to ways of changing the economic structure to reduce the cost of using aggregate demand policies to contain inflation.

Some ideas on how to do this have been around for a long time—and are no less valid for that reason. Some involve removing government impediments to the ability of prices to respond promptly to restraint on aggregate demand. Others seek to improve the functioning of the labor market so that wages also respond more flexibly and so that we can operate the economy at lower unemployment rates without risking inflationary pressures. We have made a little progress on some of these things. Rate deregulation in some industries is an example. But there would have to be a large number of such changes to produce a really significant improvement in the performance of our pricing mech-

anism. And implementation of these changes often involves disturbing vested interests. So it is sometimes easy to get discouraged about the feasibility of implementing enough of these ideas to have a significant impact.

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Other ideas for reducing the cost of keeping inflation under control are newer: One such is the suggestion that wage inflation could be made less impervious to demand restraint if multi-year wage contracts that lock in past high inflation rates were eliminated. Another idea would tie wage increases more directly to demand conditions by having some part of them take the form of profit-sharing. These ideas definitely deserve a hearing. They offer the prospect that aggregate demand policy could slow wage inflation with much less impact on employment than it has now. A number of recent wage agreements have in fact incorporated some element of profit sharing. But at the level of public policy, the climate doesn't seem at all conducive at the moment to a major re-examination of our wage and price practices. Perhaps that will continue to be the case as long as inflation remains under reasonably good control.

There are, frankly, some elements in the current inflation picture that disturb me. The current numbers, both for prices and wages have been reasonably satisfactory. Some recent flare-ups in the price numbers are pretty clearly due to the temporary effects of weather on food and fuel prices. But I think we have to say, with some 16 months of economic expansion behind us, that the pace of recovery must begin to slow down if we are to avoid trouble on the price front later this year and next. Obviously there is still substantial slack in the economy overall. But both unemployment and excess plant capacity have been coming down with unusual rapidity in this recovery. And in some areas, signs of shortages and bottlenecks are beginning to appear. So in some areas at least, new demand pressures on prices may not be far away.

As I suggested earlier, some acceleration of inflation during economic recovery from recession lows is inevitable. The problem during the late 1960s and 70s was that each inflation peak was higher than the one before it. Our task is to reverse that overall trend. When we do take the longer view, there is clearly one large negative in the prospects for further progress on inflation

over the next few years, the Federal deficit. And make no mistake about it, this is going to be a very serious negative indeed if the problem is not addressed vigorously and promptly.

But the deficit aside, there may also be some good things going for us on the longer run inflation outlook. Demographics, plus the fact that much of the absorption of women into the labor force is behind us, means that we will have a more experienced workforce. This means, in turn, that the unemployment rate at which inflation tends to accelerate is likely to drop from the levels that have proved to cause problems in the past decade or so.

Moreover, partly because of these changes in the characteristics of the workforce and partly for other reasons, we seem likely to get an improvement on the very slow productivity growth we suffered in the 1970s. Indeed, at least some students of this problem think we could approach the rapid growth we enjoyed for substantial stretches earlier in the postwar period. Any improvement on productivity would help the inflation problem. It would permit us to run the economy at higher operating rates without risks of overheating. It would also help to satisfy workers' desires for rising living standards without the need to press for inflationary wage increases.

Finally, it is clear that some significant fraction of the inflation of the 1970s reflected the two oil shocks, one triggered in 1973 by a realignment of power within the oil industry, the second by the Iranian Revolution in 1979. A little luck in avoiding repeats of such shocks would be a major help on the inflation front in the years ahead.

With luck—and it will take some of that plus a resolution of the deficit problem—inflation, nominal GNP growth, and interest rates could settle down to much lower average levels and narrower ranges of variation than we have seen in recent years. If this does happen, the technical issues and problems of monetary policy that have so bedeviled us recently, will seem less pressing. After all, earlier in the postwar period, monetary policy was a relatively simple business of “leaning against the wind” and money and credit growth rates were in fact a lot lower and more stable than they have been in the past 10 or 15 years.

Not that the risks of resurging inflation will ever entirely disappear. Like so many problems of the modern world, the risk of reigniting inflation is something we will have to learn to live with on a year-by-year basis. But I am optimistic that our prospects are brighter than they have been for some time, and that is perhaps reason enough for satisfaction.

# Effects of Exchange Rate Uncertainty on German and U.S. Trade

Economists and policy makers now widely agree that exchange rates of major currencies have been characterized by a high degree of volatility and uncertainty since the beginning of generalized floating in 1973. But they do not agree on the economic consequences of that uncertainty. Some are concerned about the possible adverse effects of exchange rate uncertainty on trade and other important macroeconomic objectives. Others argue that, on balance, exchange rate volatility does not have any significant harmful effects. More particularly, there is a continuing debate about the influence of exchange risk on the volume of trade.

On the empirical side, thus far there has been no firm evidence that exchange rate uncertainty has any significant adverse effects on the volume of trade. A recent study by the International Monetary Fund (IMF), which surveys and updates some earlier research, reaches this conclusion and argues that "given the wide variety of empirical testing that has been performed it seems unlikely that...more intensive or sophisticated tests would show a greatly different result."<sup>1</sup> Most other studies have also uncovered no significant effects of exchange rate uncertainty on trade.

Our research suggests a different conclusion, however. By making use of more recent data than other

studies have used, we find that exchange rate uncertainty has a significant impact on imports and exports of Germany and of the United States. In addition, we argue that the estimated effects are likely to understate the impact of exchange rate uncertainty on trade.

In this article, we first discuss the problem of defining exchange rate uncertainty and its relationship to observed variability of exchange rates. We then outline the various direct and indirect ways through which uncertainty might affect the volume of trade. Finally, we review our empirical results, and attempt to quantify the total impact that exchange rate uncertainty has had on German and U.S. trade in recent years.<sup>2</sup>

## What is exchange rate uncertainty?

Exchange rate uncertainty refers to a state of doubt about future rates at which various currencies will be exchanged against each other. Of particular interest are the timing and size of exchange rate fluctuations that cannot be *systematically* explained by economic factors. Specifically, exchange uncertainty reflects the extent to which exchange rate changes, in terms of their timing and size, are unpredictable on the basis of past experience and existing economic models.

This notion of exchange rate uncertainty is impossible

<sup>1</sup>International Monetary Fund, *Exchange Rate Variability and World Trade*, forthcoming. The report was requested by the GATT and was unofficially released to the press in March 1984; according to Reuters it was discussed by the GATT's 90-Nation Council of Representatives.

<sup>2</sup>This article is based on a lengthier unpublished study by M. A. Akhtar and R. Spence Hilton, "Exchange Rate Uncertainty and International Trade: Some Conceptual Issues and New Estimates for Germany and the United States," Federal Reserve Bank of New York, Research Paper No. 8403, May 1984.



to quantify precisely. But if there were a widely used empirical model of exchange rate behavior, some measure of prediction errors from that model might provide a good approximation of exchange rate uncertainty. In other words, the timing and magnitude of those exchange rate movements not consistently predictable on the basis of the model would reflect uncertainty. In practice, however, such a model does not exist and so it is not possible to estimate even a good approximation for the theoretical notion of exchange rate uncertainty as defined here.

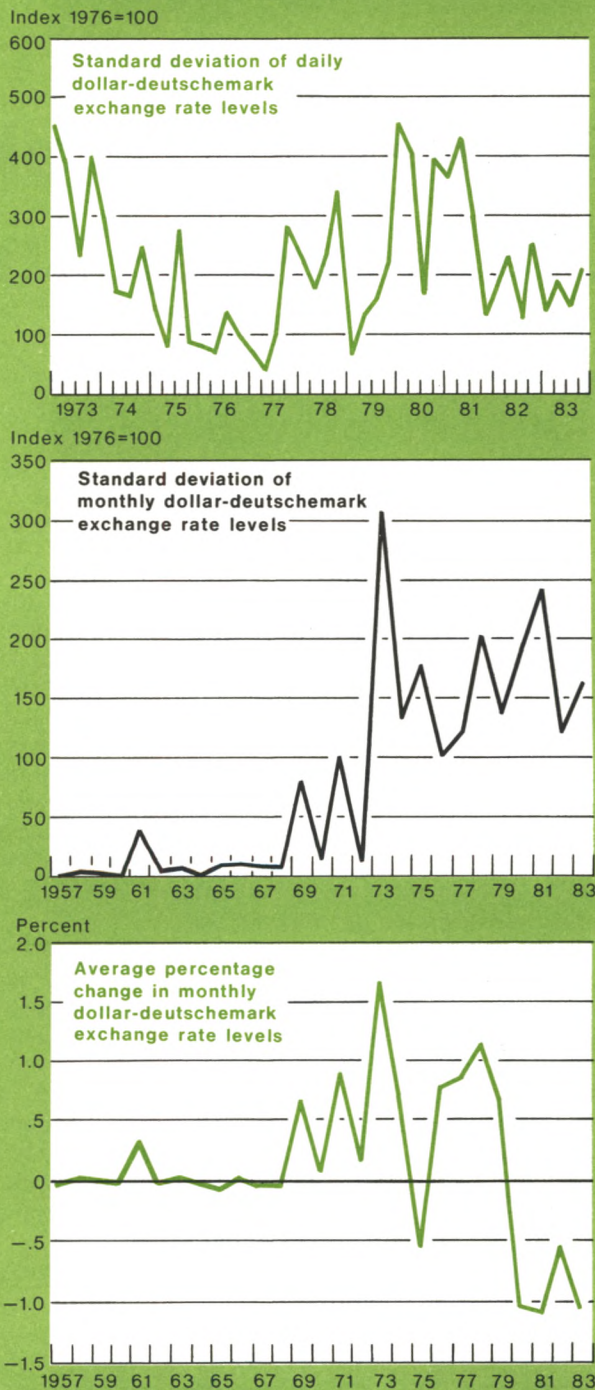
Problems of measurement notwithstanding, it is not hard to see that the behavior of major currencies has been marked by a high degree of uncertainty since the advent of generalized floating in early 1973. This is clearly suggested by observed variability, which is commonly used as an indicator of exchange rate uncertainty. Measured variability became larger after 1973 and has shown no consistent tendency to decrease (Chart 1). Persistently large exchange rate variability is suggestive of a large random component in exchange rate movements, that is, a component which cannot be systematically explained by economic factors.

Greater rate variability by itself suggests but does not logically imply greater unpredictability of exchange rates. However, exchange rate uncertainty has also been the consequence of highly unpredictable (or at least difficult to predict) exchange rates in recent years. Many widely used structural models do not forecast exchange rates any better than a random walk. In fact, the existing empirical models as well as so-called structure-free empirical analysis (which combines various "fundamentals" such as prices, money stocks, current accounts, etc. from different structural models) fail to explain exchange rate movements adequately over the last ten years or so. Perhaps more importantly, virtually all exchange rate forecasts—model-based or otherwise—exhibit large prediction errors outside the observed sample period. All of these points about the performance of empirical models and forecasts are well documented in many recent studies.<sup>3</sup>

The difficulties of predicting exchange rates are also reflected in the fact that, like other forecasts, future spot

Chart 1

### Exchange Rate Variability



Sources: International Financial Statistics, Board of Governors of the Federal Reserve System.

<sup>3</sup>See, for example, Richard A. Meese and Kenneth Rogoff, "Empirical Exchange Rate Models of the Seventies: Do They Fit Out-of-Sample?"; *Journal of International Economics* (February 1983); Jeffrey R. Shafer and Bonnie E. Loopesko, "Floating Exchange Rates After Ten Years"; *Brookings Papers on Economic Activity*, 1 (1983); Ralph W. Tryon, Ralph W. Smith, and Peter Hooper, "Models of Exchange Rate Determination and Their Empirical Content in the Light of the Federal Reserve Board Model" in Bank for International Settlements, *Exchange Rate Determination Analysis and Policy Issues* (September 1983); and Richard M. Levich, "How the Rise of the Dollar Took Forecasters by Surprise"; *Euromoney* (August 1982).

rate forecasts based on the forward rate for the relevant maturity yield large prediction errors. This suggests that the forward rate is an unreliable and poor predictor of the future spot rate. In fact, in recent years the forward premium or discount has often failed to indicate even the direction of exchange rate changes.

Even if the timing and magnitude of exchange rate changes are generally unpredictable, exchange rate movements might correspond to changes in relative price levels in some average sense over the medium-term, say over two or three years. If this type of medium-term purchasing power parity were to hold systematically, it would offset part of exchange rate uncertainty stemming from unpredictable rates. Economic agents would then be able to make *some* decisions by counting on the fact that deviations from purchasing power parity would systematically reverse themselves over time.

In fact, however, exchange rate movements since the mid 1970s have been persistently out of line with changes in relative price levels over long stretches of time. As a result, real effective exchange rates have experienced sharp appreciations or depreciations for periods of up to four years (Chart 2). These developments have rendered purchasing power parity less useful as an anchor for equilibrium. Large and persistent deviations from purchasing power parity have also made it more difficult to account for medium-term future exchange rate developments. Even if a differential in inflation rates *ultimately* is an important contributing factor to subsequent exchange rate changes, purchasing power parity does not appear to be a useful guide to the timing and size of such movements over a time horizon relevant for most economic decisions.

Based on this analysis, exchange rate uncertainty may be viewed as composed of (1) a part captured by exchange rate variability, the most commonly used proxy for uncertainty, and (2) another part not captured by variability. The latter reflects the extent to which exchange uncertainty is not systematically related to variability. Instead, it may be due to unpredictable exchange rates and/or the failure of purchasing power parity to hold over the medium-term. Of particular importance is that observed variability may not fully reflect the extent to which the timing and size of exchange rate changes are unpredictable. For example, changes in exchange rates are frequently unpredictable even when exchange markets are relatively calm, (*i.e.*, even when observable exchange rate variability is low). Put differently, even if variability—which can be measured only in the *ex post* sense—is low, the *ex ante* uncertainty reflecting forecast errors may be very high.

### Exchange rate variability as a proxy for uncertainty

Since there is no unique or precise way to *measure* exchange rate uncertainty, theoretical and empirical research on its effects has generally fallen back on some measure of exchange rate variability as a proxy for uncertainty. The variance or standard deviation of a set of observations on the nominal exchange rate within a specified period of time is the most commonly used gauge of exchange uncertainty. Alternatively, the variation in exchange rate changes is sometimes employed.

However, as discussed above, the traditional measures of variability are far from perfect substitutes for exchange rate uncertainty. In fact, we have argued that variability is likely to *understate* exchange uncertainty. Low levels of observed *ex post* variability may be associated with high uncertainty because there is no reliable way to predict the timing and magnitude of future changes in exchange rates. If there is no close and systematic relationship between variability and unpredictability, variability levels may not tell us much about *ex ante* uncertainty.<sup>4</sup> And under these circumstances any measure of variability would most likely understate the extent of “true” exchange rate uncertainty.

In contrast to this view, many economists maintain that measures of nominal exchange rate variability *overstate* the existing level of exchange rate uncertainty. But this argument ignores the fact that exchange rate changes are highly unpredictable. Instead it is frequently based on the view that exchange rate movements offset divergences in underlying inflation rates between countries. If a relationship between prices and exchange rates is known to hold with certainty, then some portion of the movement in nominal rates within a period of time could be predicted. Changes in nominal rates unaccounted for by relative price changes (*i.e.*, movements in the real exchange rate) would be smaller in magnitude than the total movement in the nominal exchange rate, so long as exchange rates move in the direction expected on the basis of relative price movements. Reasoning along these lines has led some to conclude that variability in *real* exchange rates provides a better measure of exchange risk than variability in nominal rates.

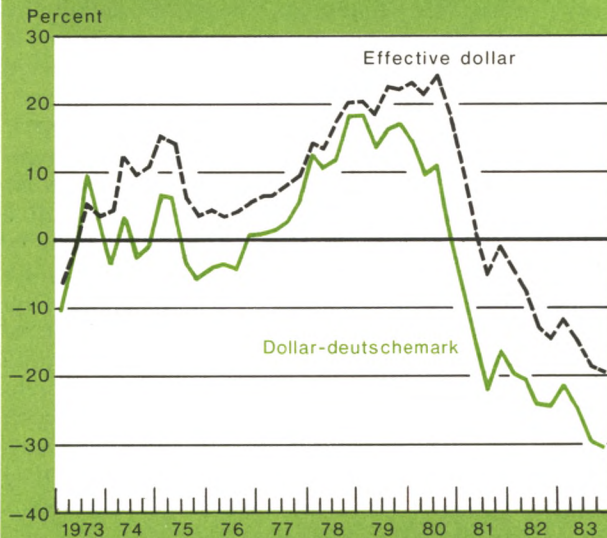
However, this proposition rests on the accuracy of purchasing power parity as a device for predicting nominal exchange rate changes, and on the confidence

<sup>4</sup>It is the *ex ante* and not the *ex post* variability that is relevant for measuring exchange uncertainty. It is sometimes argued that the forward rate variability may be a better approximation of the *ex ante* variability. However, the measured variability of the forward rate (three-month) has been almost identical to that of the spot rate over the last ten years or so. Our arguments on the limitations of variability as an indicator of exchange rate uncertainty also apply to the forward rate.



Chart 2

**Percentage Deviation of Price Adjusted Exchange Rates from Their Average 1973 Values\***



\* Negative number indicates a real dollar appreciation.

Source: International Financial Statistics, Board of Governors of the Federal Reserve System.

with which these predictions are held. The persistent deviations recorded in purchasing power parity over the medium-term, along with the fact that exchange rates both influence and are influenced by domestic prices, suggest that the relationship between relative price movements and nominal exchange rate changes cannot be determined, *ex ante*, in any reliable way. Moreover, movements in real exchange rates are frequently every bit as large as those in nominal rates over extended periods of time. And the recent evidence suggests that there is no *strong* and *systematic* tendency for deviations from purchasing power parity to be self-reversing over a period of up to two or three years. Given the highly unpredictable nature of exchange rate movements and the lack of empirical support for purchasing power parity over the medium-term, the assertion that nominal exchange rate variability would overstate uncertainty is simply not true.

Even if purchasing power parity were to hold to some degree and exchange rate changes were more predictable, adjusting nominal exchange rate changes for relative inflation might not yield a superior barometer of exchange uncertainty. A measure of variability that partly

reflects fluctuations in price levels does not allow for a distinction between the risk due to exchange rate changes independent of price movements and the risk associated with all other factors which might affect inflation at home and abroad.

For all these reasons, we reject the use of *real* exchange rate variability as the relevant proxy for uncertainty in our empirical work. Since "true" uncertainty is not measurable, that leaves us with the observed nominal exchange rate variability. Given the above discussion, the presumption in our empirical work is that even if the observed variability does not matter statistically, "true" exchange rate uncertainty may still matter; but if the observed variability matters, this strongly suggests that true uncertainty matters, and perhaps considerably more. Before we turn to empirical results, however, it seems useful to outline the main channels through which exchange rate uncertainty might influence the volume of international trade.

### Effects of exchange rate uncertainty

At the simplest level, exchange rate uncertainty is a source of concern because currency values partly determine the price paid or received for output and, consequently, affect the profits and welfare of producers and consumers. If market participants are risk averse, then exchange uncertainty can cause them to curtail their activities, change prices, or shift sources of supply and demand in order to limit their exposure to the effects of unforeseen currency movements. The distribution of output across many sectors of the world economy could be altered in this way. Moreover, in the longer run the allocation of resources between industries can be modified through the influence of exchange rate uncertainty on investment decisions concerning plant and equipment. But exchange rate considerations are most clearly relevant for internationally tradeable products, such as merchandise exports and imports, which are the focus of this study.

#### Direct effects

Exchange rate uncertainty can directly affect the volume of goods traded internationally by making prices and profits indeterminate or uncertain. For instance, consider a firm choosing between buying a foreign-made product and a similar domestic substitute when both are equally valued in local currency terms using current exchange rate levels. A preference for the domestic product over the import will exist if it is unclear at the time a purchase order is placed what the exchange rate level will actually be when payment is due. This assumes that forward markets cannot be used to create a *perfect* hedge against exchange risk (this assumption is discussed below) and that the product price is originally



quoted in foreign currency terms, requiring the importer to engage at some future date in a foreign exchange transaction to secure the foreign currency needed for final payment. If a sizable number of buyers in a country face a similar set of conditions, then that nation's aggregate level of imports could be reduced (and partly replaced with domestic output) by an upswing in the degree of exchange rate uncertainty. Under analogous circumstances exchange risk could adversely affect export volume.

In the import example, if the product price in a contract made with a foreign supplier is specified in domestic currency terms, then the importer will be freed from the consequences of an unexpected exchange rate change. However, the foreign supplier, who now must convert receipts from the importer's currency to his own, risks a loss that might result from an unanticipated exchange rate change. As compensation for assuming this risk, suppliers might impose a premium in the form of a higher sales price. Because quantity demanded responds to price, the volume of imports would be reduced by exchange rate uncertainty even if contract prices were set in the currency of importers. In this case, exchange uncertainty results in a higher price for traded goods, thereby leading to a reduced volume of trade.

To the extent that hedging in forward markets can reduce exchange risk without significant increases in costs of doing international business, the preceding conclusions have to be modified. But studies strongly indicate that forward markets are not effective in completely eliminating exchange uncertainty at modest costs, except under very unrealistic assumptions. So long as businesses cannot predict the future cost and prices of their goods or the timing and magnitude of their foreign exchange needs, even well developed forward markets can provide only limited protection from exchange risk. The difficulties of dealing with exchange rate uncertainty are compounded by the fact that future spot rate predictions based on forward rates are very poor (*i.e.*, have large forecasting errors). Moreover, any costs of forward cover or hedging will reduce the international exchange of goods: importers who pay for this cover will face a higher effective price for foreign goods; or exporters who incur hedging costs will pass along those costs by raising prices. The result in both instances is a reduction in trade volume, so long as quantity demanded is responsive to price.

Implicit in the foregoing analysis and examples is the importance of lags in the decision-making process. Some period of time elapses between the initiation of a purchase agreement and the actual payment or receipt of revenues for a product. This "contract period" may arise from production delays, delivery lags or from

the time required to arrange financing; frequently it spans several quarters. While the price of a product is generally quoted when an order is first placed, the contract currency determines whether the buyer or seller is exposed to possible exchange rate losses within the contract period.

#### *Indirect effects*

The preceding section illustrates how exchange rate uncertainty may directly reduce trade flows by making product prices and profits indeterminable, or at least more uncertain, for either importers or exporters when an order is placed. But uncertainty may also influence trade through less straightforward channels. Most of these indirect effects stem from decisions which affect trade flows over a longer period.

Beyond the contract period, the ability of a firm to anticipate its future income or expenditure stream could be impaired by doing business with foreign rather than available domestic sellers and buyers. Because the rate of foreign exchange is a major determinant of the cost of foreign products, prices of traded goods are more affected by exchange rate changes than prices for local substitutes.<sup>5</sup> If it is costly to change, say, a supply source, then buyers will refrain from switching between domestic and foreign producers to avoid incurring adjustment expenses. For a potential importer or buyer, risk averse behavior means preferring domestic markets to reduce the likelihood of future variations in outlays. Similar considerations apply to sales markets and exporters.

Under these conditions, some international trade could be discouraged, perhaps permanently, as market participants reduce their exposure to the consequences of large and pervasive changes in exchange rates--during the 1970s such changes frequently entailed a large appreciation or depreciation of both nominal and real effective exchange rates. This suggests an underlying propensity to rely on domestic in place of foreign buyers and sellers, and does not necessarily depend on unpredictability of exchange rates over the contract period. Only when there are no adjustment costs (or, alternatively, only when there are no significant effects from exchange rate changes *per se* on prices and volumes of internationally traded goods) would market participants be completely indifferent between domestic and international trade.

Large real exchange rate changes sustained over the

<sup>5</sup>The substitutability between domestic and foreign goods and relative market power determine the degree to which this holds. Only if there is a strict adherence to purchasing power parity will domestic and foreign prices (translated into domestic currency) move identically in response to exchange rate changes.

## Estimating the Effects of Exchange Rate Uncertainty on Trade\*

Price and volume equations for aggregate exports and imports of manufactured goods were estimated for the United States and Germany using quarterly observations from 1974 through 1981. The independent variables in the export volume (QX) equations were the level of foreign income (YF), the relative price of exported goods to foreign substitutes in foreign currency terms (REL PX), and capacity utilization abroad (CUF). Import volume (QM) was specified as a function of domestic income (YD), the relative price of imported goods to domestic substitutes in domestic currency terms (REL PM), and the ratio of foreign to domestic capacity utilization (CUFCU).†

A polynomial distributed lag extending back eight quarters was imposed on the relative price terms while income and capacity utilization variables were lagged one quarter. Dock strike dummies (not reported) were included in the volume equations for the United States to capture the effects of disruptions on trade flows caused by strikes.

The export price (PX) and import price (PM) equations were estimated using price indexes for manufactured commodities produced domestically (PD) and abroad (PF) because prices for traded products largely reflect costs of similar goods in the producing and consuming countries. The domestic currency equivalent for each price variable appears in the equations. Capacity utilization in the domestic country (CU) and in the foreign country were inserted in the export and import price equations, respectively. A one quarter lag was imposed on all these independent variables in the price equations.

As in other empirical studies of trade flows, the natural logs of all the above variables were used in estimation.

\*For more details on the estimates see Akhtar and Hilton (*op. cit.*).

†In all cases, capacity utilization indexes were included to capture the effects of nonprice rationing on prices and volumes. The asymmetric treatment of capacity utilization in the export and import volume equations was the outcome of some empirical experimentation rather than the result of any theoretical considerations.

### Estimation Results

#### Export Volume

##### United States:

$$QX = 1.00 YF - 1.37 RELPX + 0.56 CUF - 0.040 S - 0.30 e \quad \bar{R}^2 = .96$$

(8.75) (7.78) (2.78) (1.82) (1.71) DW=1.87

##### Germany:

$$QX = 2.21 YF - 2.38 RELPX + 0.73 CUF - 0.224 S + 0.24 e \quad \bar{R}^2 = .93$$

(9.63) (4.34) (3.15) (3.24) (1.33) DW=2.02

#### Import Volume

##### United States:

$$QM = 2.03 YD - 2.44 RELPM - 0.86 CUFCU + 0.005 S + 0.07 e \quad \bar{R}^2 = .97$$

(10.12) (6.37) (2.57) (0.28) (0.40) DW=1.67

##### Germany:

$$QM = 1.58 YD - 2.99 RELPM + 0.35 CUFCU - 0.125 S - 0.10 e \quad \bar{R}^2 = .98$$

(9.42) (5.42) (0.65) (2.51) (0.53) DW=2.04

#### Export Price

##### United States:

$$PX = 1.07 PD - 0.01 PF + 0.02 CU - 0.002 S + 0.17 e \quad \bar{R}^2 = .99$$

(21.12) (0.33) (0.25) (0.31) (0.93) DW=1.81

##### Germany:

$$PX = 0.91 PD - 0.13 PF - 0.12 CU + 0.001 S + 0.28 e \quad \bar{R}^2 = .99$$

(11.89) (2.12) (2.05) (0.10) (1.73) DW=2.13

#### Import Price

##### United States:

$$PM = 0.39 PD + 0.48 PF + 0.16 CUF + 0.018 S + 0.44 e \quad \bar{R}^2 = .98$$

(5.03) (7.78) (1.11) (1.94) (3.03) DW=1.79

##### Germany:

$$PM = 0.63 PD + 0.33 PF + 0.31 CUF + 0.008 S + 0.34 e \quad \bar{R}^2 = .95$$

(3.84) (2.64) (2.70) (0.31) (2.07) DW=1.92

## Estimating the Effects of Exchange Rate Uncertainty on Trade (continued)

A constant term (not reported) was included in all equations. The estimates were adjusted for first degree serial correlation ( $\rho$ ). Aggregate indexes of foreign activity, prices, and exchange rates were constructed by taking trade-weighted averages of individual country indexes for the major trading partners of the United States and Germany.

The proxy for exchange rate uncertainty was based on the variability of an effective nominal exchange rate index. The standard deviation of the daily observations of this index within each three month period was calculated ( $S$ ). This measure of volatility was included in each price and volume equation with a distributed lag of eight quarters to capture the effects of exchange rate uncertainty.‡

‡Other measures of variability were also tried in estimation. On the whole, our use of alternative measures did not significantly alter the general pattern of results reported here.

Coefficient estimates appear next to the corresponding variable and t-statistics are given below in parentheses—those near or above 1.7 are significant at the 95 percent confidence level using a one-tail test. The results provide support for the hypothesis that exchange risk reduces the volume of international trade. Note that an increase in exchange risk would adversely influence the volume of exports or imports as long as the risk proxy is statistically significant in either the volume or the price equations. In Germany's case, the impact of the risk proxy is negative and statistically significant in both volume equations, but is not found to have an effect on prices. For the United States, there is also evidence that exchange rate variability reduces export volume, but a smaller coefficient and lower t-statistic suggest that it is a less important factor than for German exports. And while the volume of U.S. imports is not directly reduced, their price does increase in response to exchange rate volatility.

medium-term could affect direct investment decisions and trade patterns, which could in turn lower the volume of trade. To reduce the likelihood of price fluctuations caused by currency movements, production facilities would tend to be located near final markets, leading to changes in the pattern of trade.<sup>6</sup> Even without any effects on direct investment decisions, exchange rate movements could distort the pattern of trade among countries by influencing the relative prices of foreign and domestic goods in specific industries. This in turn would influence the distribution of supply at the industry level across countries.

No given change in the trade pattern can be viewed as permanent, since subsequent exchange rate changes in the opposite direction could lead to a reversal or yet another shift in trade patterns. In these circumstances some exporters and importers, who may have incurred initial adjustment costs to continue at least a part of their international trade, may decide to reduce it further or perhaps eliminate it over time. With large changes in real exchange rates in one or the other direction over an extended period of time, the possibility of repeated shifts in supply sources, markets, or trade patterns may increase the risk in international trade.

It is perhaps obvious that most of the indirect effects

of uncertainty on trade mentioned here cannot be separated from the effects of exchange rate changes *per se*. This is particularly true for large pervasive exchange rate changes which can impose large adjustment costs and/or change trade patterns frequently. Such effects, though impossible to separate from the usual price effects, can be considerable given substantial price responses to exchange rate changes.

### Measuring the impact of exchange rate uncertainty on trade

As mentioned earlier, we use exchange rate variability as a proxy for exchange rate uncertainty. However, we have also argued that any variability measure is likely to understate "true" uncertainty. This implies that our results would most probably also understate the effects of exchange uncertainty on trade. In addition, our discussion of uncertainty effects on trade suggests that most of the indirect effects cannot be fully separated from those of exchange rate changes *per se*. This may lead to a further downward bias in our estimates of the impact of exchange uncertainty, independent of the proxy for that uncertainty. Bearing these caveats in mind, we believe an empirical analysis which includes the component of exchange uncertainty reflected in variability would provide *some* idea about the impact of exchange rate uncertainty on trade flows.

Previous empirical investigations have failed to reach a firm conclusion about the importance of exchange rate

<sup>6</sup>This is only one of many important reasons, such as the desire to reduce transportation costs, frequently given for locating production facilities close to end-markets.

variability as a determinant of trade. This study sheds new light on the issue by examining the effects of exchange rate variability on multilateral exports and imports for the United States and Germany over the floating rate period.

Volume and price equations were estimated for each country's exports and imports of manufactured goods.<sup>7</sup> By explicitly taking into account the effects of domestic (foreign) income, relative prices, and exchange rate levels on import (export) volume, the impact of exchange rate variability on demand for traded goods can be isolated. The measure of exchange rate variability used was the standard deviation over a three month period of a daily effective exchange rate index. This measure was also included in the price equations, along with variables reflecting the cost of production. Past values of the variability measure extending back several quarters were used to capture the usual lagged effects as well as some of the longer run effects stemming from potential adjustment costs. The estimates for the 1974-81 period, together with a detailed presentation of the variable definitions and equation specifications, are reported in the box.

#### Analysis of the results

The estimates reported in the box support the hypothesis that exchange risk reduces the volume of international trade. Exchange rate variability influences both exports and imports, that is, it is statistically significant either in the volume equation or in the price equation. (Note that the significance of variability in either of the two equations is sufficient to ensure a statistically significant effect on imports or exports.) In Germany, the variability effects appear directly on volumes of imports and exports; however, there are no significant effects on prices. The volume of U.S. exports also seems to be directly responsive to variability. But there appears to be no strong *direct* link between exchange rate variability and the volume of U.S. imports. Instead, the variability influence seems to work through import prices.

Like most other such estimates, our results are sensitive to any substantial changes in the observation period. In particular, if the estimation period ends in 1978 or 1979, exchange rate variability does not appear to be a significant variable in most cases. This tells us that including recent data and using a sufficiently long sample period with floating exchange rates are important for our results. However, extending the sample period

beyond 1981 has only minor impact on the exchange risk variable. If, for example, our basic equations are estimated for the period 1974-82, there is no significant change in the results for Germany, but the influence of exchange rate variability appears stronger on U.S. imports and weaker on U.S. exports.

Table 1

#### Effect on Multilateral Trade Volume of Manufactured Goods of a Sustained 10 percent Rise in Variability of Daily Effective Exchange Rates

Trade	United States	Germany
<b>Exports</b>		
In percent .....	-.52	-2.09
In billions of 1980 dollars .....	-.74	-3.49
<b>Imports</b>		
In percent .....	-.57	-1.19
In billions of 1980 dollars .....	-.75	-1.24

Table 2

#### Cumulative Effect of Exchange Rate Variability on Trade in Manufactures, 1977-81, Under Alternative Assumptions

Alternatives	Exports	U.S. Imports	Exports	German Imports
<b>Alternative 1*</b>				
In percent .....	0.5	1.1	3.3	1.9
In billions of 1980 dollars .....	3.6	7.2	27.5	9.9
<b>Alternative 2†</b>				
In percent .....	2.6	3.7	12.0	6.7
In billions of 1980 dollars .....	18.7	24.3	100.1	34.8
<b>Alternative 3‡</b>				
In percent .....	2.2	3.3	14.2	8.0
In billions of 1980 dollars .....	15.8	21.7	118.5	41.5

\*Average value of standard deviation over 1974-81 is used as the benchmark.

†Lowest average value of standard deviation from two consecutive quarters during 1974-81 is used as the benchmark.

‡Estimated standard deviation over the fixed rate period from 1967-72 is used as the benchmark; in order to construct a benchmark comparable with daily variability under the other two alternatives, measured variability based on monthly data over the fixed rate period was adjusted by the average ratio of daily to monthly variability over the floating rate period.

<sup>7</sup>In order to obtain estimates for a relatively homogeneous set of products, only manufactured goods' prices and volumes were used as dependent variables. This still leaves a substantial proportion of trade as the object of investigation, since these goods account for over three-fifths of all U.S. and German trade.



Strictly speaking, these results offer evidence of a "statistically significant" relationship between trade and exchange rate variability, but do not show how large an impact this variability has had on trade. Table 1 reports the effect of a sustained rise in exchange rate variability on the volume of trade, based on estimates in the box.<sup>8</sup> These calculations are presented in percentage terms and in constant dollars. The elasticities are larger for Germany than for the United States.<sup>9</sup> A ten percent rise in the exchange rate variability index causes a two percent reduction in German export volume, but only a fall of one-half of one percent in U.S. export volume. On the import side, the estimated elasticity for German trade is about twice that for U.S. trade.

Table 2 provides estimates of what U.S. and German trade gains would have been had exchange rate variability been lower than actually experienced. The cumulative impact on trade volumes between 1977 and 1981 is presented for three alternative scenarios. Under the first alternative, the average value of the exchange rate variability index over the period 1974-81 is used as a benchmark. That is, the effects of exchange rate variability are assumed to be zero when measured variability is above average. Table 2 shows that had variability never exceeded its average value, over 1977-81 U.S. exports on average would have been 0.5 percent higher while U.S. imports would have been 1.1 percent higher. Over the same period, the trade gains for Germany would have been considerably larger.<sup>10</sup>

The effects of uncertainty on trade undoubtedly would appear much greater if zero variability were used as a

benchmark, rather than average variability. But zero variability as a base is clearly inappropriate since it is almost certainly unattainable. The second alternative in Table 2 utilizes the lowest observed two-quarter average value as a benchmark. Had exchange variability never exceeded this two-quarter historical minimum during 1974-81, both U.S. and German trade in manufactures would have been significantly greater: on average, three to four percent higher in the United States and seven to twelve percent higher in Germany. In a third scenario, exchange rate variability estimated over the fixed rate period from 1967 to 1972 is used as a benchmark for calculating the impact of uncertainty on trade. The results are similar to those under the second alternative.

An interesting aspect of these findings is that German manufacturing trade seems to be more responsive to exchange rate volatility than U.S. trade in comparable goods. Of course, strong conclusions cannot be reached on the basis of just one set of empirical results, but it is possible that German goods are more sensitive to exchange rate variability than U.S. goods. One reason for this may be that a high degree of openness of the German economy leads to a greater sensitivity of traded goods to prices and exchange rates and, consequently, to exchange rate uncertainty. Germany is widely believed to be more open than the United States since traded goods represent a larger share of total output; in 1980, for example, the sum of total exports and imports as a ratio of GNP was 46 percent for Germany and 18 percent for the United States. The larger price elasticities estimated for the German trade volume equations compared to the U.S. (box) are consistent with the view that exports and imports may be more responsive to prices and exchange rates in a more open economy than in a less open economy.<sup>11</sup>

Putting aside the quantitative differences, the results indicate that exchange rate variability is a significant factor in trade for both countries, and an important one for Germany. In addition, our estimates suggest that the link between variability and trade has become stronger in recent years.

## Conclusions

The results of this study suggest that exchange rate variability reduces the volume of international trade in manufactured goods. This conclusion differs from the findings of previous empirical research,<sup>12</sup> which has often

<sup>8</sup>For U.S. import volume, all calculations for Tables 1 and 2 were made by first substituting the price into the volume equation and then making computations on the basis of the estimated relationship between variability and price. German trade values were converted into dollar terms using the average mark-dollar exchange rate for the year 1980.

<sup>9</sup>Elasticity is defined as the percentage change in trade volume that follows a rise in the exchange rate variability measure by a certain percentage amount. This variable was not converted into natural log form before estimation, so only the mean elasticity of exchange rate variability is reported in Table 1. The mean elasticity is the product of the estimated coefficient on the variability index appearing in the volume equation and the mean value of this index.

<sup>10</sup>The calculations for this scenario were made as follows. For each quarter where actual exceeded average variability, the difference between the actual value of the variability index and its mean value was multiplied by the coefficient on this variable appearing in the estimated volume equations. This product was subtracted from the index of trade volume used in estimation. The difference between the hypothetical volume and actual volume was converted into a 1980 dollar equivalent and the results for each quarter were summed over the five year interval. Under the second and third alternatives, this same procedure was used replacing the average value of the variability measure with other benchmark levels, described in Table 2. For U.S. import volume, all calculations were made on the basis of the estimated relationship between variability and price.

<sup>11</sup>In fact, under certain conditions it can be rigorously demonstrated that the size of the coefficient on the exchange rate variability index is directly related to the size of the price elasticity coefficient.

<sup>12</sup>This statement applies to previous studies about the effects of nominal exchange rate variability on trade flows for individual countries. However, there are a few studies in which exchange risk turns out to be significant; they are based either on cross-section data for bilateral trade flows or on *real* exchange variability.

failed to uncover any significant impact of exchange risk on trade. Admittedly, our conclusion is based on the floating rate experience of only two countries, Germany and the United States. Further empirical research on the experience of a broader group of countries would be necessary to reach more general conclusions on the significance of exchange rate uncertainty.

Why do the findings in this study differ from those in earlier studies? One obvious explanation would seem to be our choice of an investigation period which covers the more recent experience with floating exchange rates. Including recent data is important for our results because exchange rate volatility has shown no consistent downward tendency over time and because it provides a sufficiently long sample period with floating exchange rates. This impression is confirmed by the results obtained with data through 1978. Earlier research has not investigated the period since 1977-78 and generally has mixed observations from the first few years of floating with those from the fixed rate period before 1973. Even the recent IMF study, mentioned above, does not update previous econometric tests dealing with effects of *nominal* exchange rate variability on trade flows of individual countries; it does update, however, one earlier investigation based on *real* exchange rate variability. But we have argued that real exchange rate variability is not an appropriate proxy for exchange rate uncertainty.

Another reason for the differences in findings may be that our measure of average quarterly variability, based on a daily effective exchange rate index, provides a better proxy for uncertainty than those in earlier studies that were based on a very small number of observations, e.g., average quarterly variability calculated by using three monthly observations. Finally, by explicitly

considering the impact of risk on volume through prices, our study probably provides a better reading of the full effect of exchange rate variability on trade.

We have argued that our estimates are likely to underestimate the effects of exchange rate uncertainty on trade for two reasons. First, measured exchange rate variability may itself understate the extent of true uncertainty and second, some indirect exchange risk effects on trade cannot be separated from those of exchange rate changes themselves. The indirect effects are particularly important when long-range investment decisions and choices of input sources or output markets must be made under the shadow of potentially large future exchange rate changes. Our use of long lags on the variability index may capture a part of these long-term effects. But this procedure is not adequate for fully isolating and measuring those effects. In any case, the main point of our theoretical arguments on uncertainty is that the results in this study are best interpreted as providing a lower bound on the effects of exchange uncertainty on international trade.

One important policy implication of our study is that, from the perspective of international trade, it is desirable to reduce exchange rate uncertainty or variability. Broadly speaking, variability may be reduced either by changes in macroeconomic policies, by exchange market intervention strategies, or by moving to a substantially different exchange rate system. A discussion of such a complex and broad issue is obviously beyond the scope of this study. But it should be noted that the possible adverse effect of exchange rate uncertainty on international trade is only one of several considerations in the choice of an exchange rate system, and on other grounds one may still favor the present exchange rate arrangements.

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# Corporate Use of Pension Overfunding

Pension plan terminations designed to provide funds for the sponsoring corporations have become relatively frequent in the last few years. Using this procedure, firms raised more than \$1.5 billion between 1980 and 1983, and several additional cases are now in progress (Table 1). The main impetus for this trend seems to be the recent substantial rise in pension "overfunding," a situation in which the value of a pension fund exceeds the required level, as determined by actuaries. The boom in stock prices between August of 1982 and October of 1983, and rising interest rates from 1979 to 1981 and again in the last year, have been the major factors in producing the high levels of overfunding.

The potential for additional funds from terminations is quite significant, even when compared with other more usual sources of funds to corporations. In 1982, for example, the pension plans of only 368 large corporations were overfunded by \$38.8 billion, an amount that exceeds one half the credit market funds raised by all corporations during the year.<sup>1</sup> Plans in several service industries (commercial banking, retailing, transportation, and utilities) did especially well, with 108 top companies showing an average overfunding level of \$171.3 million per firm.

The picture might seem to be one of unmitigated gains for everyone connected with overfunded plans. On the one hand, the firm is relieved of much of the short-

term pressure in the provision of employee benefits. The pension plan, to a certain extent, pays for itself. The employees, on the other hand, may feel confident that no pension benefits will be defaulted.

However, if the corporation wishes to get at the excess funds quickly and directly, it must terminate the plan. By doing so, and by purchasing annuities to cover the benefits accrued under the plan, a firm may retain the excess pension funds and use them for any purposes it deems appropriate.

Two major sets of questions arise in this context. First, what motivates firms to acquire pension assets through terminations? In particular, why has the frequency of such terminations increased markedly since 1980? Why, nevertheless, have most firms refrained from taking this route?

A second set of questions involves the fairness of the firms' actions. Which individuals or groups stand to gain and lose with the inevitable changes in the values of pension assets and liabilities? Also, is the recent phenomenon consistent with a well established government policy on pension matters?

This article looks at the principal factors behind the recent phenomenon of profit-making plan terminations and examines some of the major issues involved. The analysis starts with an overview of the structure of the financial claims that arise from the existence of a private pension plan. The technical and financial aspects of the termination decision are then examined. Once these basic elements are laid out, the phenomenon is considered from a wider perspective in order to clarify some of the policy issues now being debated.

<sup>1</sup>Johnson & Higgins, "Funding Costs and Liabilities of Large Corporate Pension Plans"; (New York, 1983). *Flow of Funds* data, Board of Governors of the Federal Reserve System, Fourth Quarter 1983.

## Pension claims and obligations

The financial claims and obligations arising from the existence of private pension plans are governed by the Employee Retirement Income Security Act of 1974 (ERISA). Many of these claims are contingent in nature and difficult to value. For this reason, only the more straightforward among them ever find their way into the financial statements of sponsoring firms, or even of the plans themselves. Nevertheless, if the alternatives that are open to the firm are to be correctly specified, all the existing claims must be properly identified.

The most straightforward of these claims is the *pension fund*—the collection of financial assets owned by the pension plan. As it presents no unusual valuation difficulties, the fund always appears on the assets side of the plan balance sheet.

On the liabilities side of a defined benefit plan,<sup>2</sup> the entry of primary importance is the so-called *accrued* (or *actuarial*) *liability*. It represents the expected present value of benefit payments that have already been accrued by plan participants.<sup>3</sup> While it is a true obligation under the tenets of ERISA, this concept is considered sufficiently nebulous so as to be relegated to the footnotes of corporate financial statements.

The main problem is that its value depends crucially on various actuarial assumptions (interest rates, mortality rates, etc.) which are not standardized across plans. Though this argument may justify the soft-peddling of the accrued liability for accounting purposes, it certainly does not imply that it may be ignored in economic analyses. This article will examine several pension concepts which are difficult to value, yet are of central importance in the firm's pension decisions. In some cases, these items do not appear even in the footnotes of the financial statements of firms or plans.

A third important concept is the *unfunded accrued liability* of the plan. It is defined as the difference between the accrued liability and the pension fund, as

<sup>2</sup>In a defined benefit plan, an employee's benefit is calculated according to a predetermined formula. Contributions are then set by actuaries at a level which is expected to cover future benefit payments. Unlike defined contribution plans—in which the employee's benefit amounts to the accumulated contributions plus interest—the funds of defined benefit plans may at times be above or below the required levels. For a clear and concise introduction to pension concepts and terminology see: C.L. Trowbridge and C.E. Farr, *The Theory and Practice of Pension Funding*, (Irwin, 1976).

<sup>3</sup>A plan participant is essentially any employee or former employee covered by the pension plan. When calculating the accrued liability, actuaries frequently use projections of future salaries, accumulated benefits, and contributions. In the discussion that follows, it will be assumed that benefit accruals and salaries are frozen at their current levels to simplify the analysis. This is perfectly acceptable under ERISA, currently recommended for corporate disclosure by the Financial Accounting Standards Board (FASB), and not otherwise uncommon in actuarial practice.

Table 1

### Plan Terminations, 1980-83:

Plan sponsor	Funds acquired In millions of dollars	Funding ratio
12 largest reversions:		
Cities Service .....	237.5	1.71
Stroh Brewery .....	98.0	2.14
M.W. Kellogg .....	58.0	1.90
GAF .....	56.0	1.56
Occidental Chemical* .....	51.0	1.63
Humana .....	49.6	1.92
Occidental Petroleum .....	42.8	2.13
Occidental Chemical* .....	31.5	2.61
Continental Air Lines .....	19.6	1.42
John Crane-Houdaille .....	18.5	1.77
Western Air Lines .....	17.0	1.15
Mattel .....	14.0	2.15
Total† (162 plans) .....	1,576.8	1.71

\*Some firms sponsor two or more independent plans.

†This total includes 162 plans, each of which produced a reversion of over \$1 million upon termination. In addition to these cases reported by the PBGC, several terminations have been announced, but are still subject to final approval. These include A&P (\$275 million), Amax (\$100 million), Celanese (\$300 million) and Reynolds Metals (\$130 million).

Source: Pension Benefit Guaranty Corporation.

long as this difference is positive, and zero otherwise.<sup>4</sup> Under ERISA, the firm is obligated to provide this amount to the plan, though it is usually amortized over a number of years, as long as the plan is in existence. If the plan is terminated, however, the firm's outstanding pension obligation is typically less than the unfunded accrued liability. This is of major importance in the financial analysis of the firm's termination decision and is the result of two provisions of the 1974 pension legislation.

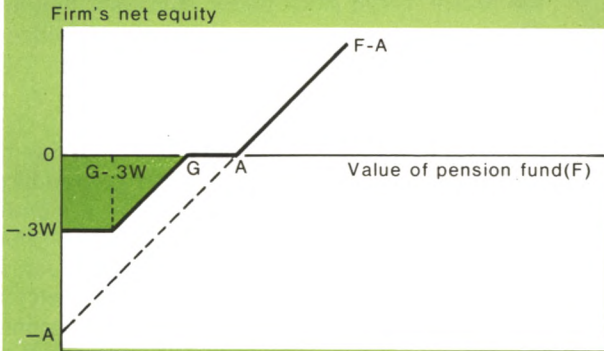
The first of these provisions establishes a rule for determining the minimum benefit level to which plan participants are entitled in case of plan termination. In general terms, only vested benefits are guaranteed. These are benefits which the employee would retain in any case, even upon leaving the firm. Although various vesting schedules are acceptable under law, a commonly used formula is that of "cliff vesting", whereby all

<sup>4</sup>According to current FASB guidelines, the unfunded accrued liability must appear in a footnote to the corporate balance sheet. The FASB, however, is now considering a proposal to require the inclusion of this unfunded liability in the balance sheet itself. It would have as a counterpart on the assets side an intangible asset representing "enhanced future employee services".



Chart 1

**Net Equity of the Sponsoring Firm  
in a Private Pension Plan under ERISA**



F=value of pension fund.  
A=accrued liability.  
G=guaranteed benefit liability.  
W=net worth of firm.

This chart illustrates the level of the firm's equity in a pension plan for various levels of the pension fund. The shaded area represents the net liability that arises whenever the value of the fund falls below the guaranteed benefit liability.

of an employee's accrued benefits become fully vested after ten years of service.

Technically, each employee's vested benefits are guaranteed only up to a certain maximum level. Few participants, however, have vested benefits in excess of the allowable limit, and the vested and guaranteed benefit liabilities are very close in practice. On average, the vested benefit liability is about 90 percent of the accrued liability of large corporate plans.<sup>5</sup>

Whenever a plan is underfunded, the accrued liability overstates the true termination liability of the firm. If the value of the fund falls short of the accrued liability, plan participants are only entitled to the benefits covered by the fund or to the guaranteed benefits, whichever are smaller. The firm has no obligations over and above the value of the fund, unless the latter is insufficient to cover the guaranteed level of benefits.

A second provision in the law establishes plan termination insurance under the Pension Benefit Guaranty Corporation (PBGC), an agency of the Federal Government. If the value of a pension fund is so low upon termination that even the addition of 30 percent of the

firm's net worth does not cover the guaranteed benefit liability, the PBGC makes up the remaining difference. The firm's net pension liability is thereby limited to 30 percent of its own net worth. In exchange for this service, the firm must pay a flat annual premium (currently \$2.60) for each plan participant.

The effects of these provisions are illustrated in Chart 1. When the value of the fund (F) exceeds the accrued liability (A), the firm is liable for all the accrued benefits. It has a claim, nonetheless, on the net overfunding of the plan (F minus A). When the value of the fund is sufficient to cover the guaranteed benefits (G), but not the accrued liability, the firm's net equity in the plan is zero. It is only liable for the value of the fund.

As the value of the fund falls below the guaranteed benefit liability, the firm's net equity in the plan becomes negative—it must make up any further funding deficiencies. The PBGC insurance, however, imposes a limit of 30 percent of the company's net worth (.3W) on the net value of this obligation.

**The mechanics of plan termination**

While the termination of an overfunded pension plan may not be accomplished overnight, there is nothing in the law to suggest that it should involve a long and difficult process. The basic procedure, commonly known as a plan termination with a reversion (of funds to the sponsoring firm), is simple.

First, the firm must notify the PBGC of its intention to terminate the plan at least 10 days in advance of the proposed termination date. If the PBGC finds that the plan is indeed overfunded, it issues a "notice of sufficiency" within 90 days of the original notification, and the termination proceeds as scheduled. Annuities are purchased from insurance companies, which assume the future payments of accrued benefits.

In practice, some terminations take much longer to complete. Two types of problems may arise. The first involves the question of the sufficiency of the fund. If it is difficult to determine whether a plan is truly overfunded, the PBGC may request an extension on its allotted time. In the event that the PBGC finds a plan to be underfunded, the chances of a reversion of funds to the firm become very slim. It is unlikely, however, that an attempt to terminate a plan with a reversion would lead to either of these circumstances.

Since it is in the firm's interest to provide full and accurate information to the PBGC in a timely fashion, informational issues should not cause any major delays. Furthermore, the procedures and assumptions used by the PBGC to calculate pension liabilities are public knowledge. Hence, firms may obtain fairly accurate estimates of subsequent PBGC determinations.

The major source of delays in the completion of

<sup>5</sup>Johnson & Higgins, *op. cit.*

pension terminations has been the filing of lawsuits on behalf of plan participants. In some cases, the latter have claimed a right to at least a share of the pension plan overfunding. One of the most publicized cases is that of A&P, which initiated its termination proceedings in October of 1981. After extensive litigation, a U.S. Court of Appeals recently upheld a settlement providing a share of about one-sixth of the total overfunding to the plan's participants.<sup>6</sup>

The law is largely silent as to the ownership of the pension overfunding. A strict interpretation would ascribe such funds to the sponsoring firm. The intent of the law may be different, however, as suggested by the A&P court rulings. This point is discussed later in more detail.

### The growing value of pension overfunding

For most firms, the value of their net equity in pension plans has been growing at a substantial pace over the last few years. The proportion of overfunded large corporate plans went from an already significant 50 percent in 1980 to 67 percent in 1982. Moreover, among overfunded plans, the average level of overfunding almost doubled from \$54.0 million in 1980 to \$105.3 million in 1982.<sup>7</sup>

At the same time, the problems of underfunding—so pervasive in the 1970s—have been dwindling in magnitude. Only 20 percent of large corporate plans had some unfunded vested liabilities in 1982, as compared with 38 percent in 1980. The proportion of firms with unfunded vested liabilities in excess of 30 percent of net worth—and, thus, with liabilities covered by the PBGC—remained stable at about 2 percent.

The recent funding success of corporate pension plans is largely attributable to developments in the financial markets—most importantly, the stock market climb and the course of interest rates. Somewhat ironically, the recession, through its depressing effects on employment and wages, contributed as well. The following have been the most important factors.

#### Stock market climb

Pension funds hold, on average, 60 percent of their assets in equities. Hence, they benefitted from the boom in stock prices that began in 1982. From August of 1982 to October of 1983, for example, the S&P 500 index rose by 69 percent. (It should be noted that some of these gains—though certainly not most—have been reversed so far in 1984.)

<sup>6</sup>The United States Court of Appeals for the Third Circuit (in Philadelphia) decided on December 29, 1983 to uphold an earlier settlement which allocated \$50 million of the A&P plan's overfunding to its participants. See *Walsh v. The Great Atlantic and Pacific Tea Company, Inc.*, 726 F.2d 956 (1983).

<sup>7</sup>Johnson & Higgins, *op. cit.*

In addition, dividend rates have been at historically high levels since 1978. Dividends, which accrue without taxes to pension funds, must be taken into consideration when determining the total return to holding equities. During the recent rise in stock prices, it is clear that the appreciation did not occur at the expense of dividend distributions.

#### High interest rates

Increases in interest rates tend to depress the value of pension assets. On the other hand, they tend to reduce the present value of pension liabilities to an even greater extent. Therefore, the degree to which a pension plan is overfunded typically increases with interest rates. Although this principle does not necessarily apply to every pension plan, it does seem to hold in the majority of cases.

To obtain a more precise formulation of the conditions required for this to hold, define:

$$R = \text{funding ratio of a pension plan} \\ = \text{pension fund/accrued liability, and} \\ R_D = \text{duration of accrued liability/} \\ \text{duration of pension fund.}^8$$

We observe that:

- R increases with the interest rate whenever  $R_D$  is greater than 1 (that is, whenever the duration of the accrued liability exceeds that of the fund); and that
- The absolute dollar amount of overfunding (the pension fund minus the accrued liability) increases with the interest rate whenever  $R_D$  is greater than R.

Estimates based on data for 1980 and 1982 indicate that the duration ratio  $R_D$  is approximately 1.4 for the typical private pension plan. Since private pension funds are relatively homogeneous in terms of asset composition, this figure is probably fairly stable across

<sup>8</sup>The duration of a stream of payments is defined as the weighted average of the time remaining to each payment, with each weight equal to the present value of the corresponding payment. The usefulness of the concept of duration stems from the fact that—up to a proportionality factor—it represents the percentage reduction in the present value of a stream that is associated with an increase in the interest rate. If  $i$  is the interest rate,  $P$  is the present value of a stream and  $D$  its duration, then

$$D = -(1+i) \frac{d \log P}{di}$$

In a continuous time model, the  $(1+i)$  factor drops out. For more details, the reader may consult: Richard W. McEnally, "Duration as a Practical Tool for Bond Management", *Journal of Portfolio Management* (Summer 1977) or G.O. Bierway, George G. Kaufman and Alden Toevs, "Duration: Its Development and Use in Bond Portfolio Management", *Financial Analysts Journal* (July-August 1983).



Table 2

### Distribution of Funding Ratios\* of Large Corporate Pension Plans, 1980 and 1982

Funding ratio	Percent of plans†		Percent of total accrued liabilities‡	
	1980	1980	1980	1982
At least:				
1.0 .....	41.6	43	52	
1.4 .....	9.3	11	29	
1.5 .....	6.4	7	25	
2.0 .....	1.0	0§	8	

\*The funding ratio is here defined as the market value of the pension fund divided by its accrued liability. (See text.)

†Calculated from survey data in Laurence J. Kotlikoff and Daniel E. Smith, *Pensions in the American Economy*, Chicago: NBER (1983). Sample consists of approximately one half of the Fortune 1000 industrial companies.

‡Estimated from survey data in Johnson & Higgins, "Funding Costs and Liabilities of Large Corporate Pension Plans", New York (1981 and 1983). Sample includes most firms from Fortune's 500 industrials (77 percent in 1980, 80 percent in 1982). Plans are weighted by their accrued liabilities, and the funding ratio is assumed to be normally distributed.

§Less than 0.5 percent.

plans.<sup>9</sup> Thus, while it is almost certain that an increase in interest rates would raise the funding ratio  $R$ , the absolute level of overfunding may rise or fall, depending on whether or not a plan is less than 40 percent overfunded. Using actual pension plan data, Table 2 illustrates that most pension funds, in fact, have funding ratios of less than 1.4.

Interest rates have been persistently high since 1978. Although they are currently below their 1980-81 record levels, they remain significantly higher than at comparable points in previous cycles. Thus, with the exception of plans with very high funding ratios, interest rates have been important contributors to the recent overfunding of plans.

#### *Decelerating wage bill*

High levels of unemployment during the last recession have dampened the extent of coverage under private

pension plans. In general, when employment and employee-hours grow less rapidly, the pension obligations of corporations are correspondingly constrained. In addition, pension participants who quit or are permanently laid off stand to lose benefits that have been accrued but are still unvested.

Slowdowns in wage increases also serve to contain the growth of pension liabilities. Many pension plans, especially those of salaried employees, have benefit formulas which depend on wages. In such cases, accrued liabilities have grown less rapidly as a response to decelerating or decreasing wage levels.

#### *Valuation of termination liabilities*

Since corporate pension overfunding may revert to the firm only after a plan is terminated, the liabilities involved must be calculated under the assumption of termination. As compared with the liabilities of a continuing plan, those at termination have tended to be lower in the last few years. There are two principal reasons for this.

The first is that current wages, rather than a projection of expected future wages, are used in calculating pension liabilities upon termination. Since many pension benefit formulas depend on final wages, which in almost all cases would truly be expected to rise over time, the use of current wages has an obvious depressing effect on the termination value of the accrued liability.

The second reason is that the interest rates used by actuaries to value the liabilities of continuing plans are typically lower than the rate required by the PBGC for plan termination valuations. In general, actuaries prefer to use conservatively low interest rate assumptions, since that tends to overstate the required level of the fund and promotes greater plan solvency.

#### **Should the firm terminate an overfunded plan?**

If corporate behavior with respect to pension overfunding is to be understood, two basic facts must be explained. First, large reversions have occurred much more frequently in the last two years than in the previous eight years since the passage of ERISA. Second, only a small fraction of the potential overfunding has thus far been tapped.<sup>10</sup>

The analysis of these facts is made clearer if we begin by considering a situation in which certain simplifying assumptions are imposed. Specifically, suppose that:

<sup>9</sup>The duration of the accrued liability was estimated using an actuarial rule of thumb derived in Howard E. Winklevoss, "Pension Mathematics", (Irwin, 1977). The duration of the pension fund was based on pension fund asset proportions from the *Flow of Funds* data of the Federal Reserve Board and on typical durations for each type of asset.

<sup>10</sup>The firm may alternatively take advantage of overfunding by reducing the level of its pension contributions. This would be comparable to recouping the excess funding through an amortization schedule. Under this alternative, however, the immediate gain is not nearly as large; and uncertainty about the future makes the total payoff more risky.

- The age distribution of the employee population is fixed over time;
- the plan's benefit formula does not change;
- the rate of interest and the price level are constant over time;<sup>11</sup> and
- the returns to the fund fluctuate randomly (but symmetrically) about the interest rate.<sup>12</sup>

One implication of these assumptions is that the accrued liability is constant over time. In addition, benefit payments and regular pension contributions remain unchanged through time.<sup>13</sup>

Consider first the net value of the pension fund, that is, the fund less the accrued liability. If the firm were fully liable for plan underfunding, this difference would represent its net equity in the plan, as illustrated in

<sup>11</sup>The more general assumption that prices grow at a steady rate (that is, that the rate of inflation is constant) does not alter the general character of the results. The case of a constant price level is used in the discussion for the sake of convenience.

<sup>12</sup>More precisely, the fund's instantaneous returns could be assumed to follow a Brownian motion process. This is the standard assumption in option pricing theory.

<sup>13</sup>These regular contributions are called "normal costs" in the actuarial literature. See, for example, Trowbridge and Farr, *op. cit.*

Chart 2(a). In that case, and under the stated assumptions, a firm that is not averse to reasonable financial risks would be indifferent as to whether to terminate or continue an overfunded plan. The intuition is as follows:

If the future returns to the fund turn out to be better than expected, the firm benefits fully from the gains. If, on the other hand, the returns are worse than expected, the firm bears the full risk. Since these two types of situations are equally likely by assumption, the firm is indifferent between acquiring the present level of overfunding and accepting a future level which is expected to be the same.

The actual situation is more favorable to the firm. Recall from the analysis of Chart 1 that the firm's liability is limited in the case of underfunding. Hence, in actuality, the downside risk for a firm with an overfunded plan is smaller than in the case just described. This limited risk feature tilts the balance in favor of plan continuation, as that alternative represents, in effect, a favorable bet for the sponsoring firm. The true value of the overfunding hence exceeds the strict difference between the fund and the accrued liability.

An extreme example of limited downside risk is presented in Chart 2(b). Here, the firm is fully protected against asset market fluctuations that would make the plan underfunded. This case is interesting for two reasons. First, it corresponds to the situation prior to ERISA, when there were neither guaranteed benefits nor a PBGC. The risks of underfunding were borne by plan participants.

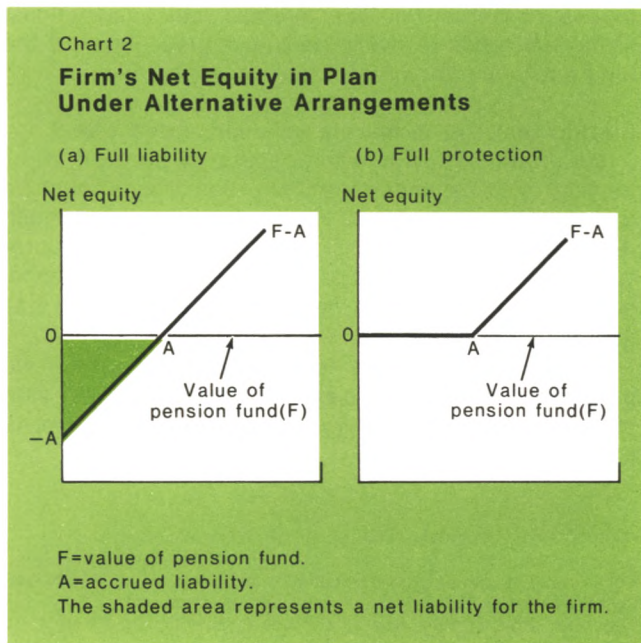
Second, the value of the overfunding under this type of full protection represents an upper bound on the actual value to the firm of the excess pension funds. The arrangement is formally equivalent to a call option, and is briefly analyzed as such in the box.

To summarize, under the basic assumptions, it is financially preferable for a firm with an overfunded plan to provide for its continuation. Moreover, the returns to qualified pension funds accumulate without taxes, providing a further incentive to continue "investing in the plan." These conclusions are consistent with the fact that most firms with overfunded plans have not opted for termination. To account for the recent surge in terminations, new elements must be brought into the picture.

#### Possible reasons for the surge in reversions

The relatively small but significant number of recent terminations may be explainable by firms' perceptions of departures from the above conditions. Any firm with a substantially overfunded plan, but which expects a long-term decline in the level of overfunding, may be tempted to realize the gains through plan termination.

Several factors may lead to reductions in overfunding.





The stock market, for example, could turn around and eliminate some or all of the previous gains. Alternatively, for a highly overfunded plan (more than 40 percent), interest rates could rise. For a less overfunded plan (less than 40 percent), interest rates could decline.

If any of these events were expected to occur and persist into the future, some firms might be inclined to terminate their plans. Expectations of rising interest rates, for example, may have been at least partly responsible for some recent terminations. As shown in Table 1, plans that were recently terminated with valuable reversions to firms had a weighted average funding ratio of 1.71. (The simple average is 2.46.) Moreover, only one of the top twelve reversions involved a plan that was less than 40 percent overfunded. Given these high funding levels, firms may have been concerned about the adverse effects of increasing interest rates on the levels of overfunding.

One other important factor that must be considered is the firm's attitude toward risk. Ordinarily, economic theory treats firms as neutral or indifferent to risk. A sufficiently risk averse firm, however, might not fully appreciate the protection against economic losses provided by ERISA. It might instead go for the bird in hand, and terminate the plan immediately.

The firm's choice regarding termination is also influenced by the funding level of the plan. The table in the box illustrates that the relative attractiveness of continuing with a plan diminishes as the funding ratio becomes larger. Thus, at high levels of funding, it takes a smaller change in expectations about future economic and financial conditions to reverse the decision not to terminate. A look at Table 1 confirms that most of the recent reversions involve plans with high funding ratios.

Apart from these technical reasons, other factors have been suggested as contributing to the recent surge in terminations of overfunded plans. One of these is the rise in merger and acquisition activity. A corporate takeover affords the possibility of capturing an overfunded plan with other firm assets. Although this is most probably not a dominant consideration, a valuable overfunded plan may "sweeten the pot" when a corporate acquisition is being considered.

Terminating a plan, then, becomes one part of an overall defensive strategy for preventing a takeover. There is evidence that in more than one instance, terminations which involved substantial reversions were connected to leveraged buyouts designed by management to prevent takeovers. If a takeover does go through, the new management—with no close ties to the acquired firm's employees—may be less reluctant to terminate a plan.

Another reason for the recent terminations may be the experience that corporate management has gained over

time with the provisions of ERISA. The complications involved in understanding and interpreting the Act may for some time have prevented firms from taking full advantage of the options permitted under law. With a better grasp of both substance and regulatory experience, corporate executives may be reaching farther.

#### **The effects of termination on plan participants**

So far we have concentrated on the financial aspects of the termination decision from the firm's point of view. Even though the firm is the primary decision maker, it is essential to consider how plan participants are affected by the termination of an overfunded plan. Are they being treated fairly? The answer may depend on the particular relationship of the employee to the plan.

Even when a plan is overfunded, employees with vested benefits may suffer intangible losses in the event of termination. Though all accrued benefits are generally provided for, a degree of certainty about future benefits is lost with the plan. Under some defined benefit plans, for example, the employee accrues a given percent of final salary with each year of service. If the individual were forced to save for retirement exclusively through other directly held financial instruments, or through a defined contribution plan, the future value of the employee's savings would be, in a sense, less predictable.<sup>14</sup>

When the benefit formula depends upon the employee's final salary, as in the above example, it also makes a difference whether one applies the formula to a future salary (as under plan continuation) or to the current salary (as under termination). Thus, even though a vested employee receives his full share from the plan, he may come up short as far as future expected benefits are concerned.

A special case of a fully vested employee is the current retiree. In this case, termination has very little significance, save for plans which provide *ad hoc* cost-of-living increases in pension benefits. These would presumably be discontinued after the plan ceases to exist, making the participant worse off.

Employees with some unvested benefits share the foregoing difficulties; but, when the plan is overfunded, all their benefits become, in effect, vested upon termination. The net result of termination is thus ambiguous for them, and it is difficult in general to say which of the two factors predominates.

On the whole, it seems that participants tend to be net losers when a plan is terminated. The exact extent of the losses, however, is hard to ascertain.

The PBGC's finances also may be adversely affected

<sup>14</sup>Plans terminated with reversions are frequently replaced with defined contribution plans.

by plan terminations. PBGC premiums are determined solely on the basis of the number of participants. Thus, when an overfunded plan is terminated, the pool of contributions is curtailed, but only a "good risk" is eliminated. Terminations of underfunded plans may induce actual payouts for the PBGC, and if these ever exceed the agency's reserves, the Federal Government may find itself under pressure to cover the shortfall.

Is the government committed to the establishment and continuation of pension plans? Even though the emphasis in ERISA and in later policy statements is on the financial soundness of existing plans,<sup>15</sup> the establishment of tax advantages and of the PBGC seem to point to a desire to promote the growth of private pension plans. If this is the case, it is important to determine whether the increased frequency of terminations with reversions is being driven by elements within the current pension law.

Whether or not the employees must share in the proceeds from a reversion, it is clear that firms have a legal right to terminate an overfunded plan and that, in practice, they end up with most if not all of the excess funds. One proposal under current debate would give the plan participants a greater share (say, half) of the overfunding in case of termination.<sup>16</sup> Once the decision to terminate has been made, this arrangement may have some desirable redistributive properties. All other things equal, however, it may tend to increase the firm's incentive to terminate an overfunded plan.

The reason for this is that the net equity of the firm in the plan, as presented in Chart 1, would be reshaped in a way that could make termination more desirable. Under the present law, the firm benefits fully from unexpected gains, but is partially protected against unexpected losses. A proposal to curb the firm's upside potential from plan continuation, leaving the downside risk intact, would seem to make the case for continuation weaker.

Another alternative for reform would involve giving the firms the right to withdraw the excess funds from a plan without the need to terminate it. This would seem to solve the present problem, but in the longer run, it could jeopardize the solvency of plans. If firms were to avail themselves of every opportunity of getting at the excess funds, all plans would end up underfunded.

Nevertheless, a limit could be set on the firm's proceeds from a reversion that does not involve plan termination. Firms might be allowed, for example, to withdraw funds in excess of a certain degree of overfunding,

<sup>15</sup>See, for example, "Coming of Age: Toward a National Retirement Income Policy", President's Commission on Pension Policy (February 1981).

<sup>16</sup>See, for instance, the editorial "Terminated Funds: A Fair Solution", *Pensions and Investment Age* (June 27, 1983).

### The Pension Call Option

A *call option* gives its bearer the discretionary right to buy a given asset on or before a specified time in the future at a preset price. When a firm has full protection against the liabilities of an underfunded pension plan (as discussed in the text) its right to any pension overfunding may be construed as a call option.\* The firm may at any time buy the pension fund at a price equal to the accrued liability of the plan. By presenting an estimate of the true worth of such an option, this box illustrates how the value of the overfunding may exceed its actual level (called the *intrinsic value* of an option) whenever there is some protection against downside risk.

As in the text, we assume the constancy of the major economic variables involved. Under those conditions, the table presents the ratio of the intrinsic value to the option value for various levels of the funding ratio of the plan (the ratio of the value of the fund to the accrued liability). In pension fund terminology, this ratio represents the actual level of overfunding (its value to the firm if the plan is terminated immediately) as a proportion of its value assuming the continuation of the plan.

At low funding levels, the protection afforded by the option makes its value substantially larger than the strict overfunding amount. As the funding level increases, however, the two values become much closer, and the financial incentive for plan continuation becomes relatively less powerful.

**Ratio of Intrinsic Value to Option Value for the Pension Call Option**

Funding ratio	Intrinsic/Option value In percent
1.1	24.7
1.2	41.5
1.3	53.4
1.4	62.1
1.5	68.7
1.6	73.7
1.7	77.7
1.8	80.8
1.9	83.4
2.0	85.4
2.5	91.8
3.0	94.8

\*The intuition behind the results of the box is given in the text. For a largely nontechnical discussion of options in general see Laurie S. Goodman, "New Options Markets", this *Quarterly Review* (Autumn 1983).

which could be stated as a percent of the accrued liability. Thus, suppose this rule were to apply with a minimum overfunding level of, say, 25 percent. A firm sponsoring a plan with an accrued liability of \$10 million and a fund valued at \$18 million could obtain a reversion of \$5.5 million (that is, \$8 million in overfunding minus 25 percent of the accrued liability, or \$2.5 million). In this way, the firm would obtain a short-term gain, but the plan would still be continued with a buffer against unanticipated financial adversities.

Such an arrangement might be construed as a tax-sheltered form of investment for the corporation. As such, it would seem to be a departure from the basic purpose of pension legislation—the enhancement of the retirement income of workers. Nevertheless, U.S. pension legislation has traditionally relied on financial incentives to firms as a means of promoting its basic goals.

It should be clear that any solution to the problem would involve some sort of trade-off. It has been argued, in fact, that reversions are not a problem, especially if plan participants are otherwise compensated for any losses incurred. In attempting to find a solution, care should be taken not to provide other incentives for undesired behavior on the part of those involved.

### **Conclusion**

The recent flurry of terminations of overfunded plans is probably not over. Strong gains in the stock market have been followed by increased uncertainty, and interest rates are again rising. Thus, firms that find themselves with heavily overfunded plans could be tempted to cash in their gains in anticipation of adverse market movements. The numbers in Table 2 indicate a large potential for this.

For the firms that have taken this opportunity so far, the main incentive seems to have been provided by the fact that the funds were there—somewhat unexpectedly and in large amounts. That much is common to all the firms. Each individual case, of course, was precipitated by its own particular set of circumstances. A careful

study of these seems potentially fruitful, but lies beyond the scope of this article.

Even though some firms have obtained very profitable reversions, relatively few have availed themselves of this opportunity so far. There seem to be two possible explanations for the apparently unexploited opportunities: the lure of further gains and the indirect costs of plan terminations. If costs—such as alternative compensation for workers—are the main concern, the number of terminations would be expected to remain at a modest level in the future. If, on the other hand, firms are waiting for the appropriate moment to realize the maximum possible gains, the looming of a large drop in the stock market, or in interest rates, could set off another stream of terminations.

There is also an important issue of equity involved. For many plan participants, their pension is the principal source of saving for retirement, apart from Social Security. The continuation of the plan could be of great importance for them. Even when a new defined contribution plan is established, as is sometimes the case, the nature of employee benefit expectations can be significantly altered.

The situation is not clear-cut, however. The reversion of a plan's overfunding to the firm improves its financial position in a way that could lead to increases in productivity, or even prevent its demise. In those cases, the employees also stand to gain from a termination, especially if a substitute pension plan is introduced.

The legal and ethical issues revolve around the question of who ultimately owns the pension fund. The law is ambiguous on this matter and provides little direct guidance. Pension obligations, for example, vary depending on whether or not the plan is terminated. Moreover, while an existing plan is closely regulated, there is no legal requirement for a firm to either start or to maintain one. Thus, while the claims of the various parties involved depend upon the circumstances, it is the firm that, at present, holds essentially all the options.

Arturo Estrella

# In Brief

## Economic Capsules

### Financial Consequences of Mergers

Recent merger activities have raised some old questions about their possible effects on credit flows in the economy. People ask whether these big deals increase the money supply or otherwise stimulate inflationary pressures. People also frequently ask whether mergers take credit away from other, potentially more productive uses of funds.

First, mergers do raise the money supply, but the effect is small and temporary. When very large shareholders of an acquired company are paid off, the effect on components of narrowly defined (M-1) money, especially checking accounts, is negligible. The reason is that both corporate treasurers and large sophisticated stockholders can move the funds into and out of transactions accounts within a day.

The main effect on M-1 comes when small shareholders of an acquired firm are paid. When payment is sent out to them, the acquiring corporation may have to keep a demand deposit balance for several days to cover the checks. Moreover, some of the balances may sit for several days in the checking accounts of those paid until the funds clear and are shifted into new investments. Whatever bulge in transactions balances does occur, however, will be temporary. Even for a very large transaction, the overall effect on M-1 will rarely exceed a few hundred million dollars in a single week.

The broader money aggregates can also be affected, since parties on both ends of the transaction hold more liquid assets. These effects are transitory, too, and are minor compared to the huge size of M-2 or M-3. To the extent that the effects of mergers on money cannot be

identified down to the last nickel, however, they do add a bit of uncertainty to the interpretation of short-run changes in the aggregates.

Perhaps the more fundamental point to note is that any effect on the money supply is not inflationary in the usual sense. The transactions mainly represent transitory reshufflings of asset portfolios. Increases in money balances resulting from such transactions do not contribute directly to aggregate demand and so do not push up wages or the price level. As discussed below, mergers could stimulate the economy slightly due to their effect on stock prices.

While the effects of mergers on the money supply give little reason for concern, the question remains whether these large mergers siphon credit away from other, more productive uses of funds. For example, does the rise in syndicated bank credits during an acquisition limit the availability of financing for firms particularly reliant on bank loans? Probably not.<sup>1</sup> The very willingness of banks to provide big low-margin chunks of credit for mergers itself may be a manifestation of generally weak demand for bank loans. Alternatively, in a situation where bank loan demand is otherwise strong, a rise in demand for bank financing for mergers could provide an opportunity for banks to raise their markups over the cost of funds. In theory this could discourage or "crowd out" certain potential borrowers. More realistically, however, many bank customers would turn to alternative means of financing, such as the commercial paper market or borrowing from foreign banks. With even a

<sup>1</sup>In the very short run the volume of bank lending to support a particular takeover might approximate that merger's impact on aggregate bank credit. Beyond the very short-run, however, the acquiring firm may issue more stock, sell assets, or issue other debt instruments to repay the bank loan. Moreover, other firms might also shift some financing away from banks. Thus, the initial effect of that particular merger on bank loans soon would start to wear off.



very slight tilt in relative pricing, big borrowers could shift out of bank loans, leaving room for the smaller borrowers with fewer options.

The credit issue can also be viewed from a broader perspective. After a merger financed by debt the newly combined firms' debt-equity ratio is greater than the pre-merger leverage of the individual companies. Does this rise in the overall debt-equity ratio steal away potential financing from other firms? The answer really depends on what other firms' financing requirements are. One possibility is that they could actually be helped, if they

want to reduce their own debt burdens. The stockholders bought out in the merger deal represent a natural market for other equity issues. So the rise in the newly merged firm's debt-equity ratio might be at least partly offset in the aggregate by other firms being able to reduce their debt-equity ratios.

Thus, if mergers only represented complicated refinancings, with no change in the underlying value of the firms' assets, their financial effects would surely be innocuous. After all, the separate companies involved would have had to be financed somehow in any case.

### Recent Major Acquisitions, Completed and Pending Transactions, 1983-1984\*

Acquirer (business and/or product line)	Acquired (business and/or product line)	Date of Announcement†	Approximate Price Paid (In millions of dollars)
Standard Oil Co. of California (Integrated oil company)	Gulf Corp. (Integrated oil company)	March 6, 1984	13,200
Texaco Inc. (Integrated oil company)	Getty Oil Co. (Integrated oil company)	January 9, 1984	10,130
Mobil Corp. (Diversified: Oil-chemicals- retail merchandising-paperboard packaging)	Superior Oil Co. (Integrated oil company)	March 12, 1984	5,700
Kohlberg, Kravis, Roberts & Co.‡ (Investment group led by Kohlberg, Kravis, Roberts & Co.)	Esmark Inc. (Diversified: foods- chemicals-personal products-auto leasing)	May 7, 1984	2,400
Broken Hill Proprietary Co. —Australia (Natural resources)	Utah International Inc. —unit of General Electric Co. (Leading producer of metallurgical coal in Australia)	January 28, 1983	2,400
Manufacturers Hanover Corp. (Multiple bank holding company)	C.I.T. Financial Corp. —unit of RCA Corp. (Major finance corporation)	September 26, 1983	1,510
Private Group‡ (Top executives of Metromedia, led by John W. Kluge, Chairman)	Metromedia, Inc. (Television and radio stations)	December 7, 1983	1,468
Diamond Shamrock Corp. (Oil/gas-chemicals-coal)	Natomas Co. (Oil exploration, development and production)	May 23, 1983	1,355
American Medical International, Inc. (Third largest hospital management company)	Lifemark Corp. (Fifth largest hospital management company)	October 24, 1983	1,145
Phillips Petroleum Co. (Domestic integrated oil company)	General American Oil Co. (Exploration and production of oil/natural gas)	January 10, 1983	1,140

\*Based on information available as of mid-May.

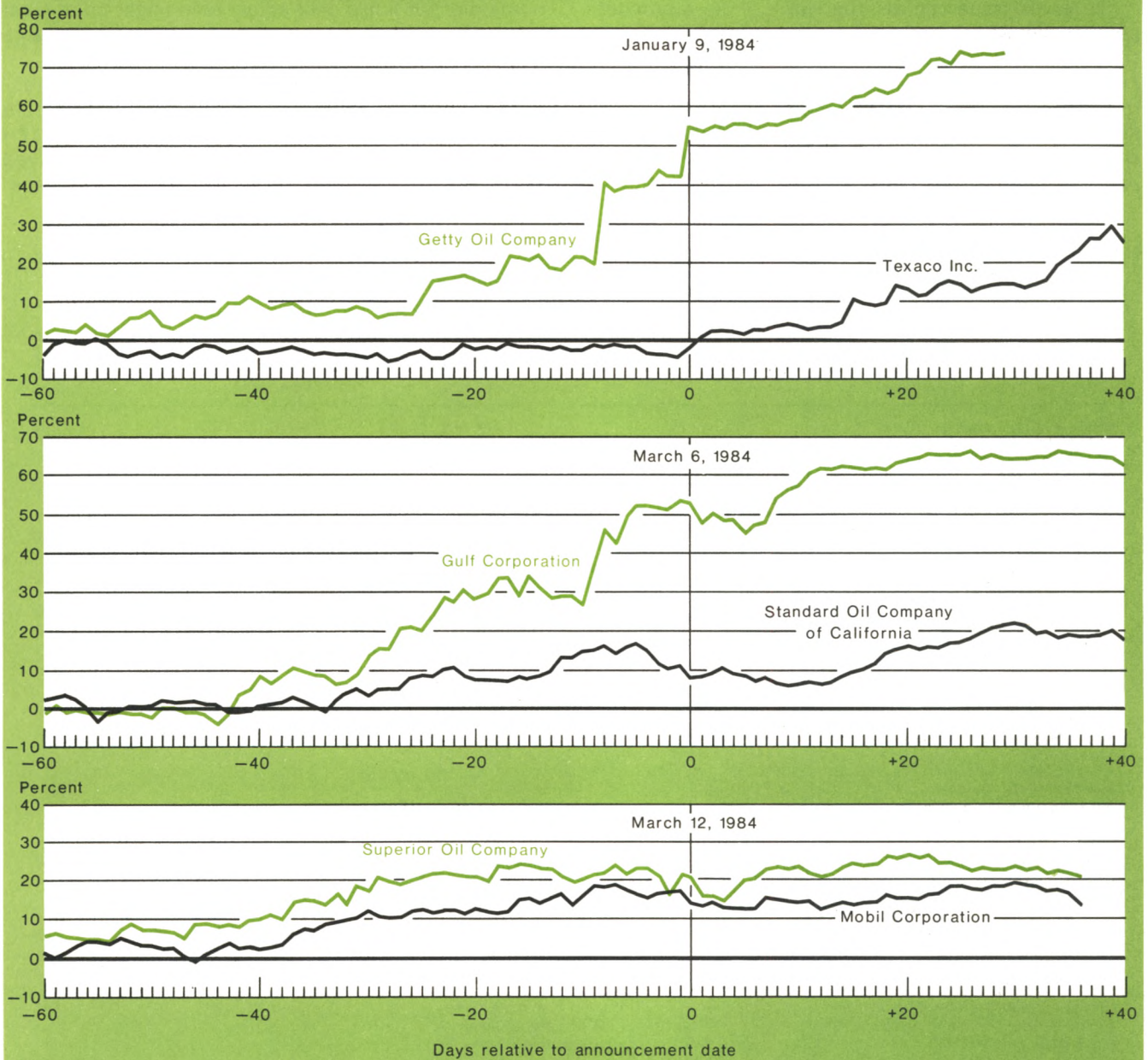
†Announcement date is defined as the day the merger was announced in the *The Wall Street Journal*.

‡Leveraged Buyout—deals which were publicly announced to be leveraged.

Sources: *The W.T. Grimm & Co. Mergerstat Review*, 1983 and *The Wall Street Journal*.



### Stock Price Reactions to Merger Activity\*



\* Cumulative excess returns to the shares of acquiring and target companies. Excess returns represent the adjustment of stock prices to new information - in this case the announcement of a merger.

Announcement data is designated as day 0 and is defined as the day the merger was announced in The Wall Street Journal.

See box for procedure for estimating excess returns.

## Estimating Excess Returns

The Capital Asset Pricing Model (CAPM) is a theoretical representation of stock price returns with much empirical support. Simply put, the CAPM says that the expected return on a security is equal to the rate of return on a riskless asset plus a coefficient, called beta, times the difference between the return on the market portfolio and the return on the riskless asset. This is written as:

$$R_{i,t} = R_{r,t} + \beta_{i,t}(R_{m,t} - R_{r,t}) \quad (1)$$

where  $R_{i,t}$  is the return on the  $i$ th security at time  $t$ , defined as the percentage change in security  $i$ 's price;

$R_{r,t}$  is the return on the riskless asset at time  $t$ , generally taken to be the Treasury bill rate;

$R_{m,t}$  is the return on the market portfolio at time  $t$ , defined as the percentage change in the market portfolio's index; and

$\beta_{i,t}$  is the beta coefficient of security  $i$  at time  $t$ . The beta coefficient is simply a measure of the sensitivity of a stock's price to market movements.

This model says that on average, one should not expect a return greater (or less) than the sum of the two components of this equation. Statistically this means that if a regression equation was estimated the residuals would have an expected value of zero.

In order to test for "unexpected" movements in a stock's price after an announcement, we estimated an empirical analog of the conceptual model described above for five years prior to the three months immediately before the announcement. Our estimation period excludes price observations for the three months preceding the announcement date since there may have been abnormal price behavior just prior to the announcement as a result of information leaks or speculation. (Our analysis was alternatively performed excluding seven months prior to the announcement which gave us results that

were qualitatively the same.) Using our estimated regression coefficients we then examine predicted residuals for the time surrounding the announcement date in order to determine if there were any unexpected returns as a result of the announcement.

Specifically, using daily stock returns we estimated:

$$R_{i,t} = a_i + b_i R_{m,t} + e_{i,t} \quad (2)$$

where  $R_{i,t}$  is the daily return on security  $i$ , defined as the percentage change in security  $i$ 's price adjusted for stock splits and dividends;

$$a_i = R_{r,t}(1 - \beta_{i,t});$$

$R_{m,t}$  is the daily return on the market portfolio, defined as the percentage change in the S&P 500 index; and  $e_{i,t}$  is a normally distributed zero mean random disturbance term.

If the market failed to anticipate the forthcoming appreciation in the security price after the merger announcement, there should be returns in excess of those specified by equation (1) after the announcement date. That is, on average there should be nonzero residual terms in equation (2) in the post-announcement period.

To test for this, we estimate the residuals or "excess" returns around the day of the announcement. The residuals are calculated as:

$$\hat{e}_{i,t} = R_{i,t} - (\hat{a}_i + \hat{b}_i R_{m,t}) \quad (3)$$

where  $\hat{a}_i$  and  $\hat{b}_i$  are the estimated values from equation (2).

Finally, by cumulating these "excess" returns we can observe the adjustment of the stock's price to the merger announcement. Cumulative excess returns at time  $T$  are defined as:

$$\sum_{t=-60}^T \hat{e}_{i,t}$$

Our empirical results are presented below with  $t$  statistics in parentheses.

## Empirical Results

Regression equations:	Acquirer Texaco Inc.	Acquired Getty Oil Co.	Acquirer Mobil Corp.	Acquired Superior Oil Co.	Acquirer Standard Oil Co. of Ca.	Acquired Gulf Corp.
$\hat{a}_i$	- .0002 (- .57)	- .0002 (- .46)	- .0001 (- .24)	.0003 (.50)	- .0001 (- .29)	- .0001 (- .27)
$\hat{b}_i$	1.0577 (27.90)	1.3258 (28.35)	1.2883 (28.84)	1.4271 (23.42)	1.3242 (31.83)	1.1921 (26.69)
$\bar{R}^2$	.34	.35	.35	.26	.40	.32
D.W.	2.08	1.80	1.98	1.98	1.75	1.93
Estimation period:	Jan 1, 1978	to Sept 1, 1983	Jan 1, 1978	to Dec 1, 1983	Jan 1, 1978	to Dec 1, 1983
Prediction period for excess return calculations used in chart:	Sept 1, 1978	to May 1, 1984	Dec 1, 1983	to May 1, 1984	Dec 1, 1983	to May 1, 1984
Announcement Date*	Jan 9, 1984		Mar 12, 1984		Mar 6, 1984	

\*Defined as the day the announcement appeared in the *The Wall Street Journal*.

Bank loans, commercial paper, bonds, and equities are all substitutes along the spectrum of financing arrangements. Increased reliance on one particular mode by partners in a merger stimulates at least partially offsetting shifts by other firms and could even be helpful to some.

But as a practical matter the market value of the combined firms does quite often rise after a merger and in theory this may affect availability of credit to other borrowers. Empirical evidence indicates that the value of pre-merger holdings of stock in the involved companies rises significantly as a result of the combination.<sup>2</sup> Recent large mergers in the oil industry are cases in point (chart). Around the time of these recent merger announcements the stock prices (adjusted to eliminate overall market movements) of both the acquiring firms and the takeover targets tended to rise noticeably.

One explanation is that this rise in stock values represents purely irrational speculative activity in the stock being taken over. The trouble with such reasoning is that if market participants thought that the acquiring firm paid too much for its takeover target, then the value of the acquiring firm's stock should fall to offset any excessive rise in the acquired firm's stock. But the available evidence shows that the acquiring firm's stock either rises or, at worst, falls only enough to partially offset the acquired stock's rise. Therefore, the question remains whether the incremental financing needed to support the new higher value of the company detracts from the aggregate availability of funds to other firms.

The answer depends on the underlying source of the appreciation in asset values. If the combined firm indeed promised to be more productive, for example because of economies of scale or technological synergy, then the merger would represent a type of "real" productive investment. If this "crowded out" other investments, that would be part of the necessary allocation of real resources being mirrored in the credit markets.

But what if the rise in asset values reflects socially nonproductive reasons, such as more efficient use of tax benefits? For example, repurchase of recently appreciated assets can lead to higher depreciation charges. This benefits the firms themselves but not necessarily society at large.

What effects this will have on aggregate investment activity is an unresolved theoretical problem in economics. One admittedly extreme view would argue that taxpayers clearly recognize that this is a tax benefit going to the companies. As such, consumers will recognize that there is no aggregate rise in overall wealth because the rise in the company's value is offset exactly

by the increase in future tax liabilities needed to finance the rise in the government's budget deficit. If some consumers spend more as their stock wealth goes up, others will save even more, which on balance will finance the tax revenue short-fall and keep unchanged the share of consumption out of aggregate income. Thus, according to this extreme rationality view, interest rates and real investment would be completely unaffected.

It may be more realistic to assume that neither the average citizen nor the sophisticated investor will analyze the rise in stockholders' wealth so precisely. If the direct beneficiaries of mergers spend some of their new wealth but others do not save more, overall consumption would increase. From a short-run macroeconomic perspective, the dampening effect on investment of lower savings rates and higher interest rates would compete with the stimulus to investment of expanded final demand. In time the negative impact of interest rates on investment might predominate.

Quantitatively, however, the macroeconomic impacts of even a huge merger would be practically negligible. For example, take a hypothetical case where a \$10 billion appreciation in stock values is realized by the stockholders of an acquired firm. Econometric estimates from the FRB-MIT-PENN (FMP) econometric model which is based on historical evidence indicate that each \$1 sustained rise in equity values generates about 4¢ extra of consumer spending within about two years. Using this rule of thumb, the \$10 billion gain would raise consumer spending by about \$400 million, equal to two one-hundredths of one percent of total consumption. This is tiny compared to the increase in consumption of about nine percent during 1983.

It could be argued that the effect of mergers would exceed these econometric estimates because in a merger the capital gains may be realized, thereby raising shareholders' income, in contrast to unrealized ups and downs in market values. Even if the effect were several times greater, however, the effect of even a massive merger deal would still be essentially imperceptible.

In conclusion, while mergers have some impact on monetary and credit aggregates, their effects mainly represent transitory shifting of portfolios and rearrangements of financing for corporate assets. To the extent that real changes in company value occur, they can influence real economic variables. Real improvements in productivity raise financing requirements but so does tax avoidance. Notwithstanding the source of the asset appreciation, any impact mergers may have on overall credit demands and spending are likely to be negligible in practice.

<sup>2</sup>For a review of the evidence, see Michael C. Jensen and Richard S. Ruback, "The Market for Corporate Control—The Scientific Evidence," *Journal of Financial Economics*, Vol. 11, April 1983, page 5.

Madelyn Antoncic and Paul Bennett



# Currency Diversification in International Financial Markets

High U.S. interest rates, the enduring strength of the dollar, and widespread international debt problems call attention to the currency composition of international credit. On the surface, diversifying the currency denomination of credit would reduce the exposure of both borrowers and lenders to unforeseen sharp movements in rates of exchange or interest. Yet two important sectors of the global credit market—international syndicated credits and international bonds—show completely opposite movements in currency denomination.

In the syndicated credit markets, new dollar lending has fallen sharply since 1981 and the share of total new loans in nondollar currencies has risen strongly. But in the international bond markets, the reverse holds: new issues in dollars have reached record levels and the share of total new issues in nondollar currencies has been well below pre-1981 levels. These contrasting movements of currency shares can be explained by the primary role of borrowers in the syndicated credit markets and lenders in the international bond markets in determining the currency denomination.

## Syndicated credits

In the syndicated credit markets, borrowers exert a large influence on the currency denomination of loans and they have many motives for diversifying. Banks, the lenders, can generally hedge their exchange risk and so are often willing to accommodate a borrower's choice of currency. Besides the high cost of dollar borrowing, increased exchange rate volatility has encouraged some borrowers to switch to a mix of currencies or to stay in their domestic currency. Diversification from the dollar has also been spurred by liberalization of financial markets in Japan and the United Kingdom. This increased the opportunities for Euro-lending in these currencies.

Overall, the rise in the nondollar share of syndicated credits largely reflects diversification by industrial country borrowers. The nonoil LDCs have also engaged in more currency diversification since 1981, with the Asian countries showing a greater propensity to diversify than the Latin American countries. In addition, the cut-back in new lending to Latin America has reinforced the decline in the dollar share since Latin American borrowing has traditionally been denominated almost exclusively in dollars.

Among the major nondollar currencies, shares of the Japanese yen, pound sterling, and Canadian dollar have risen substantially. Among the other currencies, new markets have developed for the European currency unit, Australian dollar, Hong Kong dollar, and Spanish peseta.

## International bonds

In the international bond markets, the preferences of lenders, principally individual private investors, appear to be the main determinant of the currency composition of loans. Borrowers in this market have traditionally included international institutions, governments and their agencies, and corporations. In many cases, these bor-

Table 1

### Syndicated Loans by Currency

In percent\*

Currency	1979	1980	1981	1982	1983
U.S. Dollar	90.0	89.4	86.9	78.8	74.0
Japanese Yen	3.7	0.5	0.9	2.7	5.5
German Mark	2.6	3.0	1.2	2.4	1.6
Pound Sterling	1.0	1.5	4.3	5.7	5.3
Canadian Dollar	0.2	0.8	1.2	2.4	3.8
Hong Kong Dollar	0.2	1.2	1.1	1.0	1.4
Swiss Franc	0.2	0.6	0.2	0.2	0.4
European Composite Units	—	—	0.1	0.2	1.1
Australian Dollar	—	0.8	0.2	0.8	2.2
Spanish Peseta	—	0.1	0.4	0.4	1.1
Other	2.2	2.1	3.5	5.4	3.5

\*Totals may not add due to rounding.  
Source: *Euromoney Syndication Guide*.

Table 2

### Issues of Foreign Bonds and Eurobonds by Currency

In percent\*

Currency	1979	1980	1981	1982	1983
U.S. Dollar	41.7	47.4	64.9	63.9	56.2
Swiss Franc	23.9	18.2	15.6	14.6	18.8
German Mark	22.0	20.1	4.9	7.1	8.5
Japanese Yen	4.8	3.3	5.3	4.9	5.2
Dutch Guilder	1.5	3.1	1.9	2.2	2.3
Canadian Dollar	1.0	0.7	1.2	1.5	1.4
Pound Sterling	0.7	2.7	2.4	2.5	3.6
European Composite Units	0.6	0.2	0.6	2.5	2.7
Other	3.9	4.3	3.2	0.8	1.3

\*Totals may not add due to rounding.  
Source: Morgan Guaranty Trust, *World Financial Markets*.

rowers have used the sale of an international bond as a means of hedging future receipts in that currency. Investors, on the other hand, generally carry the exchange risk involved in purchasing an international bond. In part, this may happen because long-term hedging opportunities for nonbank investors are limited. Nevertheless, Eurobond investors have shown a willingness to take deliberate positions on the currency composition of their portfolios.

In the last few years, there have been many reasons to buy dollar-denominated assets. Total returns to investors have been boosted by relatively high nominal U.S. interest rates and a generally strengthening dollar from late in 1980. Investors have also been offered protection of total returns to the extent that the fall in bond prices resulting from an upward movement in U.S. interest rates might be associated with a rise in the dollar exchange rate.

Strong demand for dollar assets allowed regular issuers and new borrowers to raise a large volume of funds in the Eurodollar bond market on favorable terms. U.S. companies were prominent in 1981 and 1982, financing a much higher share of their bond borrowings in the Eurodollar bond market than they had in earlier years. A deepening in the secondary market, allowing larger primary issue volumes to be absorbed more easily, further increased the market's attraction.

As the dollar share rose, shares of the German mark and, to a lesser extent, the Swiss franc fell. The sharp decline in the German mark share in 1981 reflected, to some degree, informal actions by the authorities to limit the issuance of foreign bonds. Despite the absence of these actions in later years, the German mark share remained well below the levels achieved in 1979-80.

Although slipping somewhat from its 1982 level, the dollar share stayed relatively high through 1983 and the first part of 1984. Within the Eurodollar market, floating-rate-note issues by banks and governments have increased strongly. Banks have also raised substantial amounts in the fixed-rate market, often to swap the proceeds for floating-rate funds. The greater issuance of medium-term bonds by banks has increased the maturity of their liabilities, and thus has balanced to some extent the lengthened maturity of recently rescheduled loans. (This is discussed more fully in the following article.)

Andrew Mohl

## Maturity Matching in the Euromarkets

Discussions of the stability of the international interbank market often overlook European and Japanese banks' borrowing in the international bond and note market. By relying less on short-term interbank deposits and more on intermediate-term obligations to fund their foreign-currency assets, these banks have made themselves more liquid and thus the interbank market more stable.

Not all international banks are depending more on the note market. Bank of England data on the balance sheet of British banks show no such trend. Data for Swiss, Canadian, and Italian banks are not available. But the French and Japanese banks have drawn on the international note market to reduce the disparity between their long-term lending and their long-term funding in foreign currency. This clearly emerges from the dollar balance sheets of banks in France and Japan as well as the nonsterling book of Japanese banks in Britain (chart). Although the dollar book of banks in Germany does not show such a development, in light of the activity of German banks in the international note market—Deutsche Bank alone raised over \$1 billion there in 1982-83—their consolidated balance sheet probably shows the same trend.

These banks are reducing the liquidity risk of heavy reliance on short-term funds by lining up funds in the range of 3 to 10 years. They are not necessarily betting on higher interest rates. This is because many notes that banks sell carry a floating interest rate, typically reset every six months in line with prevailing money-market rates. And even when banks sell fixed-rate obligations, they generally "swap" the proceeds with nonfinancial corporations for floating-rate funds.\*

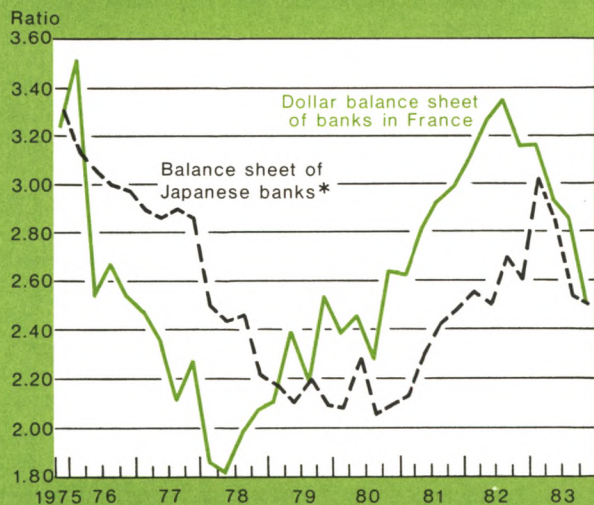
During the mid- to late-1970s European and Japanese banks did not have to go to the capital market to increase their liquidity. Instead they benefited from medium-term deposits made by OPEC countries that wished to diversify the nationality of the banks holding their assets. But two developments have since left these banks less liquid. First, as world petroleum markets weakened, oil-exporting countries slowed and then

\*In a swap, a bank issues a fixed-rate note and a corporation obtains a floating-rate credit of similar maturity. Then, each undertakes to service the other's obligation. Such an arrangement is mutually advantageous when one or both parties is able to borrow relatively cheaply in the specific market it enters.



## Maturity of the Foreign-Currency Balance Sheet of Selected Banks

Long-term assets to long-term liabilities



\*Dollar balance sheet of banks in Japan, nonsterling balance sheet of Japanese banks in United Kingdom.

Sources: Bank of International Settlements, *Statistics of Eurocurrency*; Bank of England Quarterly Bulletin.

reversed their accumulation of foreign assets, especially medium-term Eurodeposits. Second, recent reschedulings of major international debts have lengthened the maturity of assets.

Although neither French nor Japanese bankers report any difficulty in raising short-term funds, they have indicated that officials in their countries have expressed concern about the banks' liquidity. Against this background, these banks began to close the gap between their long-term lending and their long-term funding in foreign currency. French banks started in mid-1982 after their change in management; Japanese banks started only after strains appeared in the international interbank market in the second half of 1982.

At the same time, developments in international capital markets have favored the banks' efforts to close the gap. Since 1982, banks have been able to sell fixed-rate obligations and convert the proceeds into floating-rate funds by swapping them with nonfinancial corporations. In this manner some banks secured three-month money over the medium term for less than they would pay for three-month money in the interbank market. Japanese and German banks have pursued these deals actively. French banks have not because official

policy has reserved the fixed-rate sector of the international capital market for their domestic customers. In addition, the recent broadening and deepening of the Eurodollar floating-rate-note market has made it easier and cheaper for banks to raise medium-term funds there.

Robert N. McCauley

## Borrowing Against Home Equity

In recent quarters households have been liquifying their home equity at a pace not seen since 1979. Debt outstanding on existing homes expanded by an estimated \$40 billion in the second half of 1983 alone (chart). Households can use the proceeds from these borrowings for various purposes: to repay other outstanding debt, to accumulate assets, or to finance consumption expenditures.

Households can usually borrow against home equity at rates that are slightly above prevailing mortgage rates. The cost of all forms of unsecured personal borrowing is substantially higher than the cost of mortgage borrowing. (The spread between the average two-year personal loan rate and the average contract mortgage rate has been as much as 5 percentage points.) Also, mortgage loans allow longer repayment periods than personal loans. Thus, home equity is a preferred source of personal finance to direct consumer credit for those who can utilize it. The method used for liquifying accrued home values, however, has varied over time with credit and housing market conditions.

When home prices are accelerating, households can sell their homes, extinguish their outstanding mortgages, and realize capital gains. These profits need not be fully invested as downpayments on the next homes. Since the mortgage rate for a home purchased with 50 percent down is on average less than 50 basis points lower than the rate for the same home purchased with a much smaller downpayment, investing the funds in the downpayment offers little advantage. The cost of the funds gained in the existing home transaction, then, is essentially the rate on the new mortgage. This method of liquifying home equity was widely used during the booming housing market of the late 1970s.

A second way of getting access to tangible wealth



through the mortgage market is to refinance in excess of an existing mortgage. This is an especially attractive alternative when interest rates drop since the household can take on a larger debt than the outstanding mortgage and still have the same monthly payment. Again, the cost of the additional funds borrowed is the mortgage rate.

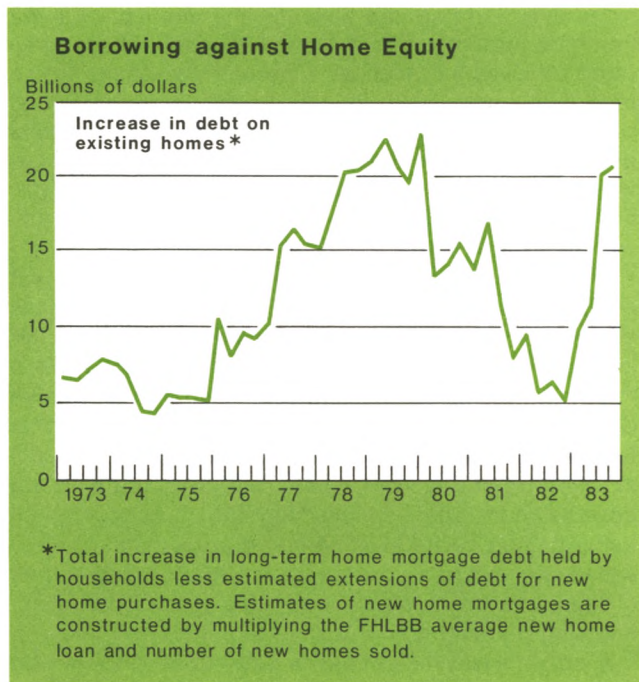
A third mechanism for obtaining funds backed by homeownership is taking on a second mortgage. Second mortgages were not particularly popular with lenders or borrowers in earlier years; low interest rate ceilings made them unprofitable for lenders while borrowers found the terms inflexible. But with the removal of "usury" rate restrictions, lenders have made second mortgages more appealing to borrowers by offering lines of credit as well as the conventional lump sum contracts.

Which of these home equity financing techniques have been prominent recently? Refinancings are estimated to have accounted for more than half the current surge in debt on existing homes. They became particularly appealing during 1983 when mortgage rates dropped more than 150 basis points. In the second half of the year, the increase in debt from refinancings at savings and loan institutions totaled \$13 billion. Data on refinancing activity at other types of lenders are not available. But, if those lenders experienced the same volume of refinancings per dollar of originations during the six-month period, total refinancings would have accounted

for about \$30 billion in net mortgage flows. By comparison, for all of 1979, when market values of houses rose rapidly, refinancing contributed an estimated \$21 billion in additional mortgage debt and accounted for only 25 percent of the increase in debt outstanding on existing homes.

Also, the new line-of-credit type of second mortgage financing is being actively marketed. These contracts, frequently called equity access accounts, are accessible by writing checks. The maximum line of credit is usually 70 to 80 percent of the difference between the home's current sale value and the balance remaining on the first mortgage. The interest rate charged is typically one to two percentage points above the prime or some market rate. So, equity access funds are cheaper than ordinary revolving credit and personal loans, as well as more flexible than the conventional second mortgages of the past. If their availability continues to spread, future increases in home equity values could become more readily and quickly liquified to support consumption or for other purposes. However, the future popularity of equity access accounts tied to market rates will depend, in part, on how willing households are to absorb the risk of variable rate liabilities.

Robin C. DeMagistris



## The Impact of Weather on Housing Starts in the First Quarter of 1984

The wide swings in the published figures on residential construction activity during early 1984 once again reminded us how dramatically weather can influence economic data. Housing starts figures seasonally adjusted in the usual way showed a surge in January and February but a sharp drop in March, reflecting in part unusual changes in weather conditions.\* Our analysis suggests that after allowing for the extreme weather changes, housing starts were strong in the first

\*The official seasonal adjustment process eliminates variations in the unadjusted data caused by such factors as normal changes in weather and differing lengths of months. This adjustment is based on the experience of the previous five years, and does not take account of abnormal weather conditions in a particular month.



## Housing Starts and Weather in the First Quarter of 1984

In Percent

Region	Degree days* (deviation from normal)				Published Housing Starts (seasonally adjusted change)			Weather-adjusted Housing Starts† (change)					
	December	January	February	March	January	February	March	January		February		March	
								a	b	a	b	a	b
Northeast . . . . .	-7	-8	18	-21‡	32	59	-45	33	32	21	31	-19	-13
North Central . . .	-30	-5	21‡	-20	49	10	-34	20	15	-17	-2	0	-11
South . . . . .	-31	-14	13	-10‡	-3	22	-28	-16	-16	-7	-7	-8	0
West§ . . . . .	0	9	6	15	43	-12	-10	30	43	-10	-12	-18	-23
United States§	-19	-6	16	-10	17	14	-27	1	3	-6	-4	-11	-9

\*Positive numbers indicate warmer than normal temperatures; regions are weighted by population.

†Housing starts were adjusted for the weather in two alternative ways. The first method (a) adjusts starts data from their reported levels by the same percent as degree-days vary from their normals, thereby increasing the measure when temperatures were below normal, and vice versa. Recognizing that small fluctuations of temperatures may not significantly alter housing starts, a second adjusted series (b) ignores degree-day deviations of less than ten percentage points. In addition, since severe storms certainly interfere with starts, this series increases starts by ten percent in a region that experienced severe storms—approximately the difference between the Northeast and North Central regions in March.

‡Indicates severe storm(s) in region during month.

§Excluding Alaska and Hawaii.

Source: Bureau of the Census, and Assessment and Information Services Center, *Climate Impact Assessment*.

quarter as a whole, but that the peak this winter occurred in January rather than February as published.

Weather conditions help to explain the recent regional and national fluctuations in monthly data on housing starts (table). Housing starts are especially sensitive to temperature extremes in winter, since frozen ground makes the starting of new projects nearly impossible. January's warming from December coincided with a jump in housing starts, especially in the North Central region. Moreover, in February increasingly warm weather was accompanied by large increases in starts except where severe storms occurred. In contrast, March brought very cold weather or severe storms in every region except the West, and housing starts fell sharply in these affected regions. The West, unlike the other regions, did not experience large fluctuations in weather patterns this winter. Even though the weather appeared to be favorable, this region registered declines in housing starts in February and March.

To quantify the effect of weather on starts, the levels of regional housing starts were adjusted in two admit-

tedly crude ways. These methods raised starts in cold months and lowered them in warm months; the second method also adjusted for severe storms. Although other reasonable techniques may yield different outcomes, the results of these two adjustments are quite similar. The first quarter weather-adjusted average of the annual rate of housing starts stood between 1.92 million and 1.98 million units, bracketing the reported average. In both cases, housing starts rose slightly in January from a weather-adjusted December level and *declined* in February and March, ending between 1.74 million and 1.84 million units. This pattern resembles that of the West (where weather was more nearly normal), lending some support to our results.

These weather-adjusted figures suggest that housing starts peaked during the quarter in January rather than February. They also indicate that, while the published figure for March probably did not fully reflect the underlying strength of residential construction, there may have been some modest slowdown in starts during the course of the first quarter.

Robert B. Stoddard

# Why Are New York City's Electricity Rates So High?

Electricity rates in New York City are among the highest in the nation and pose an impediment to the city's continuing effort to maintain and expand employment for its residents. High electricity costs have recently been an important consideration in negotiations between the city and some financial service firms regarding the possible relocation of their back-office operations.

Consolidated Edison Company of New York (Con Ed), which serves the five boroughs of New York City and also Westchester County, leads the nation in the cost of 12 customer usage categories and has the second highest charges in the remaining three.<sup>1</sup> All classes of Con Ed's customers—residential, commercial, and industrial—face these high electricity bills. Moreover, based on data for residential customers of 60 major utilities in the United States, the discrepancy between electricity rates at Con Ed and other utilities is not only substantial but, in dollar amounts, has been growing over time (Chart 1).

High electricity rates in the Second Federal Reserve District are not restricted to Con Ed. In 1983 most of the District's private utilities had rates above the United States average, with the highest occurring in the downstate New York and New Jersey area (Chart 2). Several other Second District companies also stand among the ten private utilities with the highest electricity rates in various customer usage categories. However, none of these companies appears as frequently or as consistently with a high ranking as Con Ed. In addition, significant differences exist between the level of Con Ed's rates and those of the other Second District utilities. For example, in the case of a household using 500 kilowatt-hours of electricity, Con Ed charged some \$13 more per month than did the next highest Second District utility on the top ten listing.

Discussions of the marked differences in electricity costs between Con Ed and other companies tend to focus on single explanations, high taxes being a factor often mentioned by local utility spokesmen. In actuality, a number of factors contribute to the differences:

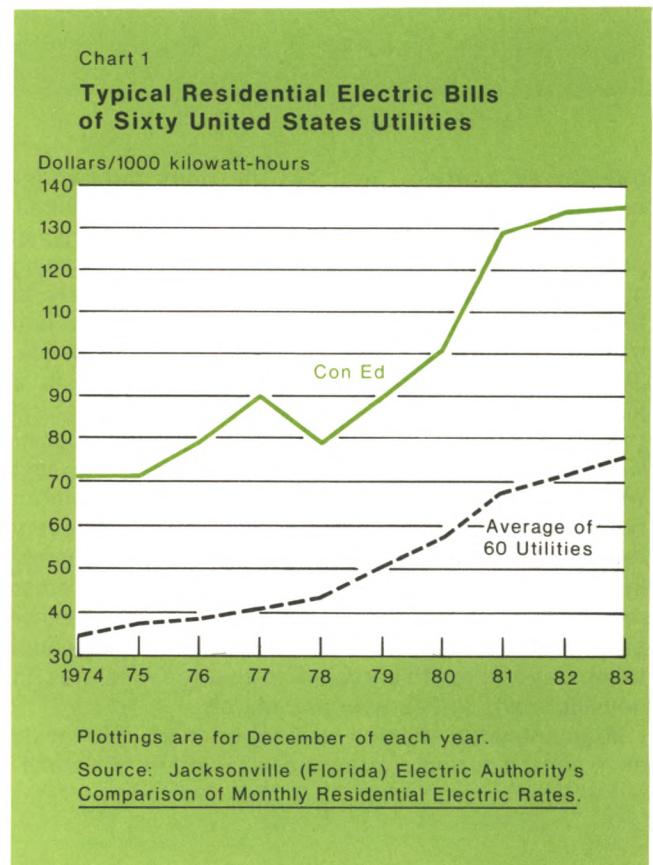
*High peak, low average demand.* An electric power company must make the capital investment to meet peak demand and all its ratepayers must share this cost. A 1980 study comparing seven other large, urban utilities with Con Ed found its peak demand to be

among the highest of the group, whereas its per customer usage was only half the seven-firm average.<sup>2</sup> Con Ed's fixed costs are large relative to usage and as a result, each kilowatt-hour consumed by Con Ed customers carries a relatively high fixed-cost burden.

*Oil.* Con Ed relies very heavily on oil for power generation whereas the nation as a whole depends to a much greater extent on less expensive coal, gas, and hydropower. In 1982 the average cost of oil was three times greater than the cost of coal per unit of generating power.

*Low sulfur oil.* Due to environmental considerations, Con Ed must burn oil with low sulfur content rather than less expensive high sulfur oil or coal. The cost of low sulfur oil is currently some 20 percent greater than high sulfur oil and at times in recent years has been as high as 40 percent greater.

<sup>2</sup>Theodore Barry and Associates, *Evaluation of Electric Supply Options for the City of New York, Part I*, February 1980.



<sup>1</sup>United States Department of Energy, *Typical Electric Bills January 1, 1983*.



**Limited Use of Hydropower.** Because of both an inadequate power transmission network in New York State and legal constraints on hydropower distribution, Con Ed's purchases of this inexpensive fuel from upstate New York and Canada amount to only a small percentage of its total requirements.

**Taxes.** While state and local taxes paid by utilities in New York State are the highest in the nation, downstate New York utilities are taxed even more heavily than their upstate counterparts. In 1982 for example, state and local taxes as a percentage of electric utility revenues were 18 percent and 17.2 percent at Con Ed and the Long Island Lighting Company, respectively. The weighted average for the five other privately owned utilities in New York State, however, was only 11.8 percent.

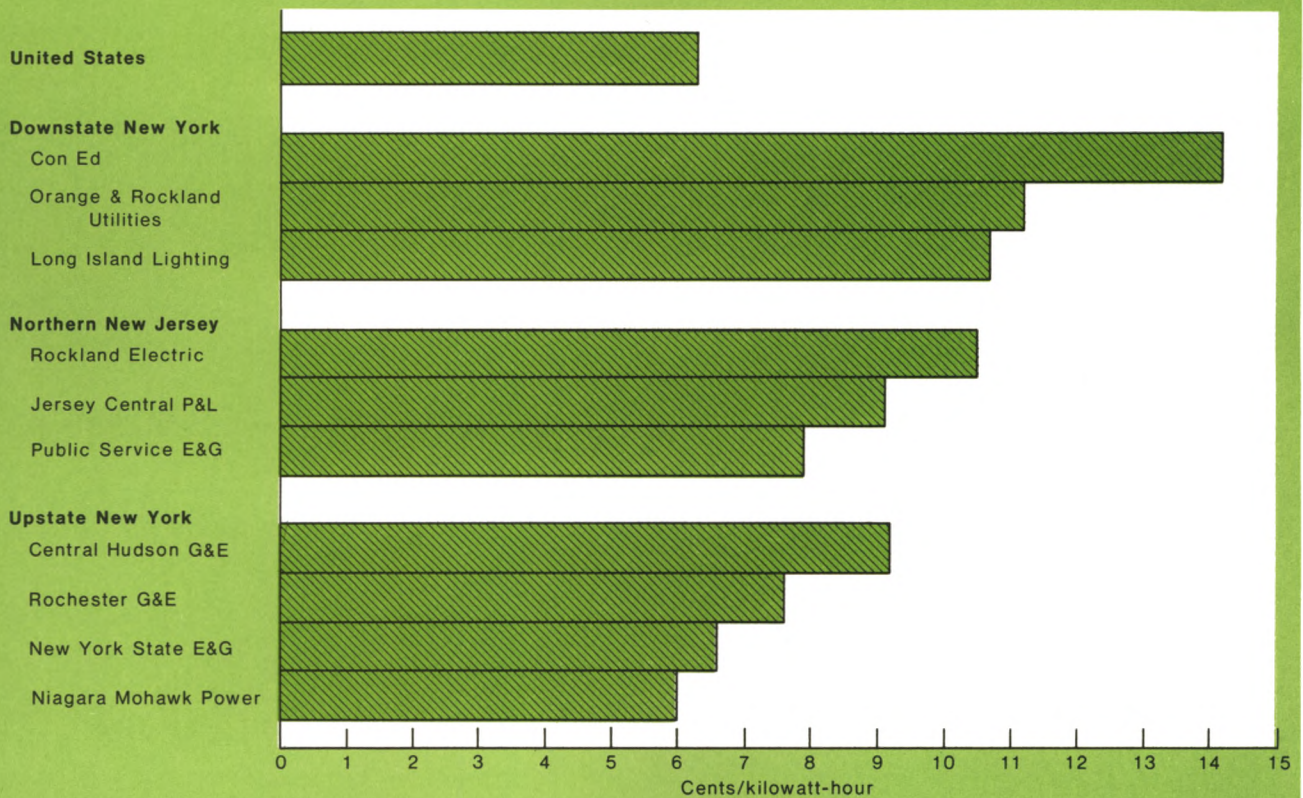
**Underground transmission.** Con Ed utilizes an underground transmission system which is two to three times more expensive to install than an overhead distribution system. In addition, maintenance of an underground system is also more costly than the upkeep of above ground lines.

An excessive rate of return does not seem to be one of the reasons for Con Ed's high electricity costs. Informal estimates by the New York State Department of Public Service of rates of return to New York's private electric utilities for 1981 and 1982 show that Con Ed's were the lowest.

Because high electricity rates add significantly to the cost of living and doing business in the New York City area, it is worth considering ways of reducing this problem. Con Ed's reliance on expensive fuel is the most likely candidate for change and the company already has plans for lowering this cost. Among other

Chart 2

**Average Price of Electricity Supplied to all Customers in 1983**



Sources: New York State Energy Office and New Jersey Department of Energy.

things, it is seeking permission to substitute coal for oil in some of its generating plants and also has asked for additional transmission lines to less expensive upstate and Canadian power sources. A lower tax burden could also reduce costs and Con Ed has pursued, and continues to pursue, this remedy as well. Finally, Con Ed's

unusually wide disparity between peak and average demand might be reduced somewhat by more aggressive use of such incentives as seasonal and time of day pricing. The only cost factor that probably cannot be remedied is Con Ed's expensive underground transmission system.

Lois Banks

# Monetary Policy And Open Market Operations In 1983

Monetary policy in 1983 sought to provide for a sustained expansion in economic activity within a framework of continuing progress against inflation. Given the background of substantial economic and institutional change, this involved careful balancing of the need for sufficient liquidity to foster the moderate recovery which appeared to be emerging at the year's outset, along with the continuing need to maintain monetary discipline. The measurement of liquidity itself was difficult in the light of marked changes in the composition of M-1 and M-2 and uncertainty about their relationships to economic activity.

As the year progressed, the economic recovery surpassed expectations while the pace of inflation remained subdued. Wage increases continued to moderate, reducing cost pressures appreciably, while productivity continued the rebound that had begun in 1982. In this environment the Federal Reserve approached policy formulation and implementation flexibly, adjusting the pressure on bank reserves judgmentally. Open market operations stepped up that pressure from May to July, when money growth seemed unduly rapid and the vigor of the recovery became apparent. Overall, System policy

and the continued decline in inflation contributed to greater interest rate stability than in other recent years.

The Committee in 1983 had to deal with institutional changes that affected the monetary aggregates and their relationships to ultimate economic variables to an uncertain degree. Already during 1982, income velocities had deviated substantially from past patterns. Ongoing financial innovation, deregulation, and economic change suggested that velocity patterns in 1983 were likely to continue to diverge significantly from past experience.

The Committee concluded that the relation between money and credit and the economy would have to remain under review in 1983. The Committee continued to specify growth ranges for money and credit as required by the Full Employment and Balanced Growth (Humphrey-Hawkins) Act. But it sought to achieve its objectives by setting reserve conditions judgmentally rather than allowing them to emerge semi-automatically in response to money behavior. The Committee chose reserve conditions during the year on the basis of its review of money growth relative to changing patterns of liquidity preference by the public, developments with respect to economic activity and prices, and conditions in domestic and international credit markets.

In shaping its instructions to the Trading Desk in New York, the Committee viewed the underlying relationship of the broader aggregates to ultimate economic objectives as likely to be less sharply altered than M-1 by continuing institutional and economic change. Hence, as in late 1982, the Committee placed less emphasis on M-1 in the implementation of policy.

In the event, all three of the money measures finished

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, Securities Department and Kenneth J. Guentner, Chief, Securities Analysis Division were primarily responsible for preparation of this report, with the guidance of Paul Meek, Vice President and Monetary Adviser. Connie Raffaele and Andrew Gordon, members of the Securities Analysis Division staff, participated extensively in preparing and checking information contained in this report.

the year within their respective growth ranges—although, as described below, M-2 was measured from a February-March base, while M-3 was later (in early 1984) revised to show growth slightly above its range. The M-1 monitoring range was adjusted at midyear to accept unusually large growth in the first half of the year.

At the year's outset M-2 surged, reflecting a massive shifting of funds from outside M-2 into money market deposit accounts (MMDAs) at depository institutions. The Committee chose to accommodate this development since it represented a one-time shift in the public's holdings of liquid assets.<sup>1</sup> By April, M-2 growth had slowed, and this measure briefly dropped slightly below its target range. On balance, M-2 grew moderately over the remainder of the year, expanding from its February-March base to the fourth quarter at a 7.8 percent annual rate, in the lower half of its 7 to 10 percent target range (Chart 1).<sup>2</sup> M-3 growth was much more moderate early in the year as banks and thrifts allowed CDs to run off when inflows through MMDAs surged. M-3 grew by 9.2 percent over the year, compared to its 6½ to 9½ percent target range (Chart 2).

M-1 growth was very rapid early in the year, far exceeding its initial 4 to 8 percent range. At least a portion of the excess growth was attributed to distortions arising from institutional and economic change. By midyear there were indications that M-1 velocity behavior might be returning to more normal patterns. Hence, the Committee felt it would be appropriate to assess subsequent M-1 growth from a second quarter base in relation to a 5 to 9 percent monitoring range, which assumed some rebound in velocity but not nec-

essarily to the extent common in earlier recoveries. M-1 decelerated appreciably in the second half of the year, expanding at a 5.5 percent annual rate from the second to fourth quarter, slightly above the lower end of its monitoring range over that interval (Chart 3).<sup>3</sup>

For the first time, an associated range had been estimated for total domestic nonfinancial debt. This broad measure of credit grew by 10.5 percent from December 1982 to December 1983, somewhat above the midpoint of its 8½ to 11½ percent range (Chart 4).

Interest rates fluctuated narrowly over the early and late parts of the year (Chart 5). Monetary policy early in the year was directed toward achieving a steady—and rather modest—degree of reserve restraint, which essentially accommodated the stronger-than-anticipated money growth believed to be stemming largely from institutional and business cycle developments.

Starting in the spring, evidence emerged of an acceleration in the rate of economic recovery and a movement toward more normal money velocity patterns for the broader aggregates. Meanwhile, M-1 growth was very strong over the first half of the year. In these circumstances, System policy increased the degree of reserve restraint in a series of modest steps to limit money and credit growth. Interest rates across the maturity spectrum generally worked higher over this interval with most reaching or coming close to their highest sustained levels for the year in August (Chart 6). The average Federal funds rate, for example, worked up from around 8½ percent in mid-May to roughly 9⅝ percent in August.

In September, the System adopted a slightly more accommodative stance as the monetary aggregates weakened and the recovery's momentum appeared to be moderating. While August saw the highs for most rates, the net change from August to year-end was modest, with some variation during the interval in response to changing perceptions of the economy's strength, recurrent concerns over heavy prospective Treasury supplies and technical supply developments related to Federal debt ceiling constraints. By the latter part of the year, with the Committee's intention to respond to money developments in timely but modest steps widely recognized and the money measures on track, significant rate movements in response to weekly money statistics abated.

<sup>3</sup>After incorporating the new benchmark and seasonal revisions available in early 1984, M-1 was perceived as having grown at a 7.2 percent annual rate from the second to fourth quarters of 1983—about at the midpoint of its monitoring range. From the fourth quarter of 1982 to the second quarter of 1983 the revised M-1 growth was at a 12.4 percent annual rate compared to a 13.3 percent rate estimated earlier. For the full year—fourth quarter of 1982 to fourth quarter of 1983—latest available estimates place M-1 growth at 10.0 percent.

<sup>1</sup>M-2's target range was specified in February as an annual rate of growth from the average level of M-2 outstanding in February-March to the fourth quarter of 1983. The February-March base was chosen, rather than the fourth quarter of 1982, so that growth of M-2 would be measured after the period of highly aggressive marketing of MMDAs had subsided. These accounts, introduced in mid-December 1982, rose to over \$230 billion by early February, with a substantial amount of funds transferred into them from sources outside M-2, such as market instruments and large CDs. The 7 to 10 percent range for M-2 allowed for some residual shifting from market instruments and large CDs into MMDAs over the balance of the year.

<sup>2</sup>The text and charts of this report use the definitions of the aggregates as they applied in 1983, as well as the seasonal factors and benchmarks in place at that time. In February 1984, new benchmarks and seasonal factors were introduced. In addition, the definition of M-3 was broadened to include term Eurodollars held by U.S. residents in Canada and the United Kingdom, and at foreign branches of U.S. banks elsewhere. The inclusion of term Eurodollars raised the level of M-3 by about \$90 billion but had a minimal effect on M-3 growth in 1983. For each of the money measures, the net effect of the benchmark and seasonal revisions was to raise the rate of growth over the respective 1983 growth range intervals. Revised M-2 growth from its February-March base was 8.3 percent, a touch below the midpoint of its range. Revised M-3 growth on a fourth-quarter to fourth-quarter basis was 9.7 percent, just above the 9.5 percent upper end of its range.



Chart 1

**M-2: Levels and Targets**

Billions of dollars

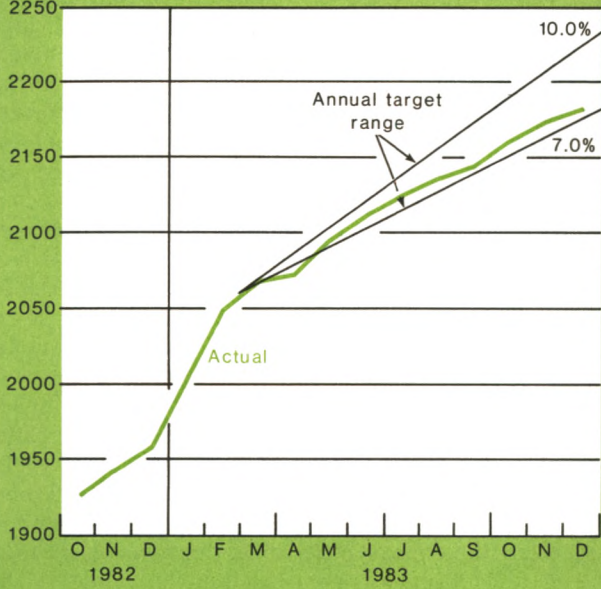


Chart 2

**M-3: Levels and Targets**

Billions of dollars



Chart 3

**M-1: Levels and Ranges**

Billions of dollars

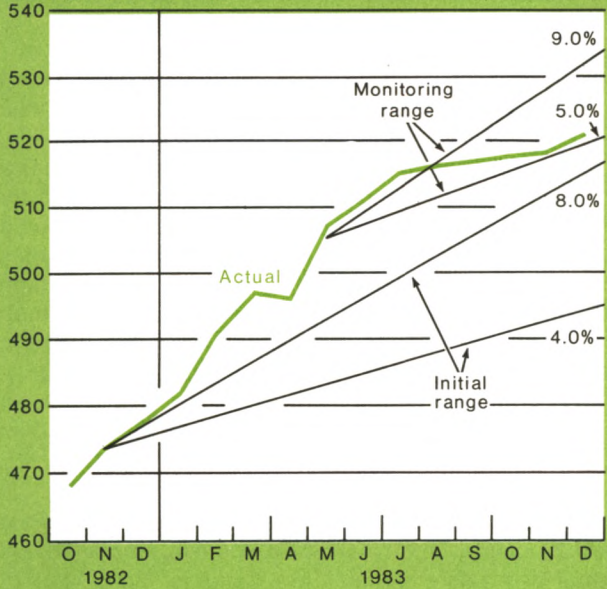


Chart 4

**Total Domestic Nonfinancial Debt**

Billions of dollars

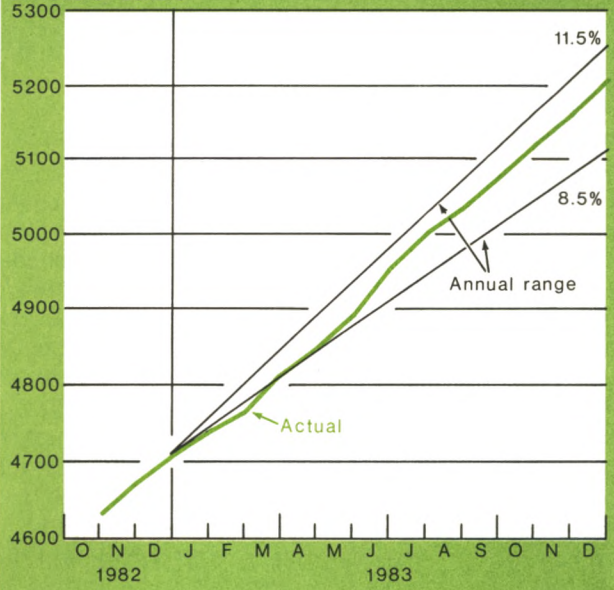
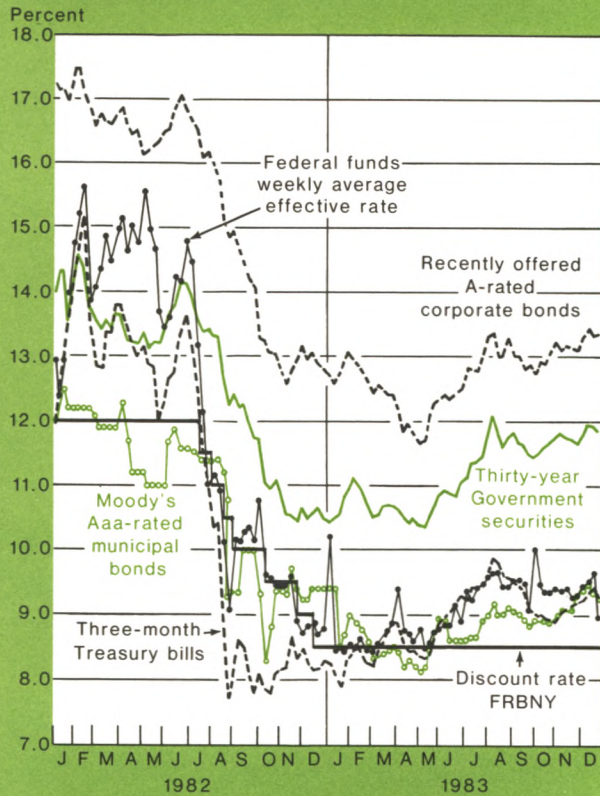




Chart 5

**Selected Interest Rates**



rates. A pickup in consumer spending, particularly in the second quarter, contributed to growth in the first half of the year.

Business fixed investment also revived during the year. Real expenditures on equipment surged after the first quarter while businesses began to replenish their sharply depleted inventories in the third quarter. Inventories still remained lean, however, suggesting that further expansion in final demand would stimulate increased production. Business spending on structures also began to grow significantly in the third quarter. Net exports were a drag on the economy, however, reflecting a dramatically appreciating dollar and much slower economic growth abroad than domestically. By the final months of the year the U.S. trade deficit had widened to record levels.

Prices advanced modestly in 1983 with most measures of inflation suggesting a pace as low as or lower than 1982. For example, the broad-based GNP implicit deflator rose by about 4 percent from the fourth quarter of 1982 to the fourth quarter of 1983. This was slightly lower than its pace over the previous year and its lowest rate of advance since 1967. The continued strength of the dollar in terms of other major currencies in 1983 helped to moderate price pressures by reducing the dollar cost of imports.

Other cost pressures also abated. On a fourth-quarter to fourth-quarter basis, unit labor costs in the private nonfarm sector rose by less than 1 percent, reflecting gains in labor productivity and appreciable moderation in wage increases. The producer price index for finished goods rose about 1 percent over the year, suggesting the potential for sustaining price moderation into 1984.

*Financial Markets*

During the first quarter both long- and short-term interest rates moved without a particular trend. While money growth was strong, it appeared primarily related to the huge flows into MMDAs at depository institutions and the continuing uncertainties about the state of the economy. Monetary policy maintained a stable stance, aiding financial flows that were promoting economic recovery. Interest rates briefly rose and fell within fairly narrow ranges as market currents shifted. Sentiment alternately improved or deteriorated on release of statistics indicating unexpected weakness or strength in money and economic activity. There was recurrent concern over large impending supplies of Treasury debt, especially whenever investor demand showed signs of faltering as Treasury auctions approached.

Short-term rates did pop up briefly around the end of the first quarter. Statement date churning coincided with a four-day Easter holiday weekend for some foreign banks and "window dressing" associated with the fiscal

**The Economy and Financial Markets**

*Economy*

After a sluggish start, it became clear by the second quarter that a vigorous, broadly-based recovery was under way. The economy sputtered ahead in the middle two quarters before showing some moderation toward the year-end. From the fourth quarter of 1982 to the fourth quarter of 1983, real GNP advanced by about 6 percent. While this was about in line with the average performance in the initial year of recent recoveries, it was considerably stronger than many had anticipated. Employment gains were significant during the year and the civilian unemployment rate dropped by well over two percentage points to finish the year at 8.2 percent.

Much of the recovery's initial momentum in 1983 emanated from the housing sector, which had begun its turnaround in 1982 with support from declining mortgage



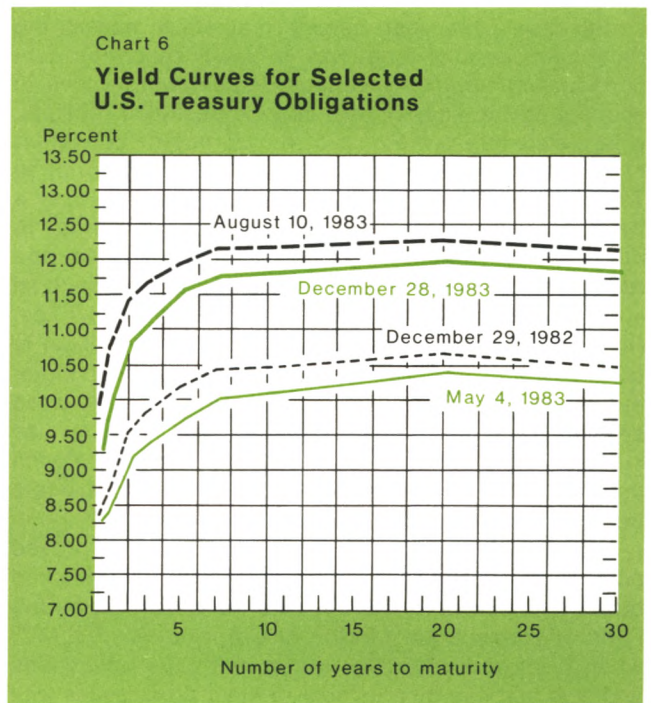
year-end of Japanese banks. Short-term rates quickly fell back as pressures subsided. The yield spread between large CDs and Treasury bills, starting from very low levels at the year's outset, almost disappeared during much of the first half. Apprehension diminished over the international loan exposure of U.S. commercial banks. But the decline in CD yields also reflected the paydown of CDs by banks adapting to the massive intake of funds through MMDAs.

Corporate and tax-exempt borrowers sold bonds heavily during the first half of the year. Issuers waited for buoyant prices, usually touched off by favorable news, then rushed large volumes to market. Tax-exempt activity accelerated before a June 30 deadline for the sale of bearer bonds. There also was substantial advance refunding activity in that sector.

New issues frequently were concentrated in longer maturities and priced aggressively. Investors were active buyers so that yield spreads between corporate and Treasury issues narrowed while tax-exempt yields also fell somewhat relative to Treasury yields. The yield spreads between lower- and higher-quality corporate securities narrowed significantly over the interval, when investors reached for higher yields as their concern over credit risk waned. Corporations also took advantage of the booming stock market to raise new equity through stock sales during the first half. Both corporate debt and equity sales proceeded at about twice their respective paces over the first six months of 1982.

From mid-May to mid-August, interest rates broke out on the upside as the economy rebounded briskly, money grew, and the Federal Reserve increased pressure on the banking system. The fixed income markets began to be troubled by the strong growth in M-1 and reacted to signs of greater-than-expected strength in economic activity. A heavy supply of Treasury debt, which included the then record \$15.75 billion August financing, frequently elicited disappointing investor demand, and dealers cut prices in an effort to keep inventories light. Tax-exempt new-issue activity gradually tapered off after April while corporate activity and the weighted average maturity of corporate issues dropped precipitously after May.

Moderate money growth for all three measures emerged in August and this, combined with indications that the recovery's momentum had slowed somewhat, restored a measure of confidence to the fixed income markets. Interest rates declined irregularly into early October, although heavy Treasury supplies moderated the decline of longer term yields. Over the balance of the year, the movement of all the money measures into their respective long-term growth ranges alleviated market concern over the near-term posture of System policy, at least with respect to concern over money



growth. Still, interest rates edged higher on balance because of heavy Treasury supplies and reemerging signs of economic strength, including a sharp drop in the civilian unemployment rate. In late October and early November, rates responded to new supply as the Treasury was forced to alter its auction schedule repeatedly to avoid debt ceiling constraints. The postponement of its \$16.0 billion November refunding package added to uncertainty and congestion late in the year.

The volume of debt sales by both corporate and municipal issuers declined appreciably in the second half, reflecting among other factors higher long-term rates and the competition of Treasury debt sales. Corporate equity sales also dropped as the stock market's mostly sideways movement reduced the appeal of equity funding. Nevertheless, for the year, corporate gross sales of debt and equity totaled about \$67 billion and \$52 billion, respectively. This compared with \$54 billion and \$31 billion in 1982. Sales of intermediate and long-term debt by state and local governments in 1983 set a new record of about \$83 billion, up from a 1982 volume of \$77 billion. Late in the year, tax-exempt mortgage bond financings accelerated to avoid the pending prohibition on the sale of such bonds in 1984.

Several major financial innovations attracted attention in 1983. The popularity of zero coupon investment vehicles based on long-term Treasury securities was

strong during the year, helping markets to absorb the record amounts of long-term Treasury securities auctioned. A number of securities dealers were active in sponsoring the sale of zero coupon custodial receipts, which evidence ownership of the corpus or coupon(s) of Treasury securities, and sales of physically stripped Treasury securities. These instruments are sold at a deep discount from face value as they provide no income prior to maturity. Offerings of zero coupon receipts varied widely in size but frequently involved substantial amounts of underlying Treasury securities. (In early 1984, an offering was based on \$1 billion in face value of underlying Treasury securities.) Major buyers of these zero coupon investments included pension funds, insurance companies, individuals for use in IRAs, and various entities seeking to closely match the duration of assets and liabilities so as to insulate from market risk.

A second innovative financing device which proved popular in 1983 was a new type of mortgage-backed bond. This innovation was pioneered at midyear by the Federal Home Loan Mortgage Corporation (FHLMC) when it introduced collateralized mortgage obligations and was followed by a number of other bond issues with similar features. The major nonFHLMC bond issues were collateralized by Government National Mortgage Association (GNMA) pass-through certificates. The innovation common to the various issues during the year is that each is structured to provide retirement classes of different average maturities. All distributions of principal and prepayments from the underlying securities are used to retire first the nearest maturity and then to amortize in sequence the longer retirement classes. This device proved appealing to investors, expanding the market for mortgage-related securities and contributing to a significant contraction in GNMA-Treasury yield spreads over the second half of the year.

### **Monetary Policy—Formulation and Implementation Background**

Monetary policy makers in the latter part of 1982 downgraded the importance of M-1 as its relation to income deviated markedly from past patterns. During the four quarters of 1982 the income velocity of M-1—defined as the ratio of gross national product to the level of M-1—declined by the largest amount in any four-quarter span in the postwar period.<sup>4</sup> Moreover, it

appeared that the atypical behavior of M-1 might well persist during 1983, while uncertainties also affected the relationships of broader aggregates and GNP. The FOMC, accordingly, opted for a substantial degree of flexibility in pursuit of its money and credit objectives.

The public's adjustment to significantly lower rates of inflation and market interest rates appeared to have a major effect on income velocity in late 1982 and the first half of 1983. By then a substantial proportion of M-1 consisted of regular NOW accounts paying a fixed rate of 5¼ percent. As interest rates declined, the differential fell between market rates and the NOW account rate, lowering the opportunity cost of holding M-1 balances. In relative terms, the fall in opportunity cost was markedly greater than the fall in market rates. As the public's demand for M-1 increased in relation to income, velocity declined.

More generally, the continuing process of financial innovation and deregulation resulted in an array of deposits and financial instruments which have attributes of both "transactions" and "savings" accounts in varying degrees. The growing importance of regular and Super NOW accounts included in M-1 has made it an increasingly attractive repository for longer term savings. To the extent that M-1 serves as a savings repository, its behavior becomes more subject to changing attitudes by the public toward saving and wealth. In consequence, the reliability of the link between M-1 and spending (economic activity) becomes more uncertain.

### **Target Ranges**

The Committee determined that an unusual degree of judgement would be required as the year progressed in interpreting the monetary aggregates. It was recognized that the appropriateness of the target ranges would require reappraisal during the year taking into account economic conditions, including developments in domestic and international financial markets.

In view of the particular uncertainties associated with M-1, the Committee gave substantial weight in its deliberations to the broader aggregates. The Committee's target range for M-2 in 1983, established in February, specified growth of 7 to 10 percent at an annual rate from a February-March base. That base accommodated the explosive growth in M-2 in early 1983 generated by the shift to MMDAs from assets outside that measure. By increasing the 1982 target range by one percentage point, the Committee also allowed for modest additional asset shifts into M-2 after March. Abstracting from such shifts, the 1983 target range in practical effect was judged to be about the same as, or slightly lower than, its 1982 counterpart. M-3 was expected to be largely insulated from the shifts of funds occurring during the year. The Committee decided to

<sup>4</sup>As indicated in Footnote 2, this report describes the behavior of the monetary aggregates as measured prior to February 1984 seasonal factor and benchmark revisions. Taking those revisions into account does not substantially alter the pattern of M-1 velocity behavior in 1982 and 1983. It does, however, concentrate slightly more of the decline into the fourth quarter of 1982 and shows a bit less weakness in the first half of 1983.



retain M-3's 1982 growth range of 6½ to 9½ percent in 1983.

While M-1 was not targeted in the same sense as M-2 and M-3, its behavior was closely observed throughout the year, and its behavior affected policy judgments in some degree. The Committee allowed for uncertainty as to the appropriate growth of M-1—related to its evolving role as a savings vehicle—by widening its annual range to 4 to 8 percent. Growth in the lower end of the range was considered appropriate if velocity exhibited a normal strong cyclical rebound, while an outcome near the upper end of the range would have been appropriate if velocity stabilized at its then existing level. (Table 1 illustrates cyclical velocity patterns.) The Committee recognized that M-1 would require close monitoring during the year and that some adjustment in its growth range could prove appropriate.

In fact, M-1 expanded at about a 14 percent annual rate over the first six months of 1983, far above the range indicated early in the year. Velocity continued to drop sharply in the first quarter of the year but essentially stabilized in the second quarter (Chart 7). The lagged effects of interest rate declines and precautionary concerns, which had bolstered M-1 demand earlier, appeared to be abating somewhat. Moreover, the currency and demand deposit components of M-1 were beginning to show strength, implying greater transactions needs associated with the recovery in economic activity.

In July, the Committee adopted a new monitoring range for M-1 of 5 to 9 percent annualized over the second half of the year. The decision to rebase to the second quarter of 1983 served to emphasize that the

rapid growth through midyear was related to special circumstances and that the Committee expected to see slower M-1 growth during the balance of the year. Primary emphasis continued to be placed on the broader aggregates, whose long-term ranges for growth were retained. M-1's role would continue to depend upon evidence that its velocity behavior was assuming a more predictable pattern.

In February, the Committee also chose for the first time an associated range for total domestic nonfinancial debt. Growth of 8½ to 11½ percent was chosen for the four quarters of 1983. The lower part of the range was about in line with that anticipated for nominal GNP, while the upper part encompassed somewhat faster growth. Long-term trends suggested the former development, but faster growth was viewed as possible because of the relatively rapid expansion foreseen for Federal debt. The Committee planned to monitor debt expansion, rather than target it directly, using it as an aid in assessing the growth of money and the impact of monetary policy.

#### Implementation

Given the uncertainty over the relationship between M-1 and economic activity, policy implementation in late 1982 had already shifted away from the partially automatic response of reserve conditions to money supply deviations that had been initiated in October 1979. Beginning in the latter part of 1982, the System developed nonborrowed reserve paths linked essentially to desired M-2 growth, modifying paths to accommodate actual M-1 growth as it developed. This approach envisaged modest responses to M-2 deviations, but it quickly became impractical after the December meeting, when the explosive growth of MMDA accounts drew funds into M-2 from nonM-2 sources.<sup>5</sup>

The Committee felt flexibility was necessary given the uncertainties affecting money and its relationship to GNP. Directives to the Trading Desk thereafter typically were oriented toward achieving a desired degree of reserve restraint, one which was subject to modification over intermeeting periods, contingent upon a set of developments. The near-term pace of money growth (with emphasis placed on M-2 and M-3) relative to Committee preferences continued to play a role. However, alterations in the degree of reserve restraint from the initial level depended not only on significant deviations in money from expectations, but also on incoming evidence about the economy.

These adaptations of operating procedures, which tended to place considerable weight on judgements of

Table 1

### Annual Rates of Change of M-1 Income Velocity

In percent

Years	Recessions	Recoveries	First Year of Recoveries
1960-1969	-1.4	3.2	5.9
1970-1973	0.0	3.7	2.8
1974-1980-I	1.5	4.3	6.9
1980-II-1981-III	-0.6	6.8	6.8
1960-1981-III	0.2	3.8	5.6
1981-IV-1983-IV	-4.2	—	0.7

The annual rates of change of velocity are quarter-to-quarter annualized growth rates. The interval averages are quarterly averages of the annual rates of change of velocity for the indicated stage of the business cycle.

<sup>5</sup>See "Monetary Policy and Open Market Operations During 1982," this *Quarterly Review* (Spring 1983), pages 37-54.

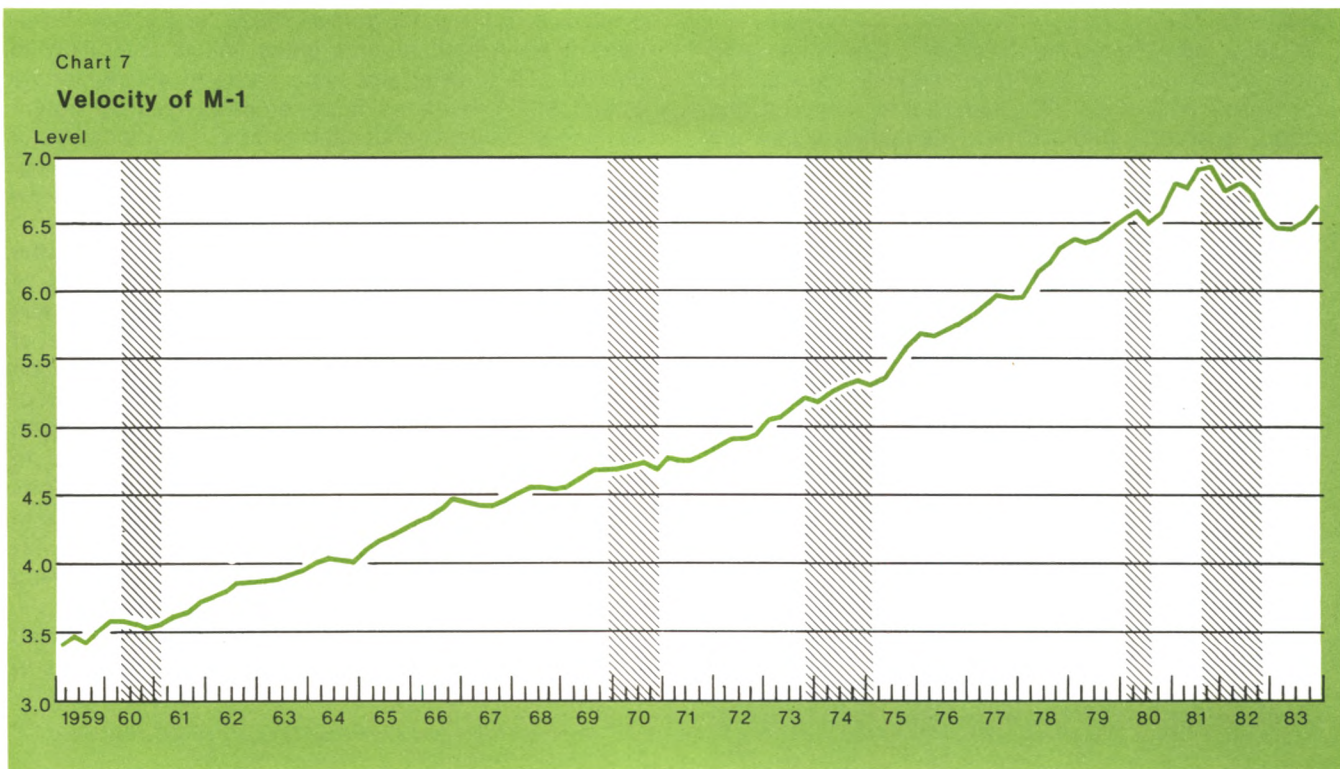
monetary and economic developments between meetings, led to relatively modest adjustments to the reserve environment compared with the procedures adopted in October 1979. Deviations in money growth from short-run objectives generated changes in reserve pressures only when economic forces generally also supported a modification. In practice, this meant that weekly adjustments to the nonborrowed reserve paths were made routinely to allow for an anticipated amount of discount window borrowing.

On a day-by-day basis, open market operations sought to maintain about the Committee's desired degree of reserve restraint. A total reserve path in any given week was constructed as the sum of the banking system's need for required reserves and an allowance for anticipated holdings of excess reserves in that week. The Desk's weekly nonborrowed reserve objective was then derived by deducting from the total reserve path a level of seasonal and adjustment borrowing at the discount window, which was associated with the Committee's preferred degree of reserve restraint. Each week the reserve paths were reviewed in the light of newly available information. The new total reserve path comprised the banking system's required and excess reserve needs for the new week in question, while the new nonborrowed reserve path was again derived by

deducting the appropriate level of adjustment and seasonal borrowing.

Under the modified procedures, interest rates, including the Federal funds rate, continued to fluctuate in response to shifting expectations of policy intent and the economic outlook. Perceptions of the existing and likely posture of System policy, which often reflected emerging monetary and economic statistics, importantly affected bank reserve management strategies and the behavior of financial market participants. Consequently, market interest rates temporarily firmed or eased at times even though open market operations were directed at maintaining a steady degree of reserve availability. On other occasions, market reactions to changes in the stance of System policy were somewhat greater than justified by the modest policy actions employed during the year.

During most intermeeting periods, monetary and economic developments remained within limits satisfactory to the Committee, resulting in no change in the degree of reserve pressure initially chosen. Therefore, in contrast to other recent years, open market operations usually aimed steadily at nonborrowed reserves thought consistent with a given level of adjustment and seasonal borrowing during intermeeting periods. Modifications introduced on occasion during the intermeeting





periods in line with Committee instructions were modest. In line with earlier procedures, path borrowing was modified on a few occasions when over- or underborrowing early in the week threatened sharp swings in reserve pressure.

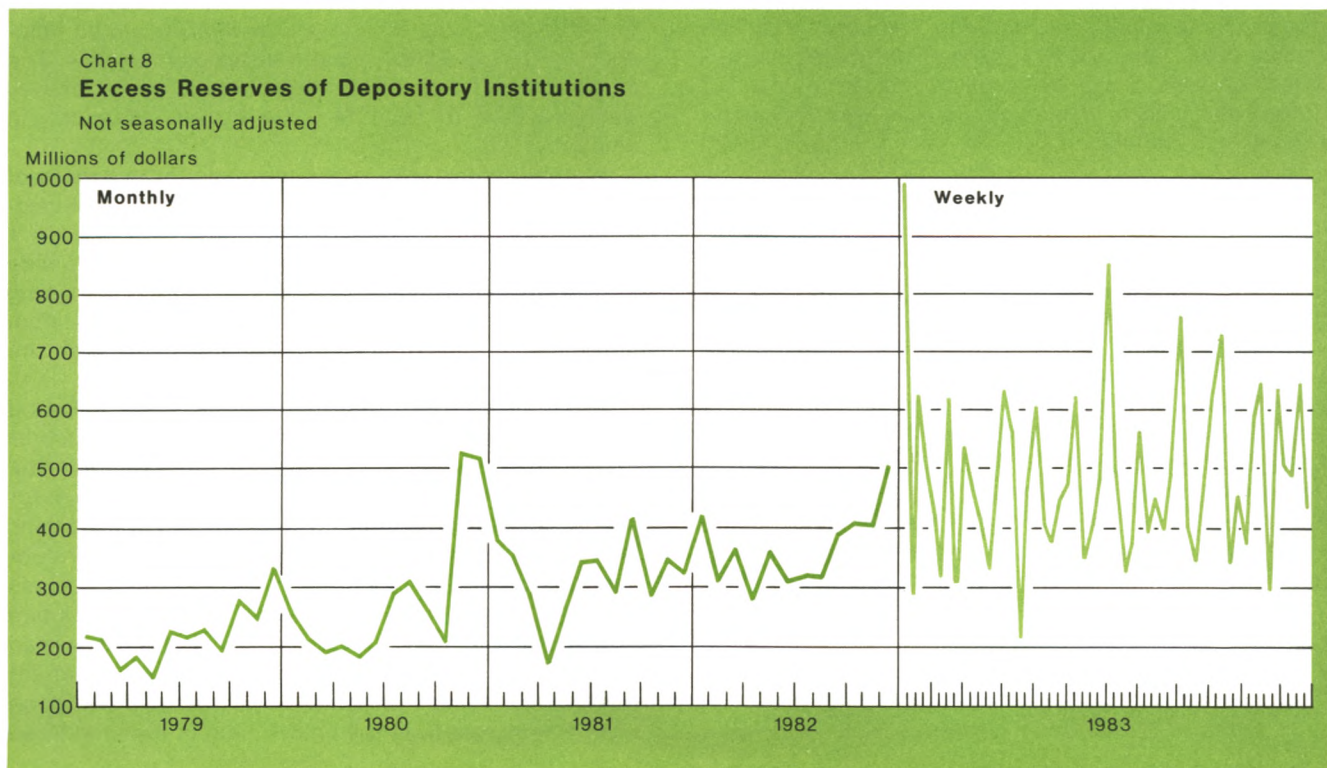
Making an appropriate allowance for excess reserves in constructing the reserve paths was a persistent difficulty in 1983. Several legislation-based reductions in reserve requirements contributed to especially high excesses in the weeks when reductions occurred, as banks adjusted slowly to new requirements. Beyond these transitional adjustment difficulties, the precise magnitudes of which are difficult to anticipate, excesses often ran high relative to both historical experience (Chart 8) and path allowances. In some cases the higher need for excesses could be discerned as a statement week progressed, allowing for some accommodation of the need through the provision of additional nonborrowed reserves. At other times, the unanticipated accumulation of excesses contributed to greater borrowing than was built into the path.

Much of the increased holdings of excess reserves appeared to stem from implementation of the Monetary Control Act (MCA) of 1980. The step-up in excess reserve levels was attributable in large part to excesses held by nonmember depository institutions, which held

no reserve balances prior to the MCA. The number of active nonmember reserve accounts continued to expand in 1983 because of MCA, in part to meet phase-ups of reserve requirements but more importantly as nonmember institutions opened clearing accounts to gain access to Reserve Bank services. Such institutions tended to hold excesses to reduce the likelihood of overdrafts or of being deficient with respect to reserve and clearing balance requirements.

For small member banks, the cumulative effects of phase-downs of member bank reserve requirements under MCA and the exemption of the first \$2.1 million of reservable liabilities from reserve requirements under the Garn-St Germain Depository Institutions Act of 1982 appear to have bolstered excess reserve holdings. The opportunity costs of holding such excesses may be reasonable compared to the costs of closer monitoring of reserve balances which would become necessary if the banks trimmed the excesses resulting from these legislated developments.

The degree of weekly variation in reserve availability from market factors remained substantial in 1983. The mean absolute weekly change in nonborrowed reserves net of open market operations was \$1.3 billion, unchanged from 1982. Projections of weekly nonborrowed reserve availability, while remaining subject to



significant error, were on average a bit closer to the mark than in other recent years. The mean absolute forecasting error was about \$575 million at the beginning of the week, declining to about \$90 million on the final day. The comparable beginning and end-of-week figures for 1982 had been \$600 million and \$130 million.

Given this weekly variability and still-substantial error factor, the Desk continued to rely heavily on transactions which temporarily add or drain reserves. Repurchase agreements involved both those arranged on behalf of the Federal Reserve System and those arranged in the market on behalf of foreign and international accounts. Together with matched sale-purchase transactions in the market, they totaled about \$295 billion compared to about \$310 billion in 1982. The number of market entries remained unchanged between the two years at 143. (There were 251 business days in 1983 and 249 in 1982.)

The Desk employed outright transactions to meet seasonal and secular reserve needs. Overall, the System's outright holdings of Treasury and Federally sponsored agency securities rose on a net basis by \$16.4 billion, compared to \$8.1 billion in 1982. Currency in circulation grew substantially during the year, rising by about \$14 billion. Outright purchases of Treasury securities amounted to \$22.5 billion, with slightly over one half bought from foreign accounts while the remainder was purchased in the market. Outright sales of securities (all Treasury bills) to foreign accounts totaled \$3.4 billion; no outright securities sales were made in the market. Redemptions of maturing Treasury securities (mostly bills) came to \$2.5 billion. There were no purchases or sales of agency securities during the year, but about \$300 million of maturing issues was redeemed without replacement.

### Conducting Open Market Operations

#### *January-Late May*

In early 1983, open market operations were conducted amid considerable uncertainty about the interpretation of the monetary aggregates in the face of major institutional changes. In late 1982, the nonborrowed reserve paths were built to be consistent with desired M-2 growth, retaining some of the automatic features adopted in October 1979. But nonborrowed reserve paths had been adjusted to accommodate deviations of M-1 from the levels assumed in building the path.<sup>6</sup> When it met on December 20-21, 1982, the Committee continued this approach, instructing the Trading Desk to seek nonborrowed reserves consistent with desired

M-2 growth. The directive did allow for more growth in M-2 if there were greater-than-expected shifts of funds into the broader aggregates from market instruments. As January progressed, it became apparent that M-2 was being enlarged by transfers from nonM-2 sources to a much greater extent than had been allowed for in the path. The Committee then decided not to allow the more rapid growth in M-2 to lead automatically to further restraint.

At subsequent meetings, the Committee eschewed mechanical linkages between the behavior of the aggregates and reserve pressures. Instead, the operating paragraphs of the directives specified desired degrees of reserve restraint. Modification of reserve pressure between meetings was linked to a variety of indicators, primarily the behavior of the monetary aggregates and the state of the economy.

In December 1982, the Committee had specified December-March growth at a seasonally adjusted annual rate of 9½ percent for M-2, allowing for a modest net inflow of funds in conjunction with MMDAs. It set an 8 percent growth rate for M-3, expecting only minimal distortions in it from MMDAs. The initial level of adjustment and seasonal borrowing was set at \$200 million. The consultative range for Federal funds was held at 6 to 10 percent, a range that was to remain unchanged through all of 1983. (Table 2 presents specifications of various operating guidelines and related measures.) The Committee did not specify an M-1 growth rate; it was not clear how MMDAs would influence the mix of MMDAs and transactions deposits. The introduction of Super NOW accounts in early January was expected to raise M-1 but by an indeterminate amount.

As noted above, M-2 grew at a pace far in excess of the 9½ percent path rate, as MMDAs drew a considerable volume of funds from nonM-2 sources. In a series of discussions, and a formal telephone meeting on January 28, the FOMC found acceptable the existing degree of reserve restraint, consistent with adjustment and seasonal borrowing of \$200 million over the remaining weeks until the next meeting.

Open market operations during the period following the December meeting sought to meet weekly nonborrowed reserve objectives believed consistent with the initial borrowing assumption and an allowance for expected levels of excess reserves. Year-end distortions led to borrowing exceeding planned amounts—substantially so in the January 5 statement week. Excess reserves, too, exceeded the enlarged allowance made for them that week and continued to run above assumed levels in most other weeks of the period. Discount window borrowing ran above expected levels through mid-January, but then fell below them in the final three

<sup>6</sup>Because M-1 is subject to a higher reserve requirement than the broader aggregates, it was necessary to make estimates of M-1 behavior to build a path. The approach used in late 1982 is described in "Monetary Policy and Open Market Operations in 1982"; *op. cit.*, pages 41-2 and 52-4.



weeks. Federal funds traded above the 8½ percent discount rate around the year-end but settled back near that rate once year-end pressures abated. Chart 9 shows the Federal funds rate and borrowed reserve patterns over the year.

Nonborrowed reserves were generally close to, or above, the weekly objectives during this period, which was dominated by a seasonal need to drain reserves. Outright sales of bills to foreign accounts, redemptions of maturing issues and one round of matched sale-purchase transactions in the market were employed. Repurchase agreements were used on several occasions to compensate for unexpected increases in the foreign RP pool and occasional uncertainties about float and other balance sheet items.

When the FOMC met on February 8 and 9, it faced the need to interpret the major forces buffeting the aggregates. In adopting 1983 objectives, it rebased M-2 to February-March and adopted a 7 to 10 percent range, thus accepting the ongoing bulge from the MMDA accounts but also anticipating a return to more normal behavior by the end of the first quarter. The staff suggested that the existing degree of reserve restraint was likely to be associated with rapid M-2 growth in the weeks ahead but an appreciable slowing in the other aggregates. Given the uncertainty, the operating paragraph of the directive was written without reference to specific short-run growth rates for the monetary aggregates. The Committee indicated that lesser restraint would be acceptable if, abstracting from the distortions introduced by the new deposits, the monetary aggregates seemed to be slowing appreciably to rates below the paths implied by the long-run ranges.

As the intermeeting period progressed, the existing degree of reserve pressure was retained. The monetary aggregates, and particularly M-1, were growing faster than had been expected, but distortions from the new deposits continued to cloud the significance of the behavior of the aggregates.

In practice, adjustment and seasonal borrowing in the period ran above the \$200 million expected in most weeks, reflecting a mix of reserve shortfalls and higher-than-expected demand for excess reserves. Even so, Federal funds generally traded close to the 8½ percent discount rate, edging up to about 8¾ percent just before the March meeting as quarter-end pressures began to build. During the period, reserve requirement ratios were lowered for most member banks with a phase-in of the Monetary Control Act on March 3. A modest allowance was made for additional excess reserve demand in the week of the phase-in. Actual excess reserves, after revision, were close to the assumed level. On average over the period, excess reserves were modestly above the allowance made for

them. The period's sizable reserve needs were met gradually through a mix of outright Treasury bill purchases, mostly from foreign accounts, and temporary repurchase agreements in the market.

When the Committee met again on March 28 and 29, there were signs that the bulk of the bulge in M-2 associated with the new MMDAs was over and that only a modest allowance was needed for the period ahead. Most members felt primary weight should still be placed on the broader aggregates. The unusually sharp decline in M-1 velocity continued to cast doubt on that aggregate as a principal guide for policy and, while an M-1 range was indicated, it was considered to be a monitoring range rather than a target.

The Committee weighed the strength in the aggregates against concerns that the recovery was still at an early stage and that upward pressure on interest rates might risk retarding or aborting the recovery. It opted to continue about the existing degree of reserve restraint, with anticipated borrowing initially \$250 million, in line with the actual experience of recent preceding weeks. It was anticipated, and desired, that M-2 and M-3 would slow to seasonally adjusted annual rates of about 9 percent and 8 percent, respectively, over the period from March to June. The Committee expected that M-1 growth at about a 6 to 7 percent rate would be consistent with its specifications for the broader aggregates.

The Committee indicated that lesser restraint would be acceptable if there were a more pronounced slowing of the growth in the monetary aggregates or indications of a weakening in the pace of economic recovery. If money growth proved appreciably higher than expected without its being attributable to institutional changes, the Committee would consult about the desirability of any substantial further restraint on bank reserve positions.

In fact, the aggregates did weaken in April relative to expectations, but grew very rapidly in early May. The deviations in money growth from expected levels did not lead to any change in Desk objectives. Throughout the March-to-May intermeeting period the Desk sought nonborrowed reserves consistent with \$250 million of seasonal and adjustment borrowing.

Borrowing at the discount window bulged above intended levels on a number of occasions, notably in the week that included the quarter-end statement day and the partial holiday of Good Friday. The quarter ended on Thursday, the first day of the statement week. Window dressing by corporations and banks led to high demands for reserves. The Federal funds rate rose that day, and banks turned to the discount window. Even with repeated reserve injections, the pressures in the money market subsided only gradually. The funds rate averaged 9.43 percent in that week, compared to 8.88 percent the week before.

Most of the borrowing bulges during the intermeeting period were accompanied by shortfalls in nonborrowed reserves relative to the objective. Greater-than-expected demand for excess reserves was at work in some weeks. The funds rate settled back to trade close to, or slightly above, the 8½ percent discount rate after the quarter-end week. It dipped briefly below the discount rate in early May when many participants expected a discount rate cut but moved back up once a resumption of M-1 expansion dashed those expectations.

*Late May-Late August*

During the late spring and into the summer evidence mounted that the recovery was well under way, and proceeding at a robust pace. M-2 and M-3 grew at rates that were generally close to, or modestly above, the paths set for them, but M-1 soared. While remaining skeptical about the information to be drawn from the aggregates, Committee members felt that some recognition of the persistent strength in M-1 was appropriate, especially given the emerging rapid expansion in economic activity. In this environment, the Committee increased in cautious, measured steps the extent of reserve restraint applied to the banking system.

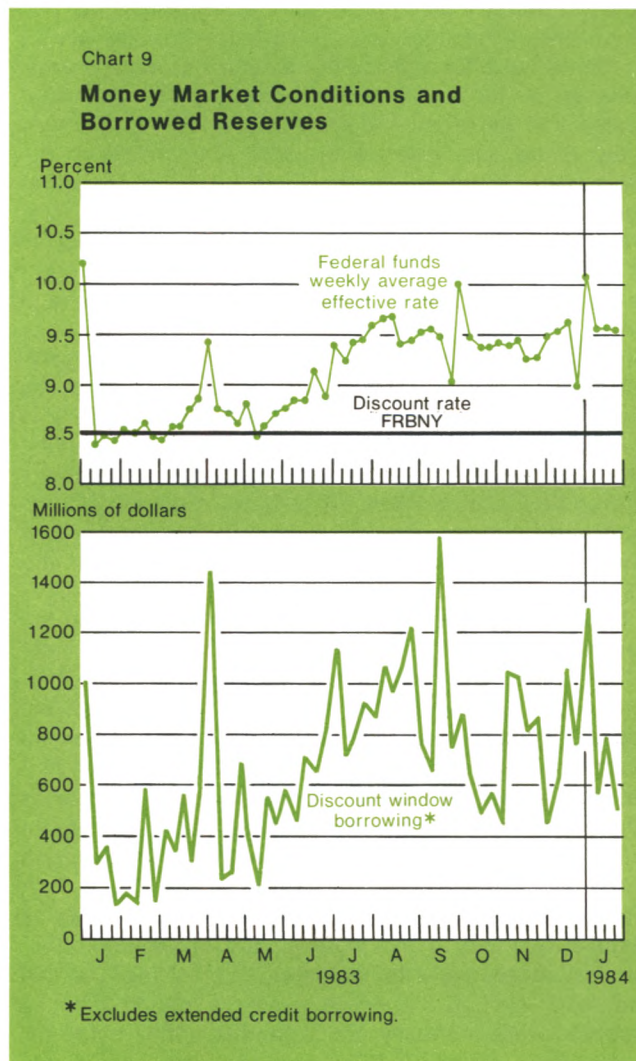
The picture presented at the May 24 meeting was particularly difficult to interpret and led to a wide range of views. Some members saw a risk that the economy might be accelerating to a pace that could prove to be very rapid. The extremely high rate of growth of M-1 in early May, after a prolonged period of rapid growth, was viewed by a number of members as deserving some response. Others questioned the sustainability of the recovery given sluggish capital spending and exports. They noted that M-2 and M-3 were tracking slightly below the second quarter targets of 9 and 8 percent, respectively, and questioned the desirability of a response to M-1 growth.

After consideration, the Committee voted to increase only slightly the degree of reserve restraint. It indicated that lesser restraint would be appropriate if the broader monetary aggregates slowed further relative to the paths implied by the long-term ranges and if M-1 decelerated, or if there were indications of a weakening in the pace of economic recovery.

After the meeting the Desk began to seek nonborrowed reserve levels consistent with adjustment and seasonal borrowing of \$350 million, as discussed by the Committee. M-2 and M-3 actually came in stronger than had been expected at the time of the May meeting. They grew at close to, or slightly above, the desired growth rates for the March-June period. M-1, as expected, ran well above the 6 to 7 percent growth range discussed at the March meeting. Borrowing at the window persistently exceeded planned levels. Reserves

at times fell short of projected levels while excess reserve demands often appeared to run above the allowances made for them in setting weekly reserve objectives.

Borrowing averaged close to \$600 million in the first three weeks of the intermeeting period, but the increase in pressure resulted in only a modest rise in market rates. Banks were slow to respond to the increased reserve pressure as there was no conviction of a policy change. The Federal funds rate averaged 8.82 percent in those weeks compared with 8.60 percent in the preceding three weeks. Thereafter market perceptions and bank actions changed as the persistence of strong money growth worked on expectations, contributing to a rise in the funds rate to a 9.14 percent average a week later.



Against this background of additional strength in the aggregates and the economy and the tendency of borrowing to run to the high side, the Committee consulted on June 23 and agreed that a modest increase in planned reserve restraint was appropriate. Adjustment and seasonal borrowing in a range of \$400 to \$500 million was contemplated. However, borrowing continued to exceed the intended level, as pressures surrounding the quarter-end and the Independence Day holiday led to cautious bank reserve management. The Federal funds rate traded over a 5 to 25 percent range before the holiday weekend.

The extended credit borrowing by Seattle-First National Bank, which jumped up in mid-June, complicated reserve management. Extended credit borrowing is treated as nonborrowed reserves for the purpose of Desk operations, since the borrowing does not carry with it the normal Federal Reserve pressure on the bank to repay its advance quickly. With additional reserves being supplied by the discount window, fewer reserves needed to be supplied through open market operations. The purchase of the bank by BankAmerica Corporation ended the reserve injection from this source by the final week of the intermeeting period.

Substantial additions to reserves were required during the intermeeting period to deal with the seasonal outflow in currency and the runup in the Treasury's balance at the end of June. The Desk bought Treasury bills and coupon issues outright in the market and purchased bills from foreign accounts. It also arranged a number of rounds of repurchase agreements. When the extended credit borrowing built up, a round of matched sale-purchase agreements in the market was used to cut back reserve availability.

When the Committee met on July 12 and 13, members focused on the economy's strong forward momentum and prospects for continuing sizable gains in real GNP. M-2 and M-3 were growing at rates that were generally in line with the FOMC's objectives for both the second quarter and the year, although M-3 was around the upper limit of its annual range. M-1 had slowed somewhat in June from its extraordinary 26 percent rate of growth in May, but had still grown at a 14 percent annual rate over the first half of the year. Given continued evidence of abnormal behavior for M-1 velocity, the Committee established a monitoring range of 5 to 9 percent for M-1 growth from a new base in the second quarter to the fourth quarter of 1983.

In view of prospective economic strength and concerns about future money growth, the Committee directed the open market Desk to increase slightly further the degree of reserve restraint. Over the period from June to September, this action was expected to be associated with M-2 and M-3 growth at seasonally

adjusted annual rates of 8½ and 8 percent respectively. It was anticipated that M-1 would grow at around a 7 percent rate over the same period. Depending on evidence about the strength of the economic recovery, lesser restraint would be acceptable in the context of a significant shortfall in growth of the broader aggregates. Somewhat greater restraint would be acceptable if those aggregates expanded more rapidly.

In carrying out policy, the Desk sought nonborrowed reserves consistent with adjustment and seasonal borrowing around the middle of the \$600 to \$800 million range discussed at the FOMC meeting. M-2 and M-3 ran a bit below planned growth, but a contributing cause was a decline in overnight RPs, perhaps in response to the temporary buildup of Treasury balances at the banks. The economy continued strong, as did M-1.

Borrowing at the window tended to rise higher than intended. Often borrowing was high over the weekend, making it difficult, if not impossible, for the weekly average to be consistent with the nonborrowed reserve objective. To communicate the intended increase in restraint, a shortfall in nonborrowed reserves was accepted on occasion rather than risk a buildup of excess reserves and an easing of money market conditions, contrary to the Committee's intent. Nonborrowed reserves came in modestly below path in several weeks. Most of the time excess reserves ran close to the allowance made for them—in the \$300 to \$400 million area discussed by the Committee—but they were significantly higher in two weeks. The Federal funds rate rose to the 9½ to 9¾ percent area, after having traded mostly between 8¾ and 9¼ percent in the previous period.

Large reserve injections often were called for during the period. The Desk purchased \$2.1 billion of Treasury bills from foreign accounts. It also used temporary injections repeatedly through System and customer repurchase agreements in the market.

#### *Late August to the year-end*

The economic data received over the remainder of the year gave a more mixed picture than had been evident over the late spring and summer. By September, the previously steamy rate of expansion appeared to be moderating, although later in the period the extent of the slowdown seemed less clear. M-1 growth slowed markedly, while M-2 growth also slackened a bit. M-3's pace moderated slightly but left this aggregate high in its annual range.

While some Committee members thought that M-1 behavior was beginning to return to normal, a majority continued to stress M-2 and M-3 as primary objectives, with M-1 still in a monitoring status. In view of the slowdown in the growth of the aggregates and the



Table 2  
**Specifications from Directives of the Federal Open Market Committee and Related Information**

Date of Meeting	Short-Term Annualized Rate of Growth For Period Indicated (percent)			Initial Assumption for Borrowings in Deriving Nonborrowed Reserve Path (millions of dollars)	Notes
	M-2	Specified Rate M-3	Monitoring Range M-1		
12/20-21/82 .....	9 1/2	December to March 8	—	200	The Committee's short-term objective for M-2 growth allowed for modest shifting into the new MMDAs from non-M-2 instruments; greater growth was acceptable if analysis of incoming data indicated that the MMDAs were generating more substantial shifts of funds into broader aggregates from market instruments.
2/8-9/83 .....		Not specified		200	The Committee sought to maintain the existing degree of restraint on reserve positions. Lesser restraint would be acceptable in the context of appreciable slowing of growth in the monetary aggregates to or below the paths implied by the long-term ranges, taking account of the distortions relating to the introduction of the new accounts.
3/28-29/83 .....	9	March to June 8	6-7	250	The Committee sought to maintain generally the existing degree of restraint on reserve positions. The Committee noted the same provisions agreed upon at the February meeting for adopting a lesser degree of reserve restraint and added indications of a weakening in the pace of the economic recovery.
5/24/83 .....	9	March to June 8	(6-7)	350 6/23 400-500	The Committee sought to increase only slightly the degree of reserve restraint against a background of M-2 and M-3 estimates slightly below the rates specified in March for the second quarter, M-1 growing well above anticipated levels, and an acceleration in the business recovery. Lesser restraint would be appropriate in the context of less growth in the monetary aggregates or indications of weakening in the pace of economic recovery.

Table 2

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

Date of Meeting	Short-Term Annualized Rate of Growth For Period Indicated (percent)			Initial Assumption for Borrowings in Deriving Nonborrowed Reserve Path (millions of dollars)	Notes
	M-2	Specified Rate M-3	Monitoring Range M-1		
7/12-13/83 .....	8 <sup>1/2</sup>	June to September 8	7	600-800	The Committee sought to increase slightly further the existing degree of reserve restraint. The Committee noted that lesser or greater restraint would be acceptable, depending on evidence about the strength of the economy and other factors bearing on the business and inflation outlook, and the growth of the aggregates.
8/23/83 .....	8	June to September 8	7	700-900	The Committee sought to maintain the existing degree of reserve restraint. The Committee cited the same provisions agreed upon at the previous meeting for adopting a lesser or greater degree of reserve restraint.
10/4/83 .....	8 <sup>1/2</sup>	September to December 8 <sup>1/2</sup>	7	650	The Committee sought to maintain the slightly lesser degree of reserve restraint that had been sought in recent weeks. The Committee noted the same provisions agreed upon at the previous meeting for adopting a lesser or greater degree of reserve restraint.
11/14-15/83 .....	8 <sup>1/2</sup>	September to December 8 <sup>1/2</sup>	5-6	650	The Committee sought to maintain the existing degree of reserve restraint. The Committee noted the same provisions agreed upon at the previous meeting for adopting a lesser or greater degree of reserve restraint.
12/19-20/83 .....	8	November to March 8	6	650	The Committee sought to maintain at least the existing degree of reserve restraint. The Committee noted that somewhat greater restraint would be acceptable depending on evidence about the strength of the economy and should the aggregates expand more rapidly.

Note: The discount rate remained at 8.5 percent for the entire year and the consultation range for Federal funds remained at 6 to 10 percent.

economy, the FOMC relaxed slightly the degree of reserve restraint in September. This stance continued through the rest of the year.

When the Committee met August 23, many signs suggested economic activity would moderate later in the year. Consumer spending, housing, and inventory building were expected to provide less impetus in the future. M-2 and M-3 growth had slowed substantially in July; M-1 began to slow in July and seemed to be decelerating further in August. These developments were viewed constructively, and the Committee voted to direct the Trading Desk to maintain the existing degree of reserve restraint. Depending upon evidence concerning the strength of the economy and other factors bearing on the business and inflation outlook, lesser restraint was considered appropriate if M-2 and M-3 showed a significant shortfall from the expected annual rate of growth of around 8 percent for June to September. Greater restraint would be acceptable should these aggregates expand more rapidly. Deceleration of M-1 to a rate of around 7 percent was expected to be consistent with the specifications for the broader measures.

The Desk initially sought to maintain restraint consistent with \$800 million of adjustment and seasonal borrowing. As the aggregates weakened and the economic data suggested some abatement in the momentum of the recovery, the borrowing level used in developing the nonborrowed reserve objective was scaled back to \$700 million for two weeks and then to \$650 million in the final two weeks.

The period between the August and October meetings proved to be particularly challenging to open market operations, making it worthy of closer examination. Right after the August meeting, the Desk faced initial estimates of a small need to absorb reserves. Given its modest size relative to the usual uncertainties surrounding reserve forecasts (see discussion on page 47), the Desk normally would have deferred absorbing reserves. However, the Federal funds rate was well below recent levels, at  $9\frac{1}{8}$  percent. Some market participants were concluding erroneously that the FOMC had voted to seek a more accommodative stance. Hence, the Desk withdrew reserves by arranging overnight matched sale-purchase agreements in the market. As the August 31 week progressed, float and other factors provided fewer reserves than expected. The Desk initiated customer and System repurchase agreements, but reserves still fell short. Discount window borrowing and excess reserves both exceeded anticipated levels.

In preparation for an expected need to drain reserves beginning in the September 7 week when required reserves were reduced by a phase-in under the Mon-

etary Control Act, the Desk had run off maturing Treasury bills in the auction held August 29. It also had sold bills directly to foreign central bank customers during the August 31 statement week. Once again, revisions to market factors, and a sense that excess reserve demand was running very high, led the Desk to reverse direction, adding reserves through both customer and System repurchase agreements. Excess reserves turned out well above the higher than average allowance. A number of special factors apparently raised demand more than expected. These factors were the Labor Day holiday, the payment of Social Security checks, and the reserve effects of the Monetary Control Act, which released reserves at member banks and extended effective requirements to more nonmember institutions.

A different set of factors complicated reserve management in the September 14 week. Friday, September 9 was a holiday in California but not in the rest of the country. Whenever such a partial holiday occurs, the reserve transfers affecting the closed banks are put through when the banks reopen. The Federal Reserve gives credit subsequently on checks deposited by the banks for collection as if the banks had been open. However, it was customary that if a bank was not notified of its reserve credits until late in the week or in the next week, it could choose the week in which the reserve adjustment would be taken. In this case, it took a couple of weeks to sort out the amount and timing of the adjustments. A power failure at a large Los Angeles bank added to the problem. In consequence, the banks showed enlarged reserve needs in both the September 14 and 21 statement weeks pending effective receipt of the credit adjustments.

Beginning in the September 21 week, and continuing into October, a seasonal rise in Treasury deposits at Federal Reserve Banks drained reserves more rapidly than expected. Normally the Treasury seeks to maintain a reasonably steady balance at the Reserve Banks, usually at about \$3 billion. It places additional cash in its note option accounts at commercial banks. Fluctuations in the note option accounts leave bank reserves unaffected, unlike changes in Treasury balances at the Federal Reserve which do have a reserve effect. However, because banks are required to pay interest to the Treasury on their notes and to hold collateral securing the notes, they limit the funds they will accept from the Treasury and remit excess funds to the Reserve Banks. When the balances exceed the aggregate limit, Treasury cash at the Federal Reserve builds up rapidly, draining reserves.

In preparation, the Desk began to add reserves just ahead of the mid-September tax date through Treasury bill purchases from foreign official accounts. It bought



bills in the market on September 15, and continued to purchase bills from foreign accounts during the week. However, the Treasury's balance at the Federal Reserve rose to \$12.8 billion by week's end, far more than anticipated. The Desk added reserves through repurchase agreements, but its actions kept falling a bit short as the Treasury balance kept rising faster than expected. The major money market banks, enjoying the influx of Treasury funds, were willing to accumulate deficiencies so that the Federal funds rate fell during the week from a range of  $9\frac{1}{2}$  to  $9\frac{5}{8}$  percent to  $9\frac{1}{8}$  to  $9\frac{3}{8}$  percent. The Desk held back in meeting the estimated needs. When the shortage finally became apparent late Wednesday, September 21, Federal funds traded as high as 20 percent. Borrowing bulged to \$6.3 billion on the day, lifting the average to \$1.6 billion for the week. Excess reserves averaged \$345 million, close to the allowance.

Treasury balances were expected to remain at unusually high levels until Social Security payments went out in October and to be moderately high for a while thereafter. The Desk, facing a need to replace the maturing repurchase agreements, announced its intentions on Wednesday, September 21, and arranged a record \$14.1 billion of 4- and 7-day repurchase contracts the next day. On Friday, the Trading Desk replaced a portion of the repurchase contracts that were withdrawn, making customer-related repurchase agreements in the market. For a change, the Treasury balance fell short of expectations, and reserves turned out more plentiful than expected. With borrowing at the window also on the high side, the Federal funds rate declined sharply. The Desk then had to reverse course by arranging matched sale-purchase transactions in the market Wednesday, September 28 to absorb the redundant reserves. Over the week the Federal funds rate averaged only around 9 percent. Although discount window borrowing dropped sharply after the weekend, it still ran above the anticipated amount for the week. Excess reserves were modestly above the expected level.

The Desk faced another large reserve shortage in the October 5 week. It replaced a portion of the maturing repurchase agreements early in the week, ahead of the expected drop in Treasury balances associated with the Social Security payments on Monday, October 3. Banks, however, scrambled to build up excess reserves over the quarter-end and the money market remained on the firm side after the weekend; the average effective Federal funds rate was 10.00 percent.

At the FOMC meeting held October 4, the economic indicators suggested that the economic expansion was continuing, although it had slowed somewhat from the exceptionally rapid second quarter pace. The Committee

decided to maintain the reduced degree of reserve restraint that had been attained in September. It expected that such a stance would be consistent with M-2 and M-3 growth at an annual rate of  $8\frac{1}{2}$  percent from September to December. Depending on the strength of the economic recovery, lesser or greater restraint would be acceptable should these aggregates experience a significant shortfall or show more rapid growth than anticipated. M-1 growth at around a 7 percent annual rate was expected to be consistent with the objectives for the broader aggregates.

The broad aggregates generally were close to the objectives during the period, with M-2 slightly above and M-3 a touch below the  $8\frac{1}{2}$  percent growth rate in October. M-1, however, was much weaker than anticipated. Indicators suggested that the economic expansion was proceeding at a pace in line with expectations. In these circumstances, the Desk continued to provide for nonborrowed reserves consistent with adjustment and seasonal borrowing of \$650 million.

During the first three weeks, through October 26, the Desk continued to face sizable needs to add reserves as the Treasury balance persistently held at abnormally high levels (though well below those of late September). Banks seemed reluctant to borrow at the discount window after borrowing relatively large amounts in the preceding few weeks. Adjustment and seasonal borrowing ran well below expected levels even though the Federal funds rate hung close to  $9\frac{1}{2}$  percent in the first week, the week ended October 12. Also in that week, the Columbus Day holiday contributed to high excess reserve demands, and the Desk allowed nonborrowed reserves to overshoot.

In the October 19 through November 2 weeks, nonborrowed reserves were modestly above path while excess reserve demand, for a change, tended to run below expectations. Banks borrowed a bit less than the planned amounts. Late in the period, the size of the foreign account repurchase agreement pool and the Treasury balance, as well as wire transfer difficulties, contributed to a net reserve shortfall and complicated reserve management. Furthermore, excess reserve demand once more rose above expected levels, and discount window borrowing rose sharply. Federal funds generally traded in the  $9\frac{3}{8}$  percent area after the first week of the intermeeting period despite the swings in borrowing.

At its November 14-15 meeting, the Committee noted that the broader aggregates were expanding at rates in line with the desired  $8\frac{1}{2}$  percent fourth quarter pace. Economic expansion appeared to have moderated from the very rapid second and third quarter pace, although the economy still seemed to be growing relatively rapidly. Some members saw the strength of the economy

as disturbing, for it seemed to point to inflation and other imbalances in the future. Other members were more concerned with pockets of weakness, particularly in the export related sectors. The sharp deceleration in M-1 growth over recent months, following earlier rapid growth, was viewed as a desirable offset by some members but as a source of concern by others who saw such a slowdown as a possible precursor of economic weakness.

On balance, the Committee decided to retain the existing degree of reserve restraint. The directive provided for either greater or lesser reserve restraint depending on the behavior of the broad aggregates with attention to economic and financial developments. Given the relatively slow growth of M-1 in October, the annual rate of growth for the September-to-December period expected to be consistent with the broader measures was lowered to 5 to 6 percent.

As the period progressed, M-2 stayed essentially on track. M-3 growth was higher than desired, but some of the expansion was attributed to the replacement by banks of Treasury cash holdings with large CDs and term RPs. M-1 again came in well short of expectations making November the fourth consecutive month in which the measure showed very little expansion.

Against this background the Desk continued to provide for nonborrowed reserves consistent with \$650 million of adjustment and seasonal borrowing. A reserve shortfall in the week before Thanksgiving pushed borrowing up sharply on Wednesday. The high level automatically carried over the holiday into the next statement week contributing to an overrun in borrowing in both weeks. (Nonborrowed reserves were close to track in the second week.) Borrowing fell short and nonborrowed reserves came out higher than planned in the next two weeks.

Ironically, in the first two weeks the Federal funds rate fell below recent levels, trading mostly in a  $9\frac{1}{8}$  to  $9\frac{3}{8}$  percent range, while discount window borrowings were high. The rate jumped to a  $9\frac{3}{8}$  to  $9\frac{5}{8}$  percent range in the next two weeks despite the lower borrowing levels. A mix of changing expectations and variations in actual and desired reserve balances early in the statement weeks contributed to the perverse relationships, but to some extent they remain a mystery. In the final week, borrowing ran substantially above the path level, reflecting high borrowing over the weekend amid pressures related to the December tax date. The high borrowing contributed to high excess reserves as nonborrowed reserves came in close to planned levels.

At the meeting held December 19-20, the Committee noted that the economy seemed to be growing at a

rapid pace, although the rate of expansion had moderated from that of the middle two quarters. Prospects were for continued expansion in 1984, although at a reduced pace from that experienced in 1983. M-2 and M-3 were close to, or slightly above, their desired September-December growth paths. M-1 growth remained sluggish through November, but was showing signs of picking up in early December.

Committee members had somewhat mixed views about the strength of the expansion and the prospects for inflation. There was agreement that risks of increasing inflationary expectations were such that at least the existing degree of reserve restraint should be maintained. Depending on developments in the economy, the Committee indicated that somewhat greater restraint would be acceptable if M-2 and M-3 expansion should be more rapid than the 8 percent growth rate expected for the November 1983-March 1984 interval. The Committee anticipated that growth in M-1 at around a 6 percent rate over that interval would be consistent with the expected behavior of the broader aggregates.

The Desk continued to seek reserve conditions consistent with adjustment and seasonal borrowing of \$650 million. Economic data received right after the meeting suggested more slackening in the pace of growth than had been expected. The broad aggregates appeared to be tracking just below the Committee's desired growth paths, while M-1 growth was picking up a bit more than had been expected. Taken together, these factors did not suggest any reason for changing the reserve stance.

Reserve management during the late-December holiday period was complicated by year-end developments. Estimates of reserve availability were revised frequently, reflecting a weather-related bulge in float and unexpected variations in the size of the foreign repurchase pool. Reserve demands also were variable amid holiday and year-end publishing date distortions. In this environment, the Federal funds rate traded over unusually wide ranges during the two holiday weeks around the year-end. It tended to the low side—often below 9 percent—before Christmas and to the high side—often above 10 percent—around the year-end. Discount window borrowing ran modestly above the expected level in Christmas week and far above that level in the week that spanned the year-end. Nonborrowed reserves fell short of the objectives in both weeks, while excess reserves ran above the enlarged allowance in the latter week. Once the year-end pressures subsided in January, borrowing fell back to a range around the anticipated level and the Federal funds rate traded mostly around  $9\frac{1}{2}$  percent.

# Treasury and Federal Reserve Foreign Exchange Operations

During the period from August 1983 through January 1984, the dollar rose strongly on balance against the European currencies but was little changed against the Japanese yen. As the period began, the dollar was moving sharply higher and reached a 9<sup>1</sup>/<sub>2</sub>-year high against the German mark in mid-August. The dollar then declined gradually through early October, before it gained renewed strength and surpassed its earlier highs, ending the period 5 to 9 percent higher on balance against the European currencies.

At the beginning of August the U.S. economy was recovering more vigorously and inflation declining more rapidly than expected by many observers. At the same time, the U.S. authorities were perceived as willing to allow the demand pressures to be reflected in higher interest rates. In many other industrial countries, by contrast, economic recovery was more modest, unemployment was near peak levels or declining only slowly, and the monetary authorities were perceived as reluctant to tighten monetary policies. Under these circumstances, the dollar was quickly bid higher in unsettled trading as the reporting period opened. The U.S. monetary authorities and foreign central banks intervened in coordinated operations during one limited period, which helped restore order in the market.

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. Deborah J. Danker was primarily responsible for preparation of the report. Margaret L. Greene, Charles M. Lucas, Patricia H. Kuwayama, Andrew Hook, Richard Koo, Thaddeus Russell, and Alissa Rivin also contributed.

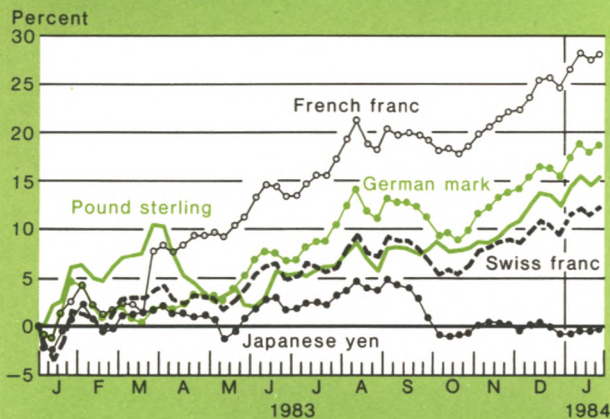
Market participants soon began to question whether the dollar could maintain the high levels reached in early August. New data pointed to a considerable slowing of economic growth in the United States, and evidence suggested that upward pressure on U.S. interest rates might be dissipating. M-1 growth had also decelerated and the inflation rate remained low, leaving market participants with little reason to expect a firming in interest rates and some room to hope for an easing. Moreover, private credit demands were appearing less strong than expected just months before, and estimates of the government's quarterly financing needs were revised downward. These developments triggered a rally in U.S. credit markets, with short-term interest rates dropping about 1 percentage point by early October. They also were seen as increasing the scope for monetary authorities abroad to take a more accommodative policy stance, without risking the inflationary impact of a depreciating currency. Under these circumstances the dollar declined through October 7, about 4<sup>1</sup>/<sub>2</sub> percent on a trade-weighted basis and about 6<sup>1</sup>/<sub>2</sub> percent against the German mark from its August peaks.

In early October, however, it became clear that U.S. growth had remained strong in the third quarter. Consequently, projections of the GNP gain for the full year—by both the Administration and market participants—were revised upward as much as a percentage point from those made as recently as July. The evidence of robust growth quickly stopped the decline in U.S. interest rates and again overshadowed the more modest economic recoveries of several European countries. The U.S. expansion once again became more evident,



Chart 1

**The Dollar against Selected Foreign Currencies**



Percentage change of weekly average bid rates for dollars from the average rate for the week of December 27-31, 1982. Figures calculated from New York noon quotations.

encouraging expectations of rising private credit demand. At the same time, market concern grew over the lack of action to reduce current and prospective fiscal deficits and, by mid-December, short-term interest rates had moved back up near the levels of early August.

In addition, optimism spread that the U.S. economy might be on the threshold of a lengthy period of strong but noninflationary expansion, with high productivity growth. The unemployment rate plummeted. Many attributed aggressive business hiring programs to growing confidence that earlier efforts to deregulate the economy, improve labor market flexibility, and adjust the corporate tax structure to spur investment were all beginning to bear fruit. In this environment the dollar developed upward momentum in the exchanges, climbing with each new economic statistic that suggested stronger expansion. There were also reports of substantial foreign interest in U.S. investments, based on expectations of improving corporate profits and yields on equity investments, as well as the continued attraction of comparatively high yields on fixed-income securities. As a result, the exchange markets showed little reaction to projections for the 1983 current account deficit of roughly \$40 billion.

The dollar also benefited from "safe haven" considerations prompted by events that heightened international tensions, such as intensified fighting in Lebanon and escalation of threats in the Iran/Iraq conflict. Episodes of increased political and financial uncertainty in Europe also led to bidding for dollars.

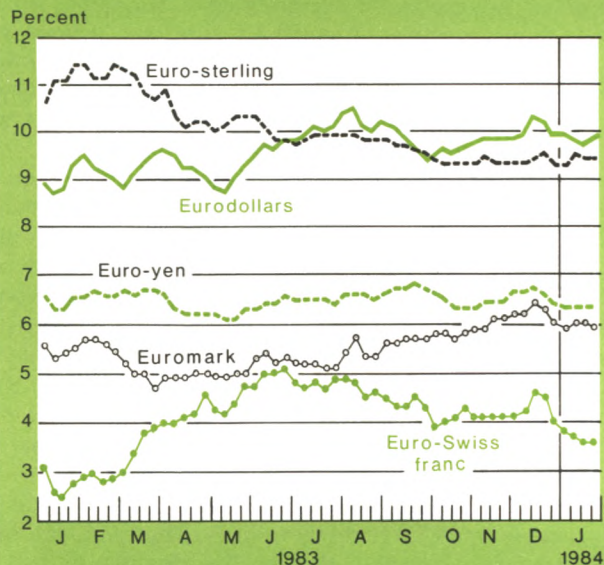
After mid-December, U.S. interest rates eased off but only slightly. The dollar dipped briefly toward the year-end but then resumed its climb. It hit a ten-year high of DM 2.8505 against the mark on January 10 and set records against most other European currencies before again easing back somewhat by the close of the period.

Over the six-month period, the U.S. authorities intervened in the exchange markets on five occasions to calm disorderly markets. Two of these occasions were described in previous reports. The first of these involved operations on four business days between July 29 and August 5, which were coordinated with foreign monetary authorities. The U.S. authorities purchased \$182.6 million equivalent of German marks and \$71.5 million equivalent of Japanese yen during that period. The second occurred on October 31 and November 1 when the U.S. authorities entered the market to purchase a total of \$29.6 million equivalent of Japanese yen. The remaining three instances, one in December and two in early January, involved purchases of German marks and totaled \$193.4 million equivalent. All intervention during the six-month interval was split evenly between the Federal Reserve and the Treasury.

Chart 2

**Selected Interest Rates**

Three-month maturities\*



\*Weekly averages of daily rates.



In other operations during the six-month period, Mexico fully repaid the remaining portion of its special combined credit facility. As noted in a previous report, Mexico prepaid on August 15 outstanding swaps of \$100.8 million to the Treasury and \$54.3 million to the Federal Reserve. Drawings of \$395.3 million and \$214.8 million were repaid to the Treasury and the Federal Reserve, respectively, upon maturity on August 23, and the facility then expired. This facility had originally consisted of \$600 million from the Treasury and \$325 million from the Federal Reserve. It was provided in cooperation with other central banks, which together with the United States extended credit to the Bank of Mexico totaling \$1.85 billion.

During 1982 and 1983, the Treasury participated, along with authorities from other nations, in providing liquidity support to the Bank for International Settlements for credit facilities the BIS provided to the Central Bank of Brazil and to the National Bank of Yugoslavia. This support took the form of the Treasury, through the Exchange Stabilization Fund (ESF), agreeing to be substituted for the BIS as a creditor in the event of delayed repayments. In November, both Brazil and Yugoslavia completed all repayments under these facilities, and all contingent Treasury commitments expired following these repayments to the BIS.

On December 23, the Treasury entered into a swap agreement of \$50 million with the Central Bank of Jamaica in support of Jamaica's negotiations on an economic adjustment program with the International Monetary Fund (IMF). On December 29, Jamaica drew \$10 million on this facility.

Also on December 29, the ESF sold \$345.5 million of Japanese yen and \$345.5 million equivalent of German marks to the Treasury general account for the purpose of financing a portion of the increase in the U.S. quota subscription to the IMF.

In the period from August through January, neither the Federal Reserve nor the Treasury general account realized any profits or losses from exchange transactions. As a result of the sale of currencies to fund the subscription payment to the IMF, the ESF recorded a transactions loss of \$204.8 million, reflecting the shift of a valuation loss, which was previously recorded in the published ESF balance sheet, into the category of transactions loss. As of January 31, cumulative unrealized valuation, or bookkeeping, losses on outstanding foreign currency balances were \$979.2 million for the Federal Reserve and \$673.0 million for the ESF. Both the realized ESF loss and the unrealized valuation losses reflected the fact that the dollar had strengthened since the foreign currency balances were acquired.

The Treasury and the Federal Reserve invest foreign currency balances acquired in the market as a result of

their foreign exchange operations in a variety of instruments that yield market-related rates of return and that have a high degree of quality and liquidity. Under the authority provided by the Monetary Control Act of 1980, the Federal Reserve has invested some of its foreign currency resources in securities issued by foreign governments. As of January 31, the Federal Reserve held the equivalent of \$1,545.2 million in these securities, while the Treasury's holdings were equivalent to \$1,978.3 million.

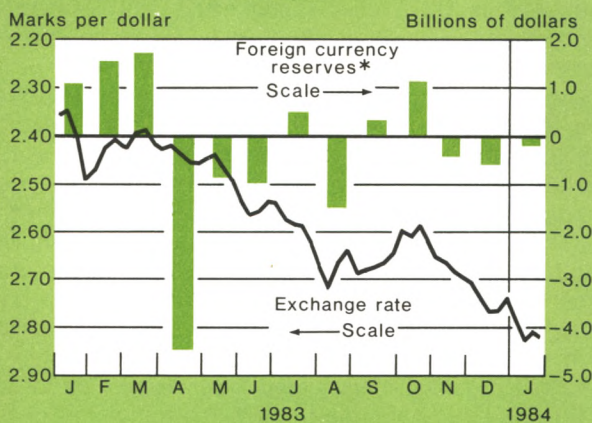
### German mark

Early in August, the German mark fell to a 9½-year low of DM 2.7440 against the dollar, then reversed course to recover about 6½ percent by early October. This turnaround coincided with a perceived improvement in German economic growth prospects, a firming of interest rates, and a subsiding of the large outflows of long-term private capital that had persisted since 1980. Although its recovery against the dollar proved to be temporary, in August the mark began a gradual and sustained rise

Chart 3

### Germany

Movements in exchange rate and official foreign currency reserves



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

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

against most Continental currencies, as Germany's low inflation rate and current account surplus continued to compare well with the performances of its main trading partners.

By mid-August, German business confidence was reviving as prospects for economic expansion improved. Increased construction, inventory, and investment spending had spurred economic activity, and later reports confirmed the strong GNP growth in the second quarter. The long decline in employment came to a halt, and export orders began to increase despite the revaluation of the mark within the EMS earlier in the year and weak growth in Europe and most developing countries.

As the economic outlook brightened, market participants speculated that, to avoid renewed mark depreciation and the consequent inflationary pressures, the Bundesbank might raise interest rates in response to increases that had recently taken place abroad. In addition, money supply growth remained above the Bundesbank's 4-7 percent target range. Under these circumstances, market interest rates in Germany moved back up over the summer. Then, effective September 9, the Bundesbank raised its Lombard rate by  $\frac{1}{2}$  percentage point to  $5\frac{1}{2}$  percent, citing the need to reduce central bank money growth, to strengthen confidence in the mark, and to limit domestic inflationary pressures. Following this move, money market rates did not rise further, interest rate differentials *vis-à-vis* dollar assets narrowed as U.S. rates eased back, and Germany's bond market joined the rally then taking place in bond markets abroad.

Against this background, portfolio capital shifted back into Germany, and the mark rose against the dollar to DM 2.5620 on October 7, its highest level during the period under review. The German currency also strengthened within the EMS, rising steadily from the bottom to the top of the band by early October. The Bundesbank intervened as part of coordinated operations with the United States in early August, and Germany's foreign exchange reserves declined \$1.1 billion by end-September to \$37.1 billion.

At that point the mark turned lower against the dollar, in a trend that continued through the remainder of the period under review. The mark began to decline as events in the United States challenged the view that the U.S. expansion was weakening substantially and that dollar interest rates would decline.

But, at the same time, negative sentiment began to reemerge toward the German economic and political situation. It became clear that the momentum the economy developed in the second quarter had not been maintained. Third-quarter industrial production stagnated, presaging the modest growth of GNP later published, and progress was slow in reducing unemploy-

ment. Demand for German exports did pick up, but rising imports kept the external sector from providing a net stimulus. The German current account in fact moved into a small deficit in the third quarter, and projections of the surplus for 1983 were revised downward.

Market participants concluded that, with the German recovery appearing to lose strength, the Bundesbank would not strongly resist a renewed decline in the mark by raising German interest rates, even if rates abroad were to increase. The government continued to emphasize its goal of reducing Germany's fiscal deficit, and the burden of economic stimulus was thought to rest on monetary policy. Central bank money growth was now decelerating toward its target range, and the earlier pickup in domestic prices had not continued. Market participants also noted that official spokesmen and business leaders pointed to the potential benefits of mark depreciation for stimulating exports.

Consequently, the decline of the mark against the dollar, which started early in October, continued through mid-January. International political tensions and domestic controversies also had an adverse effect on the mark during this period. At times, market participants sold marks in response to fears that the escalation of military conflicts in the Middle East and elsewhere might stimulate renewed "safe haven" flows into the United States. The mark also weakened against the pound and the yen but eased only slightly against other Continental currencies. By January 10, the mark had fallen to DM 2.8505 against the dollar, 11 percent below its October high, and had declined 10 percent against the Japanese yen over the same period.

As the mark fell, the Bundesbank intervened regularly at the daily fixing in Frankfurt. It also operated forcefully in the market on several days in an effort to contain rapid declines of the mark against the dollar. On three occasions during December and January, the U.S. authorities intervened to purchase marks when market conditions became disorderly, operating in each case for the U.S. Treasury and the Federal Reserve equally. In total, the Trading Desk purchased a total of \$193.4 million equivalent of marks.

The mark fluctuated widely against the dollar during the remainder of January, recovering somewhat to close the period at DM 2.8110. During January, both the dollar and yen had reached levels against the mark which some market participants doubted were sustainable, and data indicated some improvement in German economic performance as compared with the United States. Meanwhile, Germany's stock market strengthened, outperforming the U.S. market by a wide margin during January. Under these circumstances, market participants began to conjecture that international investors would increase the mark-denominated portion of their portfolios



Table 1

### Federal Reserve Reciprocal Currency Arrangements

In millions of dollars

Institution	Amount of facility January 31, 1983	Amount of facility January 31, 1984
Austrian National Bank .....	250	250
National Bank of Belgium .....	1,000	1,000
Bank of Canada .....	2,000	2,000
National Bank of Denmark .....	250	250
Bank of England .....	3,000	3,000
Bank of France .....	2,000	2,000
German Federal Bank .....	6,000	6,000
Bank of Italy .....	3,000	3,000
Bank of Japan .....	5,000	5,000
Bank of Mexico:		
Regular facility .....	700	700
Special facility .....	325	*
Netherlands Bank .....	500	500
Bank of Norway .....	250	250
Bank of Sweden .....	300	300
Swiss National Bank .....	4,000	4,000
Bank for International Settlements:		
Swiss francs-dollars .....	600	600
Other authorized European currency-dollars .....	1,250	1,250
<b>Total .....</b>	<b>30,425</b>	<b>30,100</b>

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

to restore a more traditional currency distribution. On several occasions in January, German officials publicly expressed the view that the dollar was becoming increasingly vulnerable to a decline.

During the six-month period, the mark declined 6 percent on balance against the dollar. It dropped 9½ percent against the Japanese yen and eased marginally against the Swiss franc. But the mark held on to its early gains within the EMS to close modestly higher against other member currencies. In effective terms, the mark appreciated about 1 percent over the six-month period under review. Germany's foreign exchange reserves posted little net change after September, closing the six-month period down on balance \$1.1 billion at \$37.1 billion.

#### Japanese yen

Over the month of August the yen declined about 2 percent against the dollar to a low of ¥247.50 in early September. The yen fell quite abruptly at first as the dollar climbed steeply against all currencies, but the decline moderated thereafter.

The yen's downward move through August in part reflected market concern that the Japanese economy had not yet emerged from a lengthy period of slow growth, leaving the outlook for higher profits and asset yields in Japan relatively limited. Many doubted that yen interest rates would be allowed to match any U.S. rate increases, since a rise in interest rates in Japan would dampen the still meager economic expansion. In this environment, Japan's long-term capital account deficit widened and in fact exceeded the current account surplus in August. The decline in the yen was resisted by Bank of Japan intervention during August, and the Japanese authorities joined with the United States in the coordinated intervention operation around the beginning of the month.

After the beginning of September the yen turned higher against the dollar, benefiting from evidence that the Japanese economy had begun to expand more vigorously. It was reported that GNP had grown at a 3.6 percent rate in the second quarter (later revised to 4.5 percent) and that industrial production and the index of leading indicators had risen strongly in August. Inflation remained very low, making it unlikely that the authorities would need to temper any acceleration of Japan's economy on these grounds. Japan's large current account surplus contributed to better market sentiment for the currency, despite the persistence of sizable long-term capital outflows. Against this background, the yen strengthened and quickly outpaced other currencies which had begun to rise against the dollar several weeks earlier. Over the five weeks through October 7 the yen appreciated more than 7 percent against the dollar to ¥230.10, and edged up against the European currencies as well.

During the remainder of the reporting period, the yen traded narrowly around the ¥234 level against the dollar, while it strengthened to record levels against most European currencies. Exchange market participants reassessed the outlook for the yen, especially against the mark and other Continental currencies, on the view that the yen had considerably greater scope to appreciate against those currencies than did the dollar, which had been in an uptrend since mid-1980.

The more robust performance of Japan's economy contrasted with the rather slow growth in Europe and was a major factor supporting the yen during this period. Japan's economy was seen as relatively innovative and dynamic, it had continued to expand—albeit slowly—during the recent worldwide recession, and profits were forecast to rise strongly. The Japanese inflation rate remained below even the best European price performance, and the country's higher savings and investment rates promised continued higher growth in the future.



Even though the economic outlook in Japan had improved during the autumn, expectations grew that there would be further government action to stimulate the economy. Such stimulus was expected to be aimed at raising imports to ameliorate the increasing worldwide trade frictions, especially prior to a visit to Japan by President Reagan scheduled for November. Then on October 21 the government announced a six-point program to boost economic activity, imports, and capital inflows. The package was accompanied, as expected, by a 1/2 percentage point cut in the discount rate to 5 percent. The Bank of Japan announced its readiness to counter any consequent downward pressure on the yen either by raising short-term interest rates or intervening in the exchanges. Although the stimulative impact of these actions was seen as relatively modest, they served to reinforce optimism about the durability of Japan's expansion.

Late in October the yen briefly moved lower against the dollar following a military flare-up in the Middle East, and the Bank of Japan came into the market to support the currency. The U.S. authorities joined with the Japanese central bank in intervention, purchasing a total of \$29.6 million equivalent of yen for the Federal

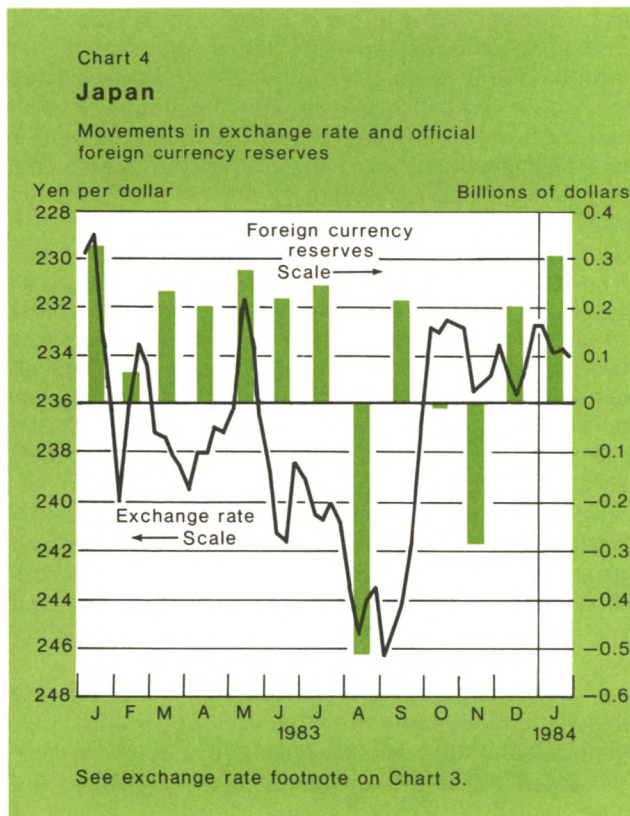
Reserve and Treasury accounts on October 31 and November 1.

During November and much of December the yen steadied against the strongly rising dollar and continued to set records against most European currencies. The yen remained firm even when Prime Minister Nakasone on November 28 dissolved the Diet and called for elections to be held three weeks later. Elections had been anticipated by the exchange markets, but few saw much chance of major changes in economic policy as a result. In the event, the governing Liberal Democratic party lost more seats than expected, threatening its parliamentary majority and triggering steep but temporary declines in the yen and the Tokyo stock and bond markets. Both the yen and Japanese stock and bond prices quickly rebounded when it became clear that Prime Minister Nakasone would be able to retain control of the Diet and to sustain the basic thrust of Japan's economic policies.

From mid-December into January, optimism about the Japanese economy gathered more momentum, reflected in both a rising yen and soaring stock prices in the Tokyo market. It was reported that Japan's third-quarter real GNP growth had climbed to 6.2 percent, industrial production had risen sharply in November, and projections of 20 percent increases in corporate profits for 1984 were published. Meanwhile, Japan's monthly trade surpluses remained at near-record levels and the consumer price index fell in December to just 1.8 percent above its year-earlier level. In this context, the yen climbed to a record ¥81.94 against the German mark on January 10, after which some profit taking on cross positions against the European currencies brought the yen back slightly from its highs.

At the same time, the yen remained nearly unchanged against the dollar throughout January despite the dollar's surge against the European currencies. At the close of the six-month period the yen, at ¥234.60, was 3 1/2 percent higher against the dollar and up 9 1/2 percent against the German mark. Over the same period, Japan's foreign exchange reserves remained virtually unchanged and stood at \$20.7 billion at end-January.

In early November, at the conclusion of President Reagan's November 9 visit to Tokyo, Treasury Secretary Regan and Finance Minister Takeshita issued a Joint Press Announcement which contained a number of measures designed to liberalize further Japan's capital markets, internationalize the yen, and allow the yen to more fully reflect its underlying strength. The announcement also reported that the Japanese Ministry of Finance and the U.S. Treasury Department would establish a joint ad hoc group of financial authorities on yen/dollar exchange rate issues. This group, co-chaired by Secretary Regan and Finance Minister Takeshita,





would monitor progress in implementing the measures and develop and implement additional steps toward the agreed objectives of liberalizing Japan's capital market and internationalizing the yen.

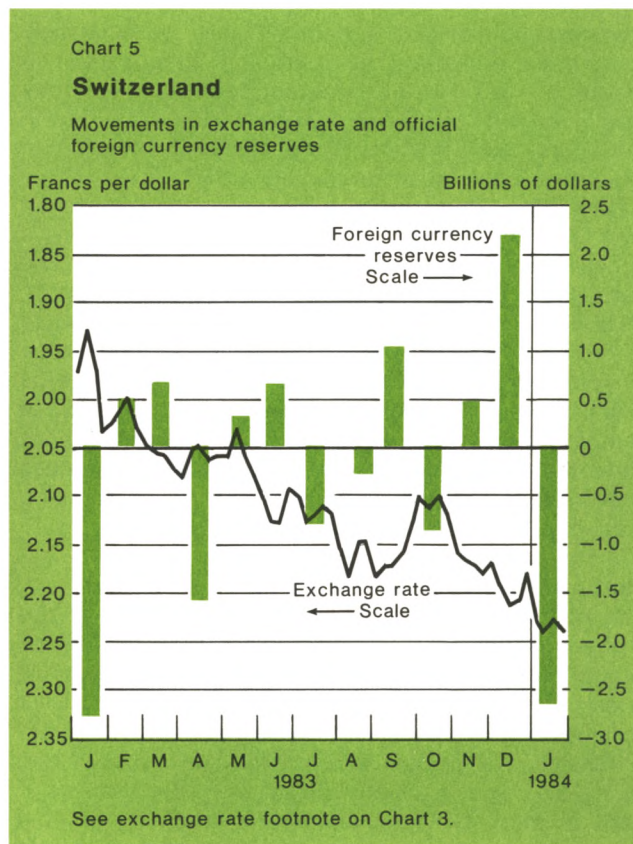
### Swiss franc

The Swiss franc was in a rising trend against the other European currencies as the period opened. In fact, by mid-August the franc had climbed about 7½ percent against the German mark since March to around SF 0.80. The franc benefited from a narrowing of the usual interest disadvantage of Swiss-franc assets, as Swiss interest rates rose on market expectations that the Swiss authorities would act to reverse the overshooting of the monetary growth target earlier in 1983. Other factors also lent some support to the franc. The inflation rate had declined further to the lowest level in 4½ years, unemployment remained low compared with that in most countries, and the current account surplus continued to run at an annual rate of about \$3.5 billion.

But even as the franc rose against the mark in early August, market participants began to question the franc's scope for further appreciation. Approach of the franc toward the franc-mark rate of SF 0.80 had in the late 1970s prompted action by the authorities to protect the competitiveness of Swiss industry within its main markets in Europe. Indeed, Swiss officials were beginning publicly to voice concern over the franc's appreciation relative to other European currencies. In early August, the Swiss National Bank announced that it had intervened in the foreign exchange market, acting in concert with several other central banks and purchasing German marks against both dollars and Swiss francs. Central bank officials also stated that they would not offset the resulting addition to liquidity in the Swiss banking system.

Also during August, market participants came to the view that Swiss monetary policy was being eased slightly, as Swiss interest rates declined along with those in the United States. In early September the Swiss National Bank did not join the German and Dutch authorities in raising official lending rates, and the gap between Swiss and German interest rates widened by about 1½ percentage points by early October to almost 2 percentage points at the three-month maturity. In these conditions, the Swiss franc lagged behind the German mark's sharp recovery against the dollar in August and then stabilized just above the SF 0.81 level against the mark for the next two months.

In early November the Swiss franc began to appreciate gradually against the German mark and other European currencies even as it fell against the dollar, gaining slightly on a trade-weighted basis. The franc benefited in part from Switzerland's political and eco-



nomics stability. An improvement in the Swiss economy, although modest, supported the franc through this period. Growth resumed in the third quarter of 1983 and was forecast to reach over 1 percent in 1984. Swiss inflation continued to subside, falling to a twelve-month rate of 1.4 percent in October, below the rate of Switzerland's main trading partners. At the same time, interest in Swiss-franc-denominated investments remained strong, allowing the continued large offerings by foreign borrowers in the Swiss market to be easily absorbed without placing noticeable pressure on franc interest rates or the exchange rate.

During the same period, Swiss fiscal and monetary policies appeared to market participants to be shifting more toward restriction. The Swiss government proposed a budget for 1984 aimed at further reducing Federal financing requirements to 0.6 percent of GNP, while the monetary authorities were seen as placing more emphasis on price stability than on tempering the franc's rise against the mark. Market participants took special note that the central bank did not intervene to cushion the franc's rise against the German mark as the cross rate again approached the SF 0.80 level in late



November. Senior central bank officials spoke publicly of the need to give priority to the fight against inflation and announced that the target for central bank money growth would be kept at 3 percent in 1984. This growth rate, if attained, would be 1/2 percentage point less than the growth actually achieved during 1983.

Thus, while dropping to a low against the dollar of SF 2.2655 on January 10, the Swiss franc reached its highest level against the German mark of SF 0.79. The franc ended January at SF 2.2455 against the dollar, down nearly 5 percent over the six-month period, while in terms of the German mark the Swiss currency rose 1 1/4 percent on balance to close at SF 0.7988. Switzerland's foreign exchange reserves were little changed from six months earlier at \$11.7 billion, with fluctuations within the period mainly reflecting foreign currency swap operations to adjust liquidity in the Swiss banking system.

### Sterling

Sterling was seldom the focus of attention in the exchanges and was virtually unchanged on balance through mid-September. Thereafter, it declined gradually to end the six-month period 8 percent lower against the dollar and down by modest amounts against most other currencies. The primary influence on the exchange rate during the August-January interval was developments in world oil markets. Expectations of lower British interest rates gave rise to some pressure on sterling in late September and early October, but this factor then became relatively unimportant.

As the dollar rose strongly through mid-August, sterling held up better than most currencies. British money market rates declined and widened the dollar's interest rate advantage. But inflation in the United Kingdom had

also dropped below 5 percent by early 1983, even as Britain's economy was in its third year of slow recovery. In addition, sterling was supported by firm world oil prices as the earlier glut in world oil supplies dissipated and was replaced by concern over supply shortages should the war between Iran and Iraq disrupt shipments from the Persian Gulf. The shift of view in the oil market improved prospects for Britain's current account and budget through higher government tax and royalty income from North Sea oil production. These factors continued to provide support for the currency through late September, and sterling generally remained close to \$1.50 against the dollar and 85 on the Bank of England's trade-weighted index.

But, in late September, new data showed some deceleration of monetary growth and market participants began to suspect that the government might lower interest rates to stimulate the economy and to lower the exchange rate. Substantial progress had already been made in regaining Britain's international competitiveness—the inflation rate had been cut in half in the last year, sterling had fallen almost 20 percent in effective terms from its peak in early 1981, and labor productivity had begun to improve. But most observers felt that production costs in the United Kingdom were still relatively high, especially for manufactured goods and especially in comparison with the Continent. Concern about competitiveness was underlined by release of data showing that output growth was sluggish, much of the growth of consumption was being met by imports, and exports remained depressed even though the economies of some of Britain's major trading partners on the Continent had begun to expand somewhat more vigorously.

On October 3 the Bank of England cut its money

Table 2

### Drawings and Repayments by the Bank of Mexico under Special Combined Credit Facility

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

	Outstanding January 1, 1983	1983 I	1983 II	1983 III	Outstanding January 31, 1984
Drawings on					
Federal Reserve special facility for \$325 million .....	257.3	+ 67.8	- 56.0	- 269.0	*
United States Treasury special facility for \$600 million .....	477.8	+ 122.3	- 104.0	- 496.0	*
Total .....	735.0	+ 190.0	- 160.0	- 765.0	*

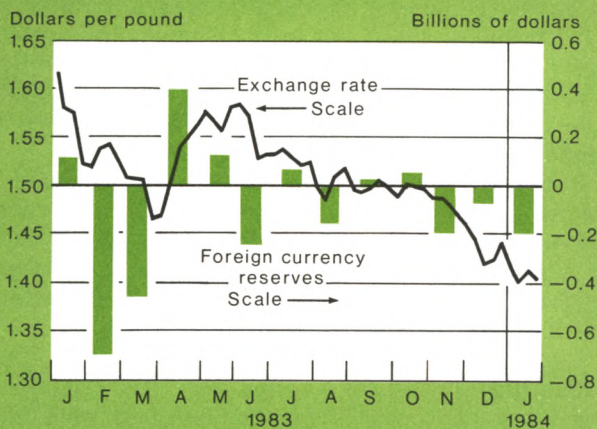
Data are on a value-date basis. Because of rounding, figures may not add to totals.

\*Facility, which became effective August 30, 1982, was fully repaid and expired on August 23, 1983.

Chart 6

### United Kingdom

Movements in exchange rate and official foreign currency reserves



See footnotes on Chart 3.

market intervention rate by 1/2 percentage point. Sterling fell sharply in response, quickly declining nearly 3 percent against the mark to about DM 3.85 and below \$1.48 against the dollar. The Bank of England exchange rate index fell to 82.4. Sterling then recovered somewhat and fluctuated narrowly during the balance of October.

Oil market developments, which had been a consistent support to sterling through late summer, had a mixed influence on the currency between October and January. Sterling benefited when the conflicts in Lebanon and the Persian Gulf flared up, raising the specter of restricted oil supplies and higher prices. But, at other times, evidence of ample supplies and an easing of spot oil prices in the Rotterdam market undermined sterling. In late December, one element of uncertainty was eliminated when the British National Oil Company announced that it would hold prices at current levels through the first quarter of 1984.

Monthly United Kingdom trade data had some influence on exchange rates from time to time, but without any significant effect on balance. Though the figures were erratic, the current account remained in surplus and appeared to improve somewhat at the year-end.

From mid-December to end-January, sterling declined slightly in effective terms and traded steadily against the German mark but fluctuated widely against the dollar. Against the dollar sterling closed the six-month interval down 8 percent at \$1.4035. On balance, sterling declined 2 percent against the German mark and about

4 1/4 percent on the Bank of England effective index. Over the six-month period, Britain's foreign exchange reserves declined almost \$500 million to \$8.5 billion.

### French franc

As the period opened, market participants were awaiting evidence that the French government's austerity program, announced after the EMS realignment in March, had begun to reduce inflation and to narrow the current account deficit. The program sought a 2 percent reduction of domestic demand through contractionary fiscal policy and more restrictive monetary growth targets and was expected to reduce economic growth nearly to zero for 1983. While it was clear at mid-summer that the economy had slowed, there was little apparent progress toward the program's main goals of cutting inflation substantially and achieving balance in the current account. Without evidence of such progress, traders questioned the sustainability of the franc's position near the top of the EMS, and some expected exchange rate pressure to emerge as soon as early fall. Benefiting from reflows after the March realignment as well as an ECU 4 billion loan from the European Community, France's foreign currency reserves stood at \$18.5 billion at the beginning of the period.

In early August the franc remained firm at the top of the EMS but declined sharply against the strongly rising dollar. The franc reached a record low of FF 8.2450 versus the dollar on August 11, and during that period the Bank of France intervened to support the franc as the dollar rose across the board. Thereafter the franc, along with other EMS currencies, turned higher against the dollar in a trend that continued through early October, and the franc held firm at the top of the EMS through early autumn. One reason for this strength was that the restrictive fiscal policy had by then slowed the growth of income and thereby reduced imports. Also, on the monetary side, M-2 growth had slowed to its reduced 1983 target of 9 percent, helping keep interest rates firm and bolster the franc. But, while franc interest rates held steady, Germany raised its Lombard rate in September, narrowing interest rate differentials favorable to the franc. Moreover, the French inflation rate had not yet begun to decline, and a large inflation differential persisted between France and Germany. Thus, even though the franc remained near the top of the EMS, there was at times considerable selling pressure on the franc against the mark, which by early October had risen to join the franc near the top of the EMS.

From late October through December, more evidence accumulated that progress was being made toward some of the main goals of the austerity program. The French external accounts improved strikingly. The first monthly trade surplus since 1979 was registered in



September, followed by news of a current account surplus for the third quarter as a whole (later revised to a small deficit). Shortly thereafter, the government partially relaxed the strict foreign exchange controls imposed earlier in the year and announced plans to reduce substantially its foreign borrowing.

Also, the government reaffirmed its commitment to a policy of reducing inflation through 1984. The government budget for 1984 limited the increase in spending to 6.3 percent in nominal terms, or about zero growth after adjustment for inflation. Also, the authorities called for average wage increases of no more than 6 percent in 1984. The growth target for M-2 was lowered to 5.5-6.5 percent, compared with a 9 percent target for 1983. The reaffirmation of the government's commitment to curb inflation, together with the continued improvement of France's trade performance, tended to reinforce confidence in the franc. Consequently, there was little exchange market reaction to labor unrest in December and January, which underscored the difficulties in achieving the government's stabilization program.

In this environment the franc traded firmly at the top

of the narrow EMS band through the end of January. Franc interest rates remained relatively high, attracting non-resident demand for franc investments. The franc closed the period at FF 3.0591 against the German mark, slightly above its midpoint. The franc, along with its partner currencies, fell back to a record low of FF 8.7020 against the dollar in mid-January, but subsequently recovered somewhat to end the period 7<sup>1</sup>/<sub>2</sub> percent lower at FF 8.5990. France's foreign currency reserves fell about \$700 million over the six-month period and stood at \$17.7 billion at end-January.

Throughout the period, French entities continued to borrow abroad, although the government did not arrange any new large-scale foreign credits. In January, Finance Minister Delors stated that France's external debt had reached \$53 billion at the end of 1983, compared with \$44 billion at the end of 1982.

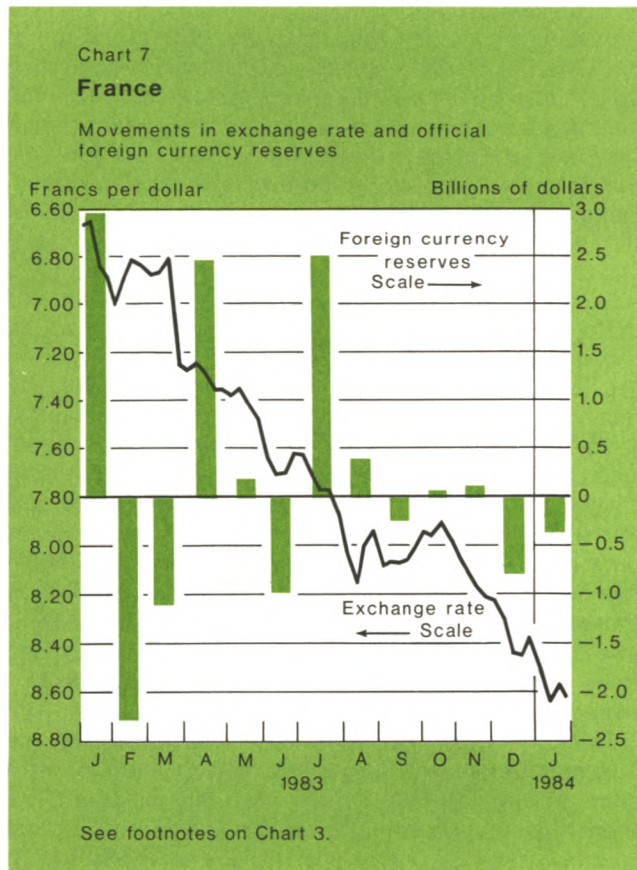
### Italian lira

The lira traded in the upper portion of its wide EMS band from the beginning of August to mid-October, although several brief flurries of pressure during this period brought the lira somewhat lower in the EMS.

Supported by high Italian interest rates, the lira had remained well above the top of the narrow EMS band since the March realignment. Money market interest rates of 17 percent and higher reflected the Bank of Italy's continuing efforts to narrow the gap between inflation rates in Italy and elsewhere in Europe. By August, some progress on inflation was becoming evident as a result of the restrictive monetary policy, the decline in economic activity, and the January modification of the *scala mobile* (wage indexation system). As the reporting period opened, the lira was also drawing support from a narrowing of Italy's trade deficit as declining domestic demand depressed imports.

During August and September, however, there were several episodes of pressure on the lira within the EMS, in part reflecting market participants' concern that the apparent improvements in Italy's trade and price performance might prove temporary or insufficient to match the progress in other European economies. In particular, deceleration in inflation was seen as threatened by the Italian government's continued difficulty in containing the fiscal deficit. In fact, many industrialists argued that the lira's devaluations within the EMS in recent years had not fully compensated for Italy's higher inflation rate and that Italy's prospects for expanding exports might therefore be limited even if economic growth in other European economies picked up sharply.

Against the dollar, the lira, along with other EMS currencies, fell sharply in early August, and the Bank of Italy intervened with modest dollar sales. Subsequently, the lira lagged somewhat behind the other EMS





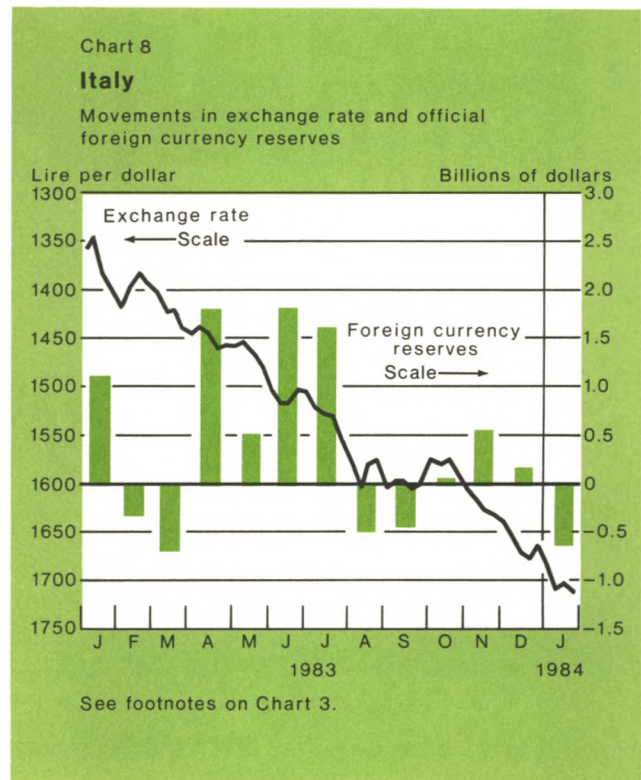
currencies when they turned higher against the dollar in a rise that lasted through mid-October. During those weeks, several brief spates of speculation and the usual tapering-off of summer tourist inflows brought the lira slightly lower within the EMS. The Bank of Italy intervened on several of these occasions to resist the lira's decline. By mid-October the lira's margin above the narrow EMS band had eased back about 1 percent and the lira was little changed on balance against the generally lower dollar. Against the German mark the lira had declined about 3 percent.

After mid-October, pressure on the lira subsided and the currency held its position comfortably above the narrow band through the end of the period under review. The Italian authorities took advantage of the lira's stability during this period to relax foreign exchange controls partially. In addition, the Bank of Italy was able to build up foreign exchange reserves, although there are typically reserve outflows in late fall. By the end of December, foreign currency reserves had risen \$854 million from end-September to \$18.5 billion. The relatively strong position of the lira reflected continued firm interest rates and some signs of improvement in inflation, economic growth, and the domestic policy situation.

The Bank of Italy maintained a restrictive policy stance through the fall and winter, while the government budget deficit continued to grow and the unemployment rate continued to establish postwar records. On October 23, Bank of Italy Governor Ciampi warned that "without effective curbs on pay and public borrowing there could be no relaxation of the highly restrictive monetary policy" and called for a comprehensive incomes policy to bring inflation down to the government's 1984 target of 10 percent. Italy's high money market rates declined somewhat during this period but by considerably less than did the inflation rate.

The progress on inflation that became evident over the fall and winter was the most significant for Italy in years. Consumer price increases fell from a year-on-year rate of 16.3 percent in the second quarter to 13.3 percent by October and hit 12.5 percent by January. Wholesale price increases fell below 10 percent in August for the first time in five years and then stayed below that level through the remainder of the period.

More broadly, signs emerged that the economy had begun to grow again in the third quarter, and in fact it turned out that real GDP had risen at a 3.6 percent rate. The external accounts continued to improve, leaving the 1983 trade deficit about a third smaller than that of 1982. In November the trade account actually registered a surplus, the first since October 1979. The current account for the first eight months of 1983 also turned around—to a surplus of Lit 1.0 trillion as compared with the Lit 5.4 trillion deficit in the same period a year ear-



lier. At the same time, Prime Minister Craxi's government achieved modest success in getting action on its budget initiatives. The new coalition government which took power in August had proposed a strict austerity budget aimed at reducing the huge fiscal deficit and further reducing inflation and, in fact, obtained Parliamentary approval for the general outlines of its program by end-December—only the third Italian budget of the postwar period to be passed on schedule.

While progress was made on several fronts, it remained clear that Italy needed significant additional progress before its economic performance would be in line with those of its neighbors. Economic growth had revived, but unemployment in Italy continued to rise. And, while Italy's inflation decelerated over the period, by January consumer price inflation was still 10 percentage points above that in Germany and 4½ percentage points above that in France. In wholesale prices, however, the gap narrowed to 7 percentage points versus Germany, and for France the gap reversed sign; French wholesale price inflation exceeded that in Italy by 6 percentage points in the year to December.

While holding steady against the EMS currencies, the lira continued to fall to record lows against the dollar, reaching Lit 1,722.75 on January 12. It then recovered

Table 3

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

In millions of dollars

Period	Federal Reserve	United States Treasury	
		Exchange Stabilization Fund	General account
First quarter 1983 .....	-0-	+0.5	+38.3
Second quarter 1983 .....	-0-	+17.0	+58.1
Third quarter 1983 .....	-0-	-0-	+70.1
Fourth quarter 1983 .....	-0-	-204.8	-0-
January 1984 .....	-0-	-0-	-0-
Valuation profits and losses on outstanding assets and liabilities as of January 31, 1984 ...	-979.2	-673.0	-0-

Data are on a value-date basis.

somewhat to close the period at Lit 1,713, down almost 9 percent on balance against the dollar.

### European Monetary System

At the beginning of August the currencies within the EMS were trading in a pattern that had changed little since the last realignment on March 21, 1983. The Irish pound and French franc were at or near the top of the narrow band, and the Italian lira remained more than 3 percent above the top, within the wider bands allowed for that currency. The German mark remained at the band's lower limit and had been joined there by the Belgian franc, while the Netherlands guilder and the Danish krone had moved to the middle of the joint float.

In mid-August, as the dollar fell from its peaks, the German mark began to rise steadily within the EMS. The Netherlands guilder and Danish krone also moved higher, leaving the Belgian franc more isolated at its EMS floor. By early October the currencies of Germany, France, the Netherlands, Denmark, and Ireland were all clustered near the top of the narrow EMS band in a configuration that was generally maintained throughout the rest of the period. The Belgian franc required only modest support to keep it within its lower limit. Against the dollar, the EMS currencies declined 6 to 9 percent on balance over the August-January period despite sizable net intervention sales of dollars by the member central banks. At the close of the period, the EMS bilateral limits adopted in March 1983 had lasted longer

than any other since those agreed upon in November 1979.

The stability in the EMS exchange rate relationships reflected growing convergence of economic performances among member countries at a time when the dollar was consistently strong against all EMS currencies and thus not straining the cross rates. The convergence, most apparent in trade and price developments, was in part a consequence of the austerity programs instituted by several member countries during 1982 and the spring of 1983. The March realignment also contributed to a narrowing of bilateral trade gaps between member countries.

The trade balance improvement was most dramatic in the case of France, but a combination of weak domestic demand and gains in competitiveness also narrowed the deficits or generated surpluses on the current accounts of Belgium, Denmark, Ireland, and Italy. In Germany and the Netherlands—the countries whose currencies were revalued the most in the last realignment—the external surpluses were little changed. There was a similar, although less pronounced, convergence of inflation rates as higher inflation countries experienced some moderation in price increases while others saw their inflation rates stabilize at low levels.

Success in trimming fiscal deficits was less visible during the period, as increased debt service costs and rising unemployment kept most countries' fiscal gaps from narrowing significantly despite serious budget-cutting efforts. Domestic opposition to tough austerity measures in several countries led to some questioning of the governments' ability to carry through their policies and temporarily brought individual currencies under pressure. In fact, the Danish government fell during the period, following debate over fiscal restraint which had been reflected briefly in pressure on the krone.

Monetary policies remained generally restrictive, with changes in official interest rates corresponding closely to the respective currencies' positions within the EMS. Central bank lending rates were raised in Germany and the Netherlands early in the period when the mark and the guilder were in the bottom half of the band. The Belgian franc was at or very near the floor of the joint float throughout the six months, and in late November the National Bank of Belgium increased its interest rates by 1 percentage point to counter some speculative pressure on the exchange rate. By contrast, official interest rates were cut in Ireland and Denmark at times when the currencies of those countries were trading at or near the ceiling of the narrow band.

### Canadian dollar

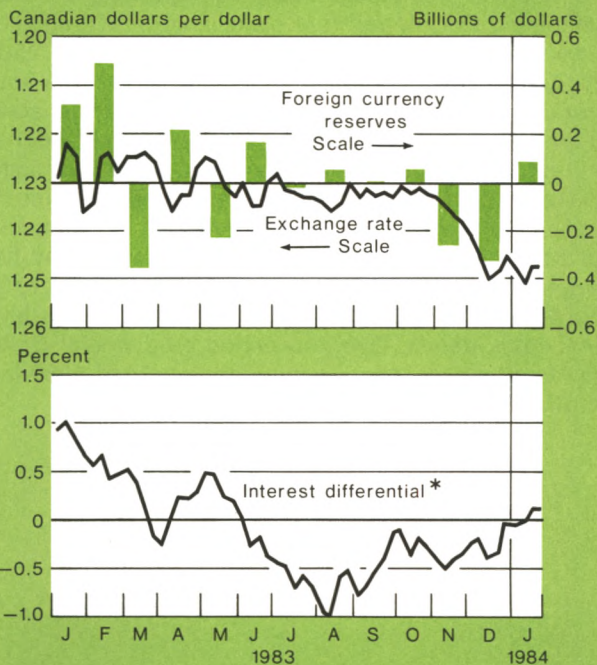
As August opened, the Canadian dollar was trading narrowly around Can.\$1.23 (\$0.8130) against the U.S.



Chart 9

**Canada**

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



\*Canadian finance paper minus Eurodollars. Weekly averages of daily rates. See exchange rate footnote on Chart 3.

dollar, while both rose strongly against most other currencies. The Canadian currency had held steady since early summer even though interest rate differentials, which normally favor Canadian assets, had shifted in favor of the U.S. dollar by as much as a full percentage point.

The Canadian currency was buoyed by the remarkable improvement in Canada's economic performance. The country's severe 1981-82 recession had given way to an exceptionally strong rebound, spurred by vigorous domestic demand and by growth in the United States. While Canadian imports picked up in response to the boom at home, strong demand from the United States helped push Canada's trade surplus to near-record levels, keeping the current account in a surplus, unusual for Canada, through the first half of 1983. Canadian inflation, which had remained stubbornly high, plunged from double-digit levels in late 1982 to 5.5 percent in July, its best level in ten years.

Canadian fiscal policy had provided stimulus for the recovery, while a successful program for public-sector wage and price restraint had reinforced the effects of recession in bringing about the marked slowing in inflation. At the same time, monetary policy remained oriented toward a return over time to price stability. The Bank of Canada had earlier ceased to specify targets for domestic monetary aggregates in the implementation of monetary policy. Instead, it was monitoring a variety of economic and financial variables, including the exchange rate. The exchange rate was cited as a major influence on domestic prices, of particular importance at a time when the authorities were moving to consolidate the hard-won progress on inflation.

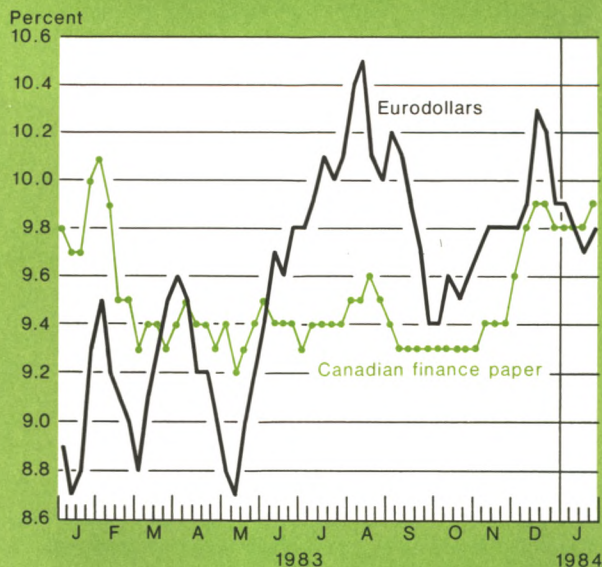
After the middle of August, U.S. interest rates turned lower, and by early October the interest differentials adverse to Canadian investments were nearly eliminated. Nevertheless, the Canadian dollar did not strengthen against the U.S. dollar along with the other foreign currencies during this period, in part because a rise in imports, spurred by robust domestic demand, was eroding the current account surplus.

After U.S. interest rates had begun to rise in October, market participants became concerned that Canadian interest rates would not match the rise. Despite the

Chart 10

**Interest Rates in Canada and the Eurodollar Market**

Three-month maturities\*



\*Weekly averages of daily rates.



rapid growth of Canadian industrial production, output had still not regained its pre-recession levels and the unemployment rate remained above 11 percent. In this context and in view of the dramatic progress on inflation, market participants expected the Canadian authorities to limit interest rate increases. Canadian interest rates rose only slightly during November, and the negative interest rate gap widened once again.

The Canadian dollar thus began to decline early in November. The rate movement prompted some increase in trading in the currency, both in the interbank market and on Chicago's IMM, from the low turnover that had prevailed during its long period of stability. The Canadian currency continued to drop in December even after Canadian money market rates moved significantly higher for the first time in over a year. With U.S. rates also rising, differentials remained unfavorable to Canadian assets. In addition, the announcement that the current account had moved into deficit for the third quarter contributed to negative sentiment. The Bank of Canada

entered the market at times to counter the pressure against the Canadian dollar, and Canadian foreign exchange reserves fell \$570 million during November and December, mainly reflecting this intervention.

The Canadian dollar recovered in late December as U.S. interest rates turned lower, first narrowing and then eliminating the interest rate disadvantage of Canadian assets. After dropping to a low of Can.\$1.2532 (\$0.7980) in early January when the U.S. dollar rose strongly against all foreign currencies, the Canadian currency resumed its rise over the rest of the month as interest differentials began to favor Canadian dollar investments. In addition, the currency benefited from the publication of November trade statistics, showing that the trend of declining monthly surpluses since May had begun to reverse. The currency ended January at Can.\$1.2482 (\$0.8012), down 1½ percent from its level six months earlier. Over the period as a whole, Canadian foreign exchange reserves had declined \$350 million to \$2.8 billion.

### NEW PUBLICATION

A table—*Depository Institutions and Their Regulators*—is now available from the Federal Reserve Bank of New York. The grid-like form shows the responsibilities that national and state regulators have in ten areas—from branching to consumer protection—for a variety of depository institutions. The table contains footnotes summarizing laws and rulings affecting the activities of regulators and depository institutions. It is intended to provide easy reference for bankers and advanced students of banking.

Single copies of the 11<sup>1</sup>/<sub>2</sub>" x 22<sup>1</sup>/<sub>2</sub>" foldout table can be obtained free. Quantities for classroom use are also available free when ordered from a university address. Write to the Public Information Department, 33 Liberty Street, New York, N.Y. 10045.

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