Federal Reserve Bank of New York

Quarterly Review

The Quarterly Review is published by the Research and Statistics Function of the Federal Reserve Bank of New York. Remarks of ANTHONY M. SOLOMON, who retired as President of the Bank on January 1, 1985, on some problems and prospects for monetary policy in 1985 begin on page 1. Among the members of the staff who contributed to this issue are ALLEN J. PROCTOR (on tax cuts and the fiscal management of New York State, page 7); LEONARD SAHLING and M. A. AKHTAR (on what's behind the capital spending boom, page 19); HOWARD ESAKI and JUDY A. WACHTENHEIM (explaining the recent level of single-family housing starts, page 31); and AARON S. GURWITZ and JULIE N. RAPPAPORT (on the structural change and slower growth in the financial services sector, page 39).

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Some Problems and Prospects for Monetary Policy in 1985

I am delighted to have this opportunity to talk about the unfolding economic situation and how it might affect monetary policy. I want to give some indication of where I think we can be going next year, but I also want to point out some of the possible pitfalls for monetary policy. I then plan to offer some thoughts on the broader issue of how monetary policy should be structured. As you probably know, my official role in monetary policy will come to an end on January 1. But I can assure you that my interest in these issues will remain intense.

The economy has given convincing signs of slowing substantially after an unexpectedly strong first half. This slowing was badly needed. Continued expansion at the earlier pace would have begun to re-ignite inflationary tensions within a matter of months. More recently, the question has become whether the slowing has gone too far. Indeed, some have been questioning whether a new recession might be brewing.

My own sense of it is that the signs of outright weakness are likely to prove temporary. As we all know, the exact timing of consumer spending is very hard to predict. In 1984, for reasons that are hard to pinpoint, consumer spending tended to bunch heavily in the first half of the year. This was then offset by a lull in subsequent months. The result of this uneven performance was apparently some overbuilding of inventories. The more recent signs of softness in production represent efforts to correct this situation.

But the classic preconditions for recession just do not seem to be present. The inventory problems have been no more than minor and scattered. Consumer confidence and financial positions have remained basically strong. There are no signs of major or pervasive capacity constraints—in good part reflecting our heavy reliance on imports in this economic expansion. On the financial side, credit has continued to expand rapidly and has remained readily available. There has been nothing remotely resembling a credit crunch. The effects of the moderate run-up in interest rates earlier in 1984 seem to have been confined to some softening in housing. Now, rates have come down substantially, more than reversing the earlier advances.

Looking just at the business cycle picture in the conventional way, the prospects look good for a resumption of the expansion. To be sure, we may still see some effects from the inventory blip created by the uneven pattern of consumer spending. But in the absence of major capacity strains, and in view of the fact that overall demand appears to have slowed to a sustainable rate, 1985 could turn out to be a very satisfactory year. Real expansion could average close to or somewhat above our long-run capacity to grow. We could see some gentle further declines in the unemployment rate. The inflation story could also be very good with, at most, only a very modest acceleration from this year's low rate. Assuming no further distortions in the money measures from deregulation, such an evolution ought to be readily accommodated by something like the tentative 1985 growth ranges announced last July.

But as we all know, there are a lot of things in the

situation that have to raise questions about the applicability of conventional business cycle analysis to the prospects for 1985. Let me tick off a few of them. One is our still-high level of real interest rates. After the fact, it is easy to think of reasons why we have been able to have a strong expansion even with these levels of rates—the fiscal deficit, changes in business depreciation rules, and financial deregulation are perhaps the most obvious. But even after allowing for these factors, there remains an unexplained element in this situation. For this reason, the continued existence of relatively high rates is bound to make us less confident of any economic forecast. We simply cannot be sure that high real rates will not become more of a barrier to expansion than they have been so far.

A second difference compared with earlier postwar expansions is the persistence of some degree of financial fragility both domestically and internationally. This fragility is the residue of the late inflation, the recession and the related performance of interest rates. As the expansion has proceeded, and as vigorous efforts have been made to deal with the international debt problem, financial health has been returning. But problems do remain. They underscore the importance of sustaining the U.S. economic expansion as a condition for restoring financial health. By the same token, they could also inhibit us in using as much monetary restraint in the event that inflationary pressures returned.

A third obvious difference from the past is our record trade deficit and the extraordinary strength of the dollar—of which more in a moment.

Given the various special features of our situation, it looks even more dangerous than usual to be dogmatic about the appropriate course for policy in 1985.

A fourth unusual factor is the relative sluggishness of the economic recovery in much of the rest of the industrialized world. A related feature of this situation is the prolonged and very high levels of unemployment in many of these countries. The social implications of this situation—especially as applied to the young people—are already serious. They become progressively more serious as the problem continues. Frankly, at this point, I do not see too much basis for near-term optimism on this front. The importance of a continued, sustainable expansion in the U.S. economy is obvious in this context.

A fifth unusual factor is what might be called the "fragility of inflationary expectations". The recent infla-

tionary experience of the American people has been very uneven. First we had very high rates of inflation for several years in the late 1970s and early 1980s. Recently, inflation has been much lower and I am pleased to see that inflationary expectations also seem to have come down. But given this major transition, many people probably have a very hard time figuring out what should be regarded as "normal" as far as inflation is concerned. I would therefore guess that views about the prospects for inflation are likely to continue for some time to be unusually volatile.

If my comments on these various matters seem to add up to a plea for the exercise of a large measure of judgment, let me say at once that I plead "guilty"—guilty with an explanation, but not with an apology!

A final unusual factor is of course our fiscal situation. It is unusual in terms of the large cyclical stimulus it continues to provide us well into a business expansion. It is also unusual in terms of its structural implications for interest rates, inflationary expectations, our balance of payments, and the dollar.

Now I do not mean to imply that all these unusual features of our situation are necessarily going to be sources of trouble or that all the risks are on the downside. For example, the international debt situation has clearly been improving rather than deteriorating recently. And a general consciousness of financial fragility does have some virtues! It encourages a desire to improve balance sheets, to shun extreme risks and, in general, to avoid the kind of unrestrained and ultimately self-destructive optimism that has always been a feature of inflationary booms. Moreover, on the fiscal problem, with the election over, we can hope that serious negotiations to deal with our fiscal imbalance will bear fruit. And of course while the strong dollar is hurting our export industries it is holding down prices.

For monetary policy, the real point about these special features of our situation is that they raise doubts that the course of policy can be as smooth next year as it looks at first blush. Given the various special features of our situation, it looks even more dangerous than usual to be dogmatic about the appropriate course for policy in 1985. Even absent these special factors, we would have the normal problems in anticipating the strength of the economy and therefore the appropriate stance of policy. But that is at least a problem made familiar by long experience in dealing with the postwar business cycle. It is the *special* features of our situation that create the potential for unfamiliar problems.

Suppose, for example, the economy expands signif-

icantly more rapidly than capacity and price pressures re-emerge. Normally, in the context of steady money growth rates, such a development would put some upward pressure on interest rates. This would be an appropriate and constructive result in such a context. But under present conditions, the response of the economy could be very hard to judge. For example, if the resulting rise in rates led to another jump in the dollar, depressing our trade balance further, the restraint on the economy could be unusually large. In that case, even a mild rise in rates could prove a powerful offset to inflationary pressures. On the other hand, if, as some believe, only quite large jumps in interest rates have any significant effects on our deregulated economy, we would have to consider how much restraint could be tolerated in a world with significant remaining financial fragility. So either way, new factors have created new uncertainties about how policy should respond to any resurgence in inflationary pressures.

Another policy issue that could arise from the special conditions of our present situation is how to factor in movements in the dollar. I myself have long believed that our domestic monetary policy should take greater account of the performance of the dollar. Certainly there have been instances—November 1978 and October 1979 are examples—when the dollar has been an important factor in domestic monetary policy. But the performance of the dollar has generally been only a background consideration in routine month-to-month decision-making. Now, however, given the extent of the dollar's rise and given its apparent over-valuation in purchasing power and trade terms, further advances in the dollar next year might provide a valid reason for some shading towards an easier position.

Conversely, while a gradual and moderate decline in the dollar would be welcome, a sharp drop could raise other problems for domestic monetary policy. Such a sharp drop would, even without any change in monetary policy, tend to put upward pressure on our interest rates. And I could imagine circumstances where international considerations could contribute to a tightening of monetary policy.

Now just how we should respond to any of these contingencies for the dollar would of course depend on the context of domestic developments. But I suspect that the foreign exchange markets will, and should, come to play a more prominent role in our thinking about domestic monetary policy than has been true in the past.

A third policy issue created by our special circumstances could arise from significant action to reduce the deficit. Action on this front, substantial enough to convince the markets, would of course put downward pressure on interest rates. This would be true even in the context of unchanged money growth. But the case can also be made that in the short run at least, the economic restraint exerted by actions to reduce the deficit should be actively offset by speeding up money growth. Again, this is one of these decisions that would have to be made in light of all the developments in the economy at the time.

Overall, I think it's clear there are many issues monetary policy may have to face in 1985 that could go beyond the routine. So it would be even more foolish than usual to try to tie policy rigidly to specific money growth targets set in advance. And this would be the case even if no new problems turn up with the money measures themselves. In fact, such problems have been pervasive throughout my tenure on the Open Market Committee. We of course have multiple money targets— three to be precise—and an associated total credit measure. Moreover, these multiple targets are defined in terms of ranges rather than points. The existence of multiple targets and the use of ranges, plus our ability to reset the ranges if appropriate, provides us with considerable flexibility within the targeting approach. I think this flexibility may be needed again in 1985 as it has in the past.

Fundamentally, the basic need is for the central bank to show that it can and will take the actions needed to control inflation.

If my comments on these various matters seem to add up to a plea for the exercise of a large measure of judgment, let me say at once that I plead "guilty"—guilty with an explanation, but not with an apology!

I think I understand and appreciate the arguments of those who favor some form of explicit rules to govern central bank performance. Basically, their argument is that rules are needed to protect central banks from pressures to focus on short-run problems at the expense of a long-run commitment to price stability. Monetary rules provide, it is argued, protection against an inflationary bias inherent in the political process. Moreover they can, on this view, provide a form of accountability for the central bank.

These arguments for some form of rule have appealed to some observers as long as central banking has been a subject for public discussion. The reason for the enduring appeal of this position is that the arguments clearly have some elements of validity. The case for some form of monetary rules—and against discretion and judgment—is one of those perennial philosophies that tends to re-emerge, though in changing form, from generation to generation. As a student of Henry Simon in my early days at the University of Chicago I can

personally attest to the durability of this position.

Nevertheless, a position that would rule out major elements of judgment in making monetary policy is not one that I find congenial. First, there is the problem of finding a rule that works. The most popular proposal in recent years has been to fix on some growth rate for some definition of money. But as almost everybody is now willing to concede, all of the various money measures have given us major problems in recent years. The reasons are too well known to need repetition here. Basically they involve the effects of financial innovation and deregulation. These forces have at times produced major and unpredictable aberrations in velocity. Perhaps the worst of these aberrations are behind us and we are returning to more "normal" behavior. But no one can be sure about this. In any case, the new version of "normal" is not likely to be the same as the "normal" of earlier postwar years. At this point, we just can't be sure what "normal" really is.

Leaving aside the problem of finding a rule that would "work", my own feeling is that monetary rules are really not the requirement for success in achieving reasonable price stability. The reason is that in the end, it is results that really count. Monetary targets provide necessary long-run discipline when applied with a measure of flexibility to deal with changes in velocity. But fundamentally, the basic need is for the central bank to show that it can and will take the actions needed to control inflation. If it does this, whatever the precise approach, it will acquire the credibility it needs to do the job of controlling inflation at reasonable cost.

I do think it is clearly true that financial markets, notably including the exchange market, are far more sensitive to the inflation implications of policy than they were in the past.

In my view, the Federal Reserve has in fact acquired credibility in recent years. This is not because of the performance of the money measures it targets. It is because inflation has in fact fallen sharply and because the public has become convinced of the Federal Reserve's determination to conduct an anti-inflationary policy. The key has been results, not monetary targets, let alone monetary rules.

And that is true not just in the United States. Other countries with relatively good inflation records, such as Germany, Switzerland, and Japan, pay attention to money growth and, in the case of Germany and Switzerland, set targets. But my evaluation would be that it is not monetary targets that have produced a successful record on inflation in these countries. Instead, it is the

well-earned confidence that the central bank will act overall as needed to do the job, even if it does not pursue monetary targets closely in each and every year. The success of these countries in limiting inflation has generally been reinforced by fiscal policies compatible with anti-inflationary objectives.

Now one objection to actual performance as the test of a successful anti-inflationary monetary policy might be that the price effects of policy show up only with a lag. If so, a satisfactory current price performance may not warn you of troubles lying ahead from a too expansionary policy. So, especially if the lags are long, the ill effects of such a monetary policy might become apparent only when it was too late.

I agree this could be a problem. But my feeling is that the lags have shortened a lot in recent years. The truth seems to be that the inflationary experience of the '70s and early '80s has greatly sensitized the financial markets and the public at large to any signs that monetary policy may be loosening its grip on inflation. Indeed, one school of academic economists apparently now takes it as a working assumption that all markets can more or less immediately foresee the price implications of excessive monetary growth. If this were true, an inflationary monetary policy would have immediately visible effects on actual inflation. And in this case, in turn, the inflation results of policy could be continuously monitored.

To be sure, such an extreme claim seems unjustified. But I do think it is clearly true that financial markets, notably including the exchange market, are far more sensitive to the inflation implications of policy than they were in the past. And perhaps commodity and even labor markets respond more rapidly to policy. So I suspect the problem that lags could represent for judging policy by its results is much reduced in today's world. Hence I come back to the working proposition that monetary policy can be and will be most meaningfully judged by its results rather than by adherence to some particular formula.

I think I should add that the "rules versus judgment" debate has a somewhat academic ring looked at from the point of view of working central bankers. Within the Federal Reserve, the practical issue that has really gotten attention is the degree of reliance on mechanistic as against judgmental responses to changing developments. In particular, the post-October 1979 approach allowed for a relatively mechanical response of interest rates to short-term movements in money growth— although even in this period there were clearly major elements of discretion in the process. More recently, purely mechanistic responses have been essentially eliminated.

In practical terms, what kind of monetary policy approach is going to bring about a sustained period of

rough price stability? We have to recognize that as much as we have accomplished in recent years, the problem is not yet solved. Inflation is still at levels that would have been unacceptable in earlier years. And our progress to date is partly hostage to a foreign exchange rate that will probably sooner or later move down. Further, the progress we have made continues to co-exist with levels of unemployment, both here and abroad, that are just too high to be acceptable over the longer run.

Our goal should be a peak cyclical rate of inflation in each business cycle expansion that is lower than the one we had in the previous expansion.

If we follow the usual cyclical script, moreover, price inflation will not improve further in this economic expansion. Instead, it could worsen somewhat—although the actual outcome obviously depends importantly both on the dollar and on some crucial commodity markets, notably the oil market. This suggests to me that a strategy for really defeating inflation will have to look beyond the current business cycle expansion. At the same time, I also believe there is a good chance that carried through one more full cycle, such a strategy can come close to the desired objective. Our goal should be a peak cyclical rate of inflation in each business cycle expansion that is lower than the one we had in the previous expansion. Under normal circumstances—that is, assuming no major further shocks from financial innovation and deregulation—such a strategy should imply a similar downward ratchet in the peak rates of money growth. It is this downward ratchet in money growth from one cyclical expansion to the next that should be our principal objective so far as money is concerned.

Gradual year-by-year slowing in money growth rates certainly remains a generally desirable objective. Indeed, the ideal of gradual, year-by-year reduction in monetary growth has continued to be a factor in the minds of most FOMC members in setting the annual targets. But the actual results, for all the Ms, have in fact differed substantially from this pattern. The need to take account of the various effects of deregulation on the Ms is one reason for the difference. The sharp and essentially unpredictable drop in all velocity measures in 1982 and the continuing weakness of M1 velocity over much of 1983 is another. This experience—plus my belief that we have to look at ending inflation over a multi-cycle horizon—is what leads me to a cycle-by-cycle reduction in monetary growth rates as the more critical test.

Obviously labor market issues are not part of monetary policy. But to me, the other side of a successful long-run anti-inflation strategy would have to do with the functioning of our labor markets. The level of unemployment rates consistent with nonaccelerating inflation has been too high in recent years given the social costs. If I were to name the single most important issue in domestic macro-economic policy, I would say it is the need to lower the average unemployment rate consistent with price stability. This is too large a subject to go into here. Some reasons for moderate optimism may be changing demographics and a prospective improvement in our productivity performance relative to the dismal record of the 1970s. Admittedly, however, such an improvement has not yet shown through in the figures.

What about the *tactics* of monetary policy? Personally I am reasonably satisfied with the approach the Federal Reserve has taken since about late 1982. At that point we set aside the approach adopted in October 1979. That approach, as I noted earlier, allowed interest rates to respond semi-automatically to deviations of money growth—especially M1—from target paths. The problem with that approach was that M1 was giving out unreasonable signals. For a brief period we tried to adapt the same general approach to an emphasis on M2. But since about the beginning of 1983 we have had what I would call a "tripartite" approach. This approach allows us to continue to take account, in a judgmental way, of the performance of money growth as before, but also of the economy itself and, indirectly, of the behavior of short-term interest rates.

I should add that you can often learn things from looking at the economy, money, and interest rates *together* that you could not learn from looking at each of them separately.

Each of these three elements has a legitimate role to play in decision-making. The relevance of looking directly at the performance of the economy is obvious. The broad, longer-term trend in money growth is a component of our anti-inflation strategy along the lines I have already described. And interest rates themselves clearly warrant explicit consideration for the manifold effects they have on the functioning of markets and the economy. Indeed, the intrinsic importance of interest rates becomes greater in circumstances where sharp exchange rate movements and financial fragility in credit markets are a factor.

I should add that you can often learn things from looking at the economy, money, and interest rates

together that you could not learn from looking at each of them separately. For example, if money growth is slowing down, does that mean policy is tightening? Does it mean that the economy is weakening? Or just that money demand has shifted? Looking at what interest rates are doing can help solve this puzzle and help indicate the proper course of action. For example, the sharp slowdown in M1 growth that worried some monetarists in the last half of 1983 looked considerably less significant when the continuing strength of the economy along with reasonably stable interest rates was taken into account.

On a day-to-day operational basis, our focus since early 1983 has been on bank reserve "availability", measured in terms of member bank borrowing and/or net free or net borrowed reserves (excess reserves less borrowings). Now there is a loose and shifting, but nonetheless real relationship between borrowings and the level of the Federal funds rate and other short rates for any given discount rate. So when a particular level of borrowings is sought, we have some rough range for the Federal funds rate in mind as the expected result. Of course it is possible that changes in banks' willingness to borrow at the window—due to changing levels of financial market anxiety, for example—could push the funds rate out of line with the rough range we had expected. In such a case, we could, of course, always adjust the level of borrowings we seek accordingly. Whether we would actually make such an adjustment would depend on the surrounding economic and market circumstances. It would be a judgment call.

Moreover, all recent Directives to the Open Market Desk here in New York have made the desired level of reserve availability conditional on unfolding events. In general, these Directives allow for the possibility of increasing or decreasing the levels of borrowings or net free reserves during the inter-meeting period. Such possible adjustments may, but need not necessarily result from substantial deviations of money behavior from the expected performance as stated in the Directive. What I want to emphasize again is that such adjustments are discretionary, not automatic. The Directive language has always made it clear that any

decision to change reserve availability would be made in the context of unfolding developments in the economy and the financial markets—with the precise emphasis varying from Directive to Directive.

Now what does all this mean for interest rates? Clearly it means we have moved a substantial distance from the post-October 1979 procedures where an automatic mechanism could set in motion large and often volatile rate movements. On the other hand, we have definitely not returned to the pre-October 1979 situation where the Federal Reserve sought, usually successfully, to control the funds rate week to week with a rather high degree of precision.

Within limits, the present approach gives significant room for market forces alone to generate movements in the funds rate. I realize that this fact at times creates uncertainty about Federal Reserve intentions for those who try to read those intentions from the funds rate itself. But I think there is a lot to be said for a procedure that gives scope to market forces. Market pressures can themselves be a source of valuable information to the policymakers. Moreover, rigid interest rate targeting seems to have a built-in weakness in making policymakers too slow to act when action is needed. This was the lesson that brought about the changes of October 1979.

Now I know none of this tells you what is going to happen to interest rates next week or, for that matter, next year. But I am sure none of you really expect that from me. What I have been trying to say is that my years on the FOMC have convinced me that there is no simple formula for making monetary policy even in the easiest of times. And these last four and a half years have certainly not been the easiest of times! Nineteen eighty-five may be a relatively smooth year to negotiate. But for the reasons I have spelled out, there are plenty of grounds of suspecting it may not be. Never, I think, has the kind of generally pragmatic approach to policymaking I favor been more clearly called for than at present. Certainly I will miss not being with my colleagues in the Federal Reserve as they work on these problems next year. But I wish them the best of luck in an endeavor that is so important to all of us.

Tax Cuts and the Fiscal Management of New York State

Presently, debate over tax policy in New York State is beginning to go beyond the recurrent issue of whether and how much to cut tax rates when budget surpluses appear. Right now, cash surpluses are expected on average over the next several years, assuming stable expenditures, strong economic growth, and unchanged financial management. Recent experience, however, suggests that a tax reduction is not likely to be sustainable through a future recession if New York continues the fiscal management practices of the last several years. In particular, the question arises how tax reduction can be balanced with a policy to safeguard the fiscal health of the state. This article attempts to explore this question and offer some possible solutions.

State and local governments throughout the nation were unprepared for the back-to-back recessions of 1980-82. In order to recoup unexpected shortfalls, taxes were raised by over $18 billion and expenditures were frozen or reduced in many states and localities. The overall economic effect of these fiscal policies was probably to worsen the 1982 recession. Moreover, these policy reversals disrupted private and public sector planning—only a few years earlier, expanding state and local budget surpluses had encouraged widespread tax cuts and expenditure increases.[1]

In New York State, the ability to maintain both tax reductions and strong expenditure increases also ended abruptly when growth in the state economy fell sharply and unexpectedly in late 1982. The resulting fiscal

stress lasted until reductions in the government work force and increases in several taxes restored cash balance by 1984.

Now the state is anticipating a cash surplus this year that is variously estimated at from one to three percent of budgeted expenditures. Tax cuts are possible once more, but the concern arises that they may again be reversed if an economic downturn should occur in the next several years. Alternative responses to the emerging surplus are short-term debt reduction or replenishment of reserve funds. The choice among responses will be difficult because each holds a strong claim on whatever surpluses become available.
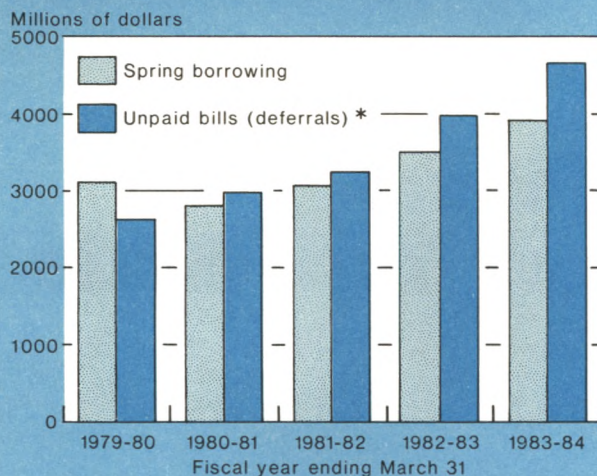
In the case of taxes, New York is perceived to have relatively high rates of taxation which adversely affect the cost of living and doing business in the state. New York has one of the highest nominal rates of taxation on personal income, although more numerous exclusions, deductions, and credits bring effective rates more in line with other states. In addition, it has several business taxes whose rates are out of line with rates in other states but which are relatively minor sources of revenue for New York.[2]

In 1978, a tax cut program was initiated to help arrest New York's below-average economic performance of the 1970s, and some observers credit that program with the state's above-average performance since then. Believing that cutting tax rates further may encourage business

[1]Peter Skaperdas, "State and Local Governments: An Assessment of their Financial Position and Fiscal Policies", this *Quarterly Review,* Winter 1983-84, pages 1-13.

[2]The New York Council on Fiscal and Economic Priorities has most recently studied New York's relatively high tax burden in their report entitled *Changes in New York State Taxes to Spur Economic Development,* November 16, 1984.

Chart 1 caption:

Spring Borrowing and Unpaid Bills

* Complete figures on earlier deferrals are not available.

Sources: State of New York, Annual Report of the Comptroller, Annual Budget Message, and Official Statement (various issues).

pation notes (TRANs) to pay those bills left from the previous year (Chart 1). In the following March, it stops paying bills until it has set aside enough revenue to repay the borrowing, and the cycle repeats itself a few weeks later.[5] The annual short-term borrowing is familiarly referred to as the "spring borrowing".

In April 1984, the spring borrowing was $4.3 billion, equivalent to almost one-fourth of tax receipts the previous year. Next April the spring borrowing is expected to rise to $4.5 billion—despite an anticipated cash surplus—because still more bills are planned for delayed payment. As a single borrowing, this TRAN issuance is surpassed in size only by the borrowings of the Federal government.

The size and persistence of the spring borrowing imposes several costs on the state. The interest cost in SFY1984-85 is $245 million, or one percent of projected tax receipts. Moreover, the size of the debt, about equal to the combined short-term borrowing of the next nine largest state borrowers, has contributed importantly to New York's relatively low credit standing. This low rating costs New York an estimated 30 basis points in interest costs on its long-term debt.[6] Reducing this debt is the second major option to consider.

Furthermore, New York has inadequate reserve funds to provide for the routine errors of budget estimates. Budgeting is an error-prone activity in which revenue estimates were too high in some years as much as they were too low in other years. In the latter, revenue estimates in the closing months of the fiscal year, when final cash management decisions must be made, have been one to three percent lower than first estimated

in New York and contribute to statewide growth into the future, many groups have offered proposals for further tax reductions.[3]

Nevertheless, the use of any cash surplus must be evaluated in light of New York's overall fiscal position and practice. While New York ended the fiscal year April 1, 1983 to March 31, 1984 (SFY1983-84) with a surplus on a cash basis—it took in $51 million more than it paid out—it had a deficit on the modified accrual basis of generally accepted accounting principles (GAAP). Under GAAP, last year New York accrued over $300 million more in liabilities than it accrued in assets. In simplistic terms the difference between the cash surplus and the GAAP deficit is the value of bills which the state had received but had not yet paid by the end of the fiscal year on March 31.[4]

Once each April, in the opening weeks of the fiscal year, the state issues enough tax and revenue antici-

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[3] Among these groups are the Business Council of New York State, the New York City Partnership, the New York State Department of Commerce, the Finance Committee of the State Senate, and the Council on Fiscal and Economic Priorities.

[4] New York began formulating its budget according to GAAP definitions in the fiscal year ending March 31, 1983. Because GAAP methodology is still evolving, some differences between the cash-

Footnote 4, continued

and accrual-basis balances may be due to the incomplete identification of all accrued assets or liabilities. Other differences may be due to the arrival of bills after the fiscal year has ended. Since virtually all tax receipts are recorded in the General Fund under GAAP, cash or GAAP balances used in this study are for the General Fund as defined under GAAP. For an excellent discussion of the fund structure of GAAP accounting and the many public sources of information on the New York State budget, see Cynthia Green, "The State Budget: Record Spending, Fiscal Imbalance", Citizens Budget Commission *Quarterly*, Spring 1984.

[5] Most of the TRANs issued each April are due the following March. For example, $3.0 billion out of $4.3 billion of TRANs issued in April 1984 mature on March 29, 1985. By mid-March the Comptroller must postpone regular bill-paying and begin impoundment of all state revenues until enough funds are accumulated to repay the notes. Because of the postponement of bill-paying every March, the state can redeem the TRANs and close its books on March 31 with cash balance and no outstanding short-term debt. However, increasing amounts of TRANs are issued within two weeks and the proceeds are used primarily to pay the prior year's leftover bills. In spite of the two week gap, this practice has every appearance of rolling over past debt and borrowing more to finance new GAAP shortfalls.

[6] Office of the State Comptroller, "A Multi-Step Plan to Reduce the Spring Borrowing and the State's Accumulated Deficit", December 29, 1983.

when the budget was approved.[7] To minimize disruptions from such unanticipated revenue shortfalls, over twenty states set aside unexpected revenues in good years for use in years when revenues fall short. New York currently has only $51 million in reserves, less than 0.2 percent of projected revenues for this fiscal year and less than half the smallest estimation error in the past eight years.[8]

In addition to tax cuts and the two other uses of the cash surplus, the Governor's desire to balance next

[7]Initial budget estimates are reported in the State of New York *Official Statement,* April 11, 1984, and the closing estimates are reported in the State of New York *Annual Budget Message* (various years).

[8]Several states prefer to have larger funds that help them to weather not just routine forecast errors but also times when the economy turns sour. Six have funds equal to about 5 percent of expenditures. For New York's $28 billion of SFY1983-84 spending, this would require reserves about fourteen times larger than the $100 million the state plans to have in reserve by next April. A more precise method for calculating the uncertainty of revenue estimates is discussed in Robert Litterman and Thomas Supel, "Using Vector Autoregressions to Measure the Uncertainty in Minnesota's Revenue Forecasts", Federal Reserve Bank of Minneapolis *Quarterly Review* Spring 1983, pages 10-22. The reserve funds used by other states are discussed in Steven Gold, "Preparing for the Next Recession: Rainy Day Funds and Other Tools for States", National Conference of State Legislatures, Legislative Finance Paper No. 41, December 30, 1983.

Chart 2

Tax Cuts and Spring Borrowing*

Millions of dollars

Legend: Revenue foregone due to tax cuts

April 1984

Spring borrowing

Fiscal year ending March 31

(x-axis: 1977-78, 1978-79, 1979-80, 1980-81, 1981-82, 1982-83, 1983-84)

*The spring borrowing is related to the prior fiscal year's accelerations or deferrals of payments. Foregone revenues are cumulative, beginning with 1977-78.

Source: Federal Reserve Bank of New York Staff estimates based on data from the New York State Comptroller, Senate, and Assembly.

year's budget on a GAAP basis will also require more cash. To maintain GAAP balance, payment of the planned increases in school aid will have to be accelerated so that current year cash will pay for it instead of the following year's spring borrowing. Similarly, more cash will have to be available to pay tax refunds before March 31. And these additional cash requirements come on top of the cash pressures from the salary increases that will be awarded in collective bargaining with state personnel next spring.

In evaluating state fiscal management, the analysis starts from the perspective that tax cuts and reductions in the overall tax burden can benefit the economic development of New York and that the economic development impact of any tax program is affected by three criteria. First, taxpayers place less value on tax reductions in the future. To be most effective, a tax program should have some emphasis on tax cuts in the early years of the program. Second, taxpayers are also cautious and dislike uncertainty. A program that is highly dependent on uncertain events—such as future economic growth, expanding budget surpluses, or fiscal reform—will probably have a small effect on economic development. Third, raising taxes and cutting expenditures during a recession is undesirable.

This study seeks to assess the impact of fiscal management on these three criteria by analyzing both New York's past practices and then alternative fiscal plans. It finds that financial practices contributed to the past reversal of state fiscal policy and imposed several costs on the state. By simulating another tax cut over a possible future recession, the study finds that the costs may be reduced, policy reversals avoided, and greater overall tax reduction achieved if fiscal management techniques are applied properly in the future.

In particular, a balanced, controlled program of near-term debt reduction, tax cuts, and reserve accumulation may improve the chances of maintaining prudent tax reduction and expenditure growth through an economic downturn at some point in the next five years. The analysis begins with a diagnosis of how New York's tax cuts came to be partly reversed.

Past practices

For years, financial managers in New York State have maintained steady cash balance, despite wide swings in the state's true financial condition. In the five years preceding SFY1982-83, the General Fund, which had billions of dollars of spending, had a cash balance that varied by only $5 million (table). In contrast, short-term borrowing varied by almost $1.2 billion, or from over 36 percent of tax revenues to less than 23 percent. Since modified accrual balances were first published in 1981, the General Fund has had a GAAP deficit of at least
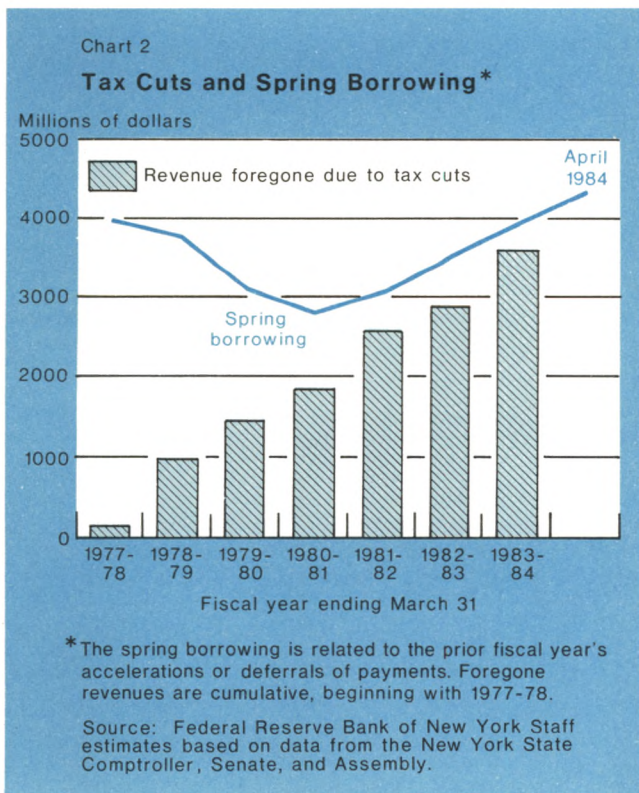
$250 million yet on a cash basis it has been in surplus for all but one year.

In addition, this cash balancing encompassed only part of total state spending. Before SFY1982-83, the state budget process and reporting covered transactions only of the General Fund, which includes less than two-thirds of total state spending. The effects on the state's financial health of the remaining third of spending, therefore, received little public scrutiny. In the last several years, however, legislation has required that all government spending be included in the budget. This more comprehensive measure of expenditures is now available for prior years as well (table).[9]

New York fiscal practice is closely related to the unusual overlap of the state fiscal year and the fiscal year of school districts and localities. The state fiscal year begins on April 1 and ends the following March.

[9]A lucid review of the shortcomings of state financial reporting and practice is contained in the Comptroller's Message in the 1978 *Annual Report of the Comptroller.* The legislation which mandated changes in reporting practices is explained in the State of New York *Official Statement,* April 11, 1984.

School districts and most localities receiving state aid begin their fiscal year three months later on July 1. This discrepancy means, for example, that state payments to localities in April, May, and June of 1984 occurred in state fiscal year 1984-85 but in local fiscal year 1983-84. In practice, the state can authorize SFY1983-84 local aid expenditures that do not require cash until SFY1984-85. Most importantly, this delayed funding enables the state to finance prior fiscal year expenditures with current fiscal year short-term borrowing every April (Chart 1).

The opportunity for fiscal management in New York is provided by the ease of adjustment provided by all these factors. New York has used principally four techniques to adjust recorded cash receipts and disbursements and thereby maintain cash balance. The techniques and how they affect cash balance are as follows:

- Deferring aid payments to school districts and localities until the following fiscal year;

- Deferring personal income tax refund payments until

The Fiscal Condition of New York State
In millions of dollars

Fiscal Year April 1 to March 31	Disbursements* All Govern-mental Funds	Tax receipts	Cash basis General Fund balance†	Budget GAAP General Fund balance†	Tax cut programs New cut	Tax cut programs Total reduction	TRANs Issued in April	TRANs Other
1977-78	17,846	10,491	4	‡	−184	−184	3,930	0
1978-79	19,404	11,005	5	‡	−791	−994	3,790	0
1979-80	20,412	12,320	0	‡	−346	−1,408	3,100	0
1980-81	22,307	13,485	0	−257	−307	−1,829	2,800	0
1981-82	24,778	15,129	3	−339	−545	−2,562	3,050	0
1982-83	26,460	15,976	−62	−1,076	−268	−2,882	3,500	500
1983-84	28,361	18,688	51	−345	−412§	−3,595§	3,900	0

Disbursements and tax receipts are reported on a cash basis for All Governmental Funds. As defined by GAAP, this includes the General, Special Revenue, Debt Service, and Capital Projects fund types. The cash- and accrual-basis General Fund balances follow the GAAP definition of General Fund for fiscal years beginning on or after April 1, 1980, and the former definition for earlier fiscal years. A comparison of the two definitions is presented in the February 1983 *Message of the Governor.* Calculation of the cumulative annual effect of tax reductions uses each incremental tax cut as an additional reduction in the tax base. The following year's tax revenues are calculated from the new tax base, the implicit income elasticities for each year, and the growth in New York State personal income. The Tax and Revenue Anticipation Notes (TRANs) issued in April are referred to as the spring borrowing and they mature before March 31. The other TRANs were issued in January 1983 and they matured in the following fiscal year.

*Disbursements not funded by taxes and General Fund receipts are financed mostly by Federal grants. They are also funded by proceeds from general obligation bonds and notes and by fees charged by state educational and medical facilities.

†Surplus is positive; deficit is negative.

‡Not available.

§Excludes about $800 million in tax increases.

Sources: Federal Reserve Bank of New York staff estimates based on State of New York, *Official Statement,* April 11, 1984; NYS *Annual Report of the Comptroller* (various issues); NYS *Comptroller's Annual Report to the Legislature on State Funds Cash Basis of Accounting* (1984); NYS *Annual Budget Message* (various issues); and other information provided by the State of New York Senate Finance Committee, State of New York Assembly Ways and Means Committee, and State of New York Division of the Budget.

the following fiscal year;

- Depositing and withdrawing funds from the Personal Income Tax Refund Reserve; and

- Depositing, borrowing, and repaying funds to the Tax Stabilization Reserve Fund.

Local aid deferrals, which account for about 65 percent of adjustments to the cash budget, reduce recorded disbursements and thus cash deficits. Deferring tax refunds or withdrawing refund reserves, by way of contrast, increases recorded tax receipts, thereby lowering the recorded cash deficit for a given year. In addition, any cash deficits that have not been eliminated by these three techniques can be financed by the Tax Stabilization Reserve Fund at the end of the fiscal year. For the three years beginning with SFY1980-81, the state also supplemented its cash receipts with some one-time transfers from off-budget funds. By these means, state budget managers have substantial leeway to adjust the cash surplus or deficit at the end of the fiscal year.[10]

Deferrals are actively managed as a part of the budget process and their effect on the cash budget is predictable in advance. In that sense, the practice of deferring or accelerating payments goes beyond routine cash management and must be analyzed as an active instrument of fiscal policy.[11]

[10]In this study, local aid deferrals are measured as GAAP liabilities to localities (Annual Report of the Comptroller). Tax refund deferrals are measured as personal income tax refunds paid after April 1 for the tax year ending the previous December (State of New York Official Statement). Tax Refund Reserve usage is reported in the Annual Budget Message; Stabilization Fund usage is reported in the Annual Report of the Comptroller; and one-time transfers are reported in the State of New York Official Statement, February 22, 1984.

[11]The impossibility of knowing whether a delayed payment was due to late arrival of a bill or due to a policy decision to defer payment can lead to disagreement over the proper measure of deferrals. GAAP can distinguish between what was eventually paid and what was actually paid prior to April 1. And refinements of GAAP procedures have made these estimates of accrued liabilities more comprehensive over the past several years. GAAP figures exaggerate the true extent of policy decisions to defer payments because not all deferrals are controllable. Under GAAP, some deferred liabilities such as Medicaid, pensions, and vouchers payable grow irrespective of policy actions. Similarly, the amount of accrued tax refund liabilities is partly due to policy decisions to postpone refund payments and partly due to how many taxpayers file their returns after the end of the fiscal year on March 31.

The size of the spring borrowing is an alternate proxy for the extent of cash adjustment in New York. The amount of TRANs issued each spring is closely related to the amount of local aid and tax refund payments left over from the previous fiscal year (Chart 1). Efficient management of state cash flows will always include some issuance of TRANs since taxes are not necessarily received at the same time that the state's bills are due. However, as they are used in New York, TRANs are a means for financing fundamental budget imbalances.

Chart 3

New York State Personal Income Growth*

Percent per year
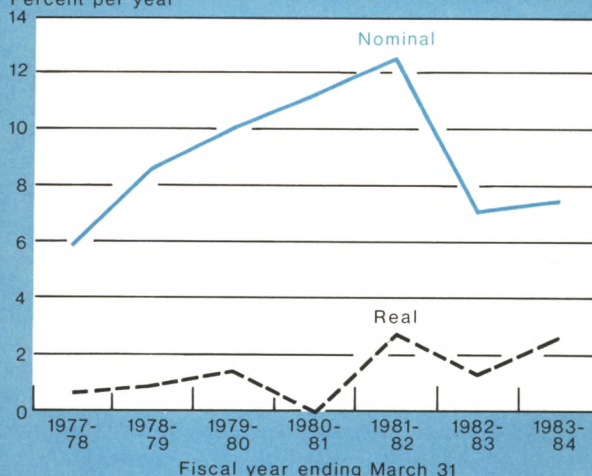
*Fiscal year nominal personal income growth is deflated by the growth in the Consumer Price Index for the calendar year ending in that fiscal year.

Source: United States Department of Commerce, Bureau of Economic Analysis and United States Department of Labor, Bureau of Labor Statistics.

Cash budgeting and the 1978-84 tax cut program

In SFY1977-78, New York initiated a series of cuts in personal, business, sales, and estate taxes. The first year's cuts reduced tax revenues by $180 million or about two percent (table). Annual cuts of $250 million or more continued for the next six years. By the end of the program, tax revenues were almost $4 billion or about 17 percent less than they otherwise would have been. The revenues foregone in the last year of the program would have been enough to eliminate the GAAP deficit, to cancel most of the spring borrowing, or to finance a reserve fund large enough to have prevented the need for state tax increases and spending reductions in SFY1983-84. In seeking instead the economic development benefits from slower growth in tax revenues, the state did not equally slow the growth of spending. Resolution of the fiscal conflict this created was delayed by the fiscal management of New York's cash budget.

In the first two years of the tax program, growth in the state economy and surpluses from prior years were still sufficient to finance both current spending and tax cuts as well as to accelerate enough payments to reduce spring borrowing needs by almost $900 million (Charts 2 and 3). The recovery of the state economy

provided an opportunity to catch up on the backlog of bills this represented, increasing the future availability of deferrals and short-term borrowing in financially more difficult years.

More rapid nominal growth of the state economy in SFY1979-80 and SFY1980-81 (Chart 3) enabled tax receipts to rise even as the value of the tax cut program was reaching $1.5 billion. In addition, spending growth and debt reduction were continued over both years—spending grew by about fifteen percent and short-term borrowing fell by one-fourth. Nevertheless, the emergence of a conflict between tax and spending policies was reflected by fiscal adjustments to create a more positive cash position. Income in each year was raised by about $400 million by virtually emptying the Personal Income Tax Refund Reserve, slowing tax refund payments, and transferring cash from off-budget funds into the General Fund. The cash position was further enhanced through a freeze on revenue sharing with local governments and through late payment of over $2.5 billion of school aid and personal income tax refunds.

In SFY1981-82 and SFY1982-83, the use of fiscal management techniques increased substantially. Policy decisions reduced or cancelled current payment of tax refunds, continued to seek one-time revenue sources, and deferred payment of substantial amounts of bills.

By permitting the state to maintain cash balance, these actions made it possible to budget accelerating expenditures at the same time the state's GAAP deficit was expanding. Press coverage of the fiscal debates at the time reveals these widely differing assessments of the state's fiscal health.[12] Without consensus on the state's fiscal position, there was little basis for agreement on the need for compromise between tax and spending priorities. The outlook was further complicated by the fact that, while the nation was reentering a recession in 1982, the above-average growth of the state economy was sustaining strong revenue growth; some hoped continued growth would pull the state through to fiscal health.

Midway through SFY1982-83, however, these ambiguities evaporated. The recession had entered the service industries for the first time, seriously affecting the New York economy. Moreover, a sharp slowdown in inflation cut deeply into the growth of the tax base (Chart 3).

There was a dramatic slowdown in growth of net tax receipts to less than six percent in SFY1982-83 from an annual average of about eleven percent over the previous three years. Nevertheless, state spending growth exceeded this by almost $1 billion.

[12]For examples see articles and/or editorials in *The New York Times* on January 20, April 14, May 7, June 6, and November 11, 1982.

New York had already tapped all the techniques available to allow it to certify that the proposed budget was balanced. No current tax refunds were planned, and all refund payments were deferred into the next year. Use of one-time revenue sources peaked at over $500 million. Continued delayed payment of local aid was pushing the spring borrowing back to its April 1977 peak. This was not enough and the state issued an extraordinary TRAN of $500 million in January 1983 that was carried into the next fiscal year. The total increase in debt and fiscal adjustments necessary to finance the expenditure program replaced almost one-half of the SFY1982-83 revenues foregone through the tax cut program.

As the budget was being formulated for SFY1983-84, the revenue shortfall remained severe and the state economy weak. There were virtually no further fiscal adjustments to utilize and the special borrowing of the previous year had to be repaid. In this setting, consensus was reached that tax and expenditure policies were out of line. As a result, consumption taxes, selective business taxes, and various fees were increased by an estimated $800 million and work force reductions saved another $200 million.

The reversal of over 20 percent of the progress in reducing the state tax burden could have been avoided in the middle of a recession if tax and spending policies had been kept in line when the economy was expanding. One obvious way to have facilitated this would have been agreement on some measure of the fiscal condition of the state. Alternatively, there could have been agreement that increased spring borrowing or any of the fiscal adjustment techniques could not be used when the economy was expanding. Or that tax cuts or expenditure increases were contingent on a zero GAAP balance or a steady or falling spring borrowing.

If this had been done, one could have seen at least two signals by 1981 that some restraint of tax cuts or expenditure growth was necessary. The first was that, in closing the books in March 1980, the state spent virtually all that remained in its two reserve funds combined. The second was that the March 1981 balancing effort forced up deferrals of tax refunds and local aid at a faster rate than the economy was growing.[13]

Costs of past practices

As Chart 2 shows, since 1978, New York State has indeed benefited from a substantially reduced tax

[13]The key to recognizing these signals is to combine the effect on the budget of all four adjustment techniques. In any given year, some techniques are used more than others. Focusing on any single technique over this period would not have revealed a picture of rapidly and continuously expanding use of fiscal management techniques.

burden, even given the reversals of SFY1983-84. Moreover, deferrals are an indirect way to borrow interest-free. And TRANs are a much less expensive way to fund a deficit than are long-term bonds. But the fiscal management practices—deferrals, reserve fund withdrawals, and increased short-term borrowing—have also had undesirable effects on the state, including:

- An increased fiscal adjustment burden on localities faced with volatile and unpredictable aid flows;

- High direct debt-servicing costs and deteriorated credit standing because of budgetary reliance on continual and expanding access to short-term, tax-exempt credit markets;

- An unpredictable long-term tax environment in which businesses and individuals may find it difficult to plan for the future composition or size of their tax liabilities; and

- A procyclical worsening of the economy in a downturn because all alternatives to tax boosts or spending cuts were exploited in more prosperous years.

Because aid to local governments and school districts is more than 60 percent of state spending, one would expect occasional disruption to aid payments when the state encounters fiscal difficulties. However, school districts and cities routinely face an uncertain budget environment and an erratic cash flow from year to year because of the constant and extensive adjustments to local aid. For example, each year since SFY1979-80, the legislature has reimposed a cap on state revenue sharing to localities. As a result, each year local governments have had to limit expenditures or find alternative revenues for the $80 to $150 million in increased revenue sharing they were otherwise scheduled to receive.

Unpredictable year-to-year cash flows undermine the value of state assistance and may have additional adverse effects on the ability of localities to implement long-range spending plans. Furthermore, within each fiscal year, many school districts and counties must borrow until the closing weeks of their fiscal years when state payments finally arrive, creating an additional local short-term financing burden on New York taxpayers. For example, the particularly late payments for SFY1980-81 were estimated to have imposed extra financing costs on localities and school districts of about $22 million.[14]

The extensive use of deferrals brings the state to the short-term credit market with regularity. The financial

costs are substantial. New York pays over $200 million in interest every year on the spring borrowing. The risk that the state will be shut out of the market, and be caught short by billions of dollars, is small—high state taxes and the growing popularity of tax-exempt money market funds probably ensure strong and continuing demand for New York paper. But New York's reliance on debt for operating funds contributes to the state's relatively low credit rating. This penalty has already raised New York's infrastructure repair bill by an estimated $60 million over the next decade or so.

A less quantifiable, but potentially more harmful, consequence of New York's recent fiscal experience is the effect it may have on popular perceptions of the future tax burden in New York. Decisions of businesses to invest in New York, or of skilled individuals to take jobs in New York, are influenced by their expectations concerning the tax consequences of their decisions over a period of many years. The trend toward reduced taxes was halted and partially reversed in SFY1983-84. If New York embarks on a new tax cut program that again results in tax increases a few years down the line, future tax cuts may have little effect on expectations.

The last consequence of past fiscal practices was that, by exhausting most of its management techniques in relatively good years, the state had little maneuvering room during bad years. As a result, the state was left with no alternatives to raising taxes and reducing the state work force in a recession, when the state economy most needed income and jobs.

Alternative fiscal plans for New York

The most effective use of fiscal management techniques is to help maintain and not reverse tax and expenditure plans during an unexpected recession. For example, a reserve fund system can collect funds in years of economic expansion for use in declining years to maintain desired tax and spending programs, including tax cuts. Deferrals can also be managed so that they stabilize state fiscal policy over business cycles—the state can reduce deferrals and the spring borrowing in expansions, and increase them in recessions.

The remainder of the paper examines how effective management of deferrals or reserve funds can preserve tax cuts and expenditure growth over a hypothetical economic downturn. To make tax reduction feasible, a combination of reasonable state economic expansion and controlled expenditure growth has been chosen that provides periods of both cash-basis and GAAP budget

[14]E. J. Dionne, Jr., "Albany's Delay on New Budget is Called Costly", *The New York Times,* July 18, 1981, page 25. It should be noted, however, that special efforts have always been made to reduce the

Footnote 14, continued
impact of delayed payments, particularly on the most distressed localities. In SFY1983-84, the state increased its share of direct Medicaid payments to providers. Delayed state reimbursements for localities' direct payments had been an important source of local aid deferrals.

surpluses now and in the future (illustrated by the two shaded areas in Chart 4). The bold line represents a target for tax receipts and expenditures over the next few years which would allow state spending, including aid to school districts and localities, to grow steadily without interruption at about the same long-term rate as the economy.[15] The dashed line represents the tax receipts that could be generated with constant tax rates at the same rate of long-term economic growth, with the exception of a downturn in year four.[16]

The state has three choices of how to respond to changing fiscal circumstances once a prudent expenditure objective is chosen.[17]

- Adjust tax rates as needed.

- Manage deferrals.

- Manage reserve funds.

Each choice will be examined in isolation. The consequences of each choice become clear during and after the fourth year when the state is hypothesized to have an economic downturn that results in a cash shortfall of about the same magnitude as in SFY1982-83 and SFY1983-84. In the fifth year, a recovery is assumed that is sufficient to restore budgetary balance and provide growing surpluses in later years. The assumption of rapid growth of excess receipts is common to many fiscal analysts' projections of New York finances over the medium term.[18]

[15]The state has other sources of revenue such as Federal grants, long-term bonds, and educational and medical fees. These are excluded for the purposes of this exercise and it is assumed that all activities now financed by these non-tax revenues will continue to be financed that way.

[16]Personal income is assumed to increase at eight percent per year, which allows for moderate inflation and real growth at least as strong as any of the past 15 years. Tax receipts are estimated using elasticity estimates that represent a consensus of state legislative and executive budget analysts: 1.5 for personal income taxes, 0.9 for sales and use taxes, 1.1 for business taxes, and 0.6 for other taxes and fees. In addition, it is assumed that the 16 percent SFY1983-84 refund rate on gross personal income tax collections is maintained in the future so that any changes in gross collections will be accompanied by proportional changes in refunds and net collections.

[17]The pressures on the spending side of the budget process can be substantial, and government leaders may decide that important needs warrant using some of the surplus to finance more rapid expenditure growth. If so, and tax reduction and expenditure growth become incompatible, fiscal management can at best delay an eventual policy reversal.

[18]However, none of the existing state projections incorporate any national economic downturn over the next five years even though there has been a downturn, on average, once every 19 quarters in the post-war period. It has been 12 quarters since the last downturn.

The three alternatives discussed here can all finance a possible future shortfall. Equally important, they can also leave room for a tax reduction which is assumed to take the form of a two-stage, eight-year program, while maintaining expenditure growth equal to the long-term growth of the state economy. The alternatives primarily differ in whether or not they can prevent a reversal of the first-stage tax cuts and what effect that has on the second stage of tax cuts. To simplify the analysis, the tax changes will be only in the personal income tax and the first-stage cuts will take place all in fiscal year one.[19]

Tax cuts with no fiscal management
The first option is to institute a program of tax cuts now that is intended to eliminate much of the $2 billion surplus that would otherwise accumulate over the first three fiscal years. The size of possible tax changes is illustrated in Chart 5. An immediate tax cut is followed by a tax boost in year four to finance a revenue shortfall and then by a resumption of tax cuts once surpluses reappear. The exact magnitudes will vary, depending how and which taxes are changed. Nonetheless, in the absence of expenditure cuts or the use of deferrals or reserves, an economic downturn will result in a roller coaster pattern of overall tax policy.

A gross tax cut of $450 million in the first year will lower tax revenues over the first three years by about $1 billion after refunds, and it will increase the shortfall in year four by half.[20] If other adjustments, such as deferrals and expenditure cuts, are to be avoided and if no reserve funds are available, a revenue shortfall must be avoided by substantial increases in taxes during the economic downturn. The gross tax increase necessary to finance the shortfall in Chart 4 is about $1.5 billion.

Because the effect of a tax change increases each year, the tax boost necessary to eliminate the revenue shortfall in the fourth year will produce expanding surpluses in subsequent years. To eliminate the surpluses, taxes would have to be cut in the fifth year to offset the temporary boost and then again the next year as part of the second stage of the tax reduction program.

This fiscal management technique has the advantage of minimizing tax burdens until economic events force

[19]A program that gradually phases in cuts in several taxes over several years would allow additional cuts but it would also create a larger fourth year shortfall.

[20]The scheduled sunset of temporary taxes in SFY1985-86 could have a similar and perhaps larger effect. Any cuts beyond this sunset will further reduce future surpluses and possibly increase any future shortfall. The excess receipts remaining after the tax cut are assumed to be used for one-time expenditures. Saving leftover funds for later years through accelerating payments or raising reserve funds is discussed later on in the article.

Chart 4

New York State General Fund Tax Receipts and Related Expenditures

Hypothetical business cycle
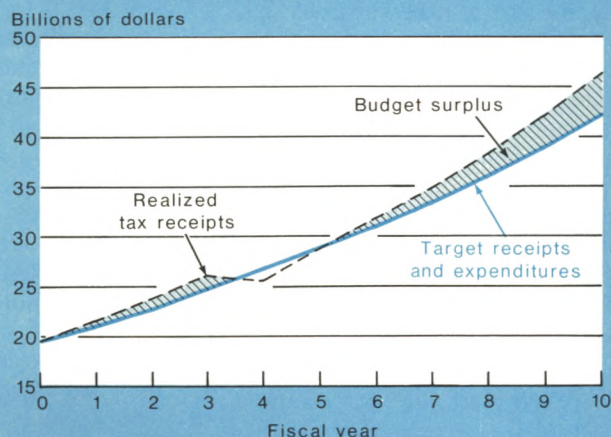
Source: Federal Reserve Bank of New York staff estimates.

an upward adjustment. It also has the virtues of being publicly visible, easily monitored, and under the direct control of elected government officials.

But this approach is not without difficulties. A policy requiring tax boosts in an economic slowdown reduces some incentives to business investment from the initial tax cut. To some degree, this effect can be limited by lowering only those taxes which are most likely to affect business decisions and raising only those taxes which are least likely to do this. Nevertheless, even when tax changes are selective, fiscal adjustment via the tax system places severe strains on individual and business taxpayers—their tax burden is raised when they are least able to pay, yet lowered when their financial situation is eased.

Moreover, tax changes are not easy to manage. The legislative process and tax collection procedures result in long lead times between the proposal of a tax change and the actual change in receipts. Recent experience in New York also suggests that this timing problem can be exacerbated by pressures to cut taxes as soon as surpluses appear yet boost taxes only as a last resort.

Managed use of deferrals
Deferring payments or drawing on reserve funds may ease a cash shortage enough so that tax increases may not be necessary. When properly managed, both methods accumulate funds in years of economic expansion and disburse the funds in economic down-

turns or years of unexpected fiscal stress. The deferral method prepares for difficult years by reducing deferrals and the spring borrowing while the reserve method does so by increasing reserve fund balances. The principal distinction between the two is timing and discipline. Reserve management is useful only if sufficient reserves are accumulated before the shortfall occurs, whereas effective deferral management can reduce deferrals and debt throughout the business cycle. Also, deferral management has few formal guidelines whereas use of reserves is governed by statutory rules.

Simulation of tax receipts and properly managed deferrals over the hypothesized business cycle shows a possible pattern of tax cuts and short-term borrowing as follows (Chart 5). In the first year, taxes would still be cut as before. In addition, jointly with the tax reduction, some bills would be prepaid to increase the proportion of current funding until the spring borrowing early in fiscal year four is about $1.3 billion lower.

As the economy turns down in the fourth year, the cash budget would be balanced, not by raising taxes, but instead by reducing current fiscal year cash requirements through deferrals of local aid and/or personal income tax refunds. In the following year, the spring borrowing would increase by about $1.5 billion to provide the funds for the postponed aid and refund payments.

Subsequent catch-up spending to repay interest and principal necessarily reduces the scope for the second stage of tax cuts. In the present example, because of the costs of the earlier tax cut and the new short-term debt, deferrals continue to grow modestly through the fifth and sixth years. As a consequence, the resumption of the tax cut program must be scaled down to $300 million and postponed until the eighth year in order to leave enough revenues to repay the debt. Full repayment allows the program to resume the full schedule of cuts in the ninth year.

A deferral-based method of balancing the budget has several advantages, which may account for its popularity in New York. Most importantly, many deferral decisions can be made in the closing weeks of the fiscal year. This characteristic leaves maximum flexibility to state officials in planning the precise timing and magnitude of the budget-balancing effort—an advantage notably absent when tax changes are used to replace lost revenues. Furthermore, the Federal tax exemption on state debt indirectly subsidizes New York's use of the spring borrowing to balance the state books.

But, as the example illustrates, postponing payment of obligations places an increased financial burden on the future that can be limited only by debt reduction prior to an economic downturn. The economy in succeeding years may not have enough strength to produce

sufficient tax revenues for both debt servicing and current expenditure programs. Even when future cash surpluses do become large enough, reduction of deferrals and short-term borrowing may be unpopular alternatives to tax cuts or expenditure increases. Thus, deferrals can easily continue for years after the revenue shortfall is over—two years in the present example but potentially indefinitely.

For a successful deferral system to rely on expanded deferrals and short-term borrowing in difficult years, there must be some reduction of deferrals and the spring borrowing in good years. Reduction and increase of deferrals will probably require continued constitutional and statutory authority to budget both GAAP surpluses and deficits, respectively. Given the fiscal pressures already on state officials when there is a cash surplus, budgeting a more stringent GAAP surplus is likely to be difficult. Another issue, closely related to this incremental adjustment of short-term debt, is how to manage

the spring borrowing that remains. An assessment of the costs and benefits of continued annual short-term funding deserves considerable attention but lies beyond the scope of this study.

Greater use of reserve funds
Financing revenue shortfalls with a reserve fund can avoid all of the disadvantages of a deferral-based system of funding. Reserve funds, like deferrals, allow maximum flexibility in managing the exact amount and timing of deficit elimination efforts. Because deficits are funded entirely by previous, known surpluses, reserve funds can potentially be the most stabilizing deficit-funding technique. Furthermore, reserve balances earn interest income, and their existence is likely to improve New York's credit standing and thereby reduce debt-servicing costs.

There are, however, serious disadvantages to a reserve fund and few states have completely exploited

Chart 5

Comparison of Tax Cuts and Spring Borrowing Under Various Methods of Fiscal Adjustment

Hypothetical business cycle
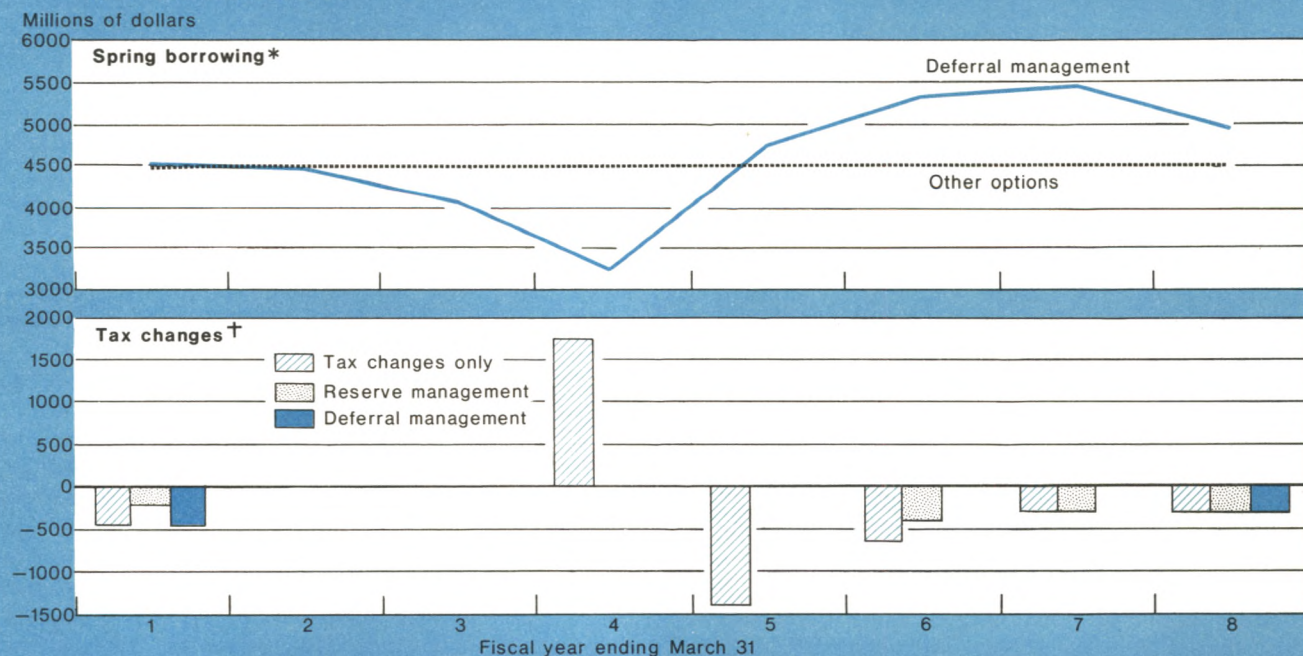
*Spring borrowing based on expected 1985 level.

†These are the first-year effects on gross tax receipts. Net receipts will not change by as much because of proportional changes in refunds. The multi-year effect of a tax change will be larger, depending on the growth of the state economy.

Source: Federal Reserve Bank of New York staff estimates.

its potential. The principal difficulty lies in establishing rules for depositing and withdrawing funds from the reserve. Deposits are often too small to accumulate to a significant balance and withdrawals are frequently made before an economic downturn occurs. For example, New York's combined reserves were virtually exhausted three years before the cash shortfall of SFY1982-83. Reserve funds also require legislators to set aside funds years before fiscal problems become apparent—a difficult task when immediate demands appear to be more pressing.

With a well-designed fund, an immediate tax cut can be accommodated and still permit sufficient reserve accumulation to avoid tax increases during the hypothetical economic downturn in the fourth year. A first-stage tax cut of $200 million in the first year would limit the amount available for the reserve fund in the example to one percent of receipts or just over $200 million. To compensate, the contribution rate in later years must be increased, say, to 2.5 percent. The lower revenue path created by the first-stage tax cuts would prolong the withdrawal of reserves into the fifth year and limit the initial second-stage tax reduction to $400 million. However, subsequent cuts of the tax program could remain on schedule (Chart 5).

Financing a shortfall of this magnitude, or of the magnitude of SFY1982-83 or SFY1983-84, without recourse to deferrals or tax increases requires reserves of about $1 billion. Setting aside this amount, while at the same time limiting the size of tax cuts and expenditure growth, may be impractical for New York. If so, the best system may be more strict control and oversight of a compromise among several approaches.

Determining the best combination of fiscal management approaches
No single approach to fiscal management seems ideal for New York. The simulations under each approach reveal a tax program over the business cycle that contradicts one of the three criteria for a tax cut program to help promote economic development.

- Reserve fund management reduces the scope for near-term tax cuts.

- Deferral management may limit future tax cuts.

- Tax changes without fiscal management could repeat the procyclical fiscal experiences of SFY1982-83 and SFY1983-84.

The first criterion is that the tax cuts should come soon to have the greatest value to taxpayers. The most immediate tax relief is facilitated by a system of tax adjustment or spending deferrals because state officials need make no provisions for revenue shortfalls in advance.

A common measure of the value of the stream of payments over several years is its net present value. The present value of tax payments acknowledges the value of future tax changes at the same time that it places more emphasis on the level of taxes in the early years of the program. While the eventual tax burden depends on tax changes, reserve accumulation, debt service, and economic growth in an uncertain environment, the tax burdens in this simple setting suggest which methods of fiscal management are most capable of facilitating permanent tax reduction.

Chart 6 shows the present value of tax collections under each management approach to financing target expenditures over the business cycle. The present values of tax collections vary across alternatives because of the consequences of each approach on the timing and duration of tax cuts over all stages of the cycle. Each management system achieves tax reductions of roughly ten percent or more from what taxes would otherwise have been. Reductions could be greater if lower expenditure growth was targeted.

These calculations suggest that careful management of deferrals could save taxpayers an additional $1 billion through lower taxes over the course of a business cycle compared with a management system that relies on tax increases to avoid revenue shortfalls. The additional savings is about $500 million if reserve funds are used instead of tax changes.

The second criterion is that the tax cut program must have a reasonable probability of being carried through to completion. Without that, it may have a limited effect on New York economic development. Use of a reserve fund provides the greatest probability that the full long-term tax cut program will be completed. By preparing for fiscal difficulties in advance, a reserve system relies much less on uncertain future economic events or budget surpluses for its effectiveness. Adjustment through tax changes also has a high probability of meeting the long-term tax cut targets; however, in the meantime the tax environment may be erratic and thus hurt economic development. In contrast, increased post-recession debt repayment relies heavily on uncertain future economic growth to finance both deferrals from prior years and continued tax reductions. For that reason, a deferral system provides the least assurance that planned tax cuts will be carried out.

In terms of the last criterion, both a deferral and a reserve system can provide assurance that tax increases over the medium term are unlikely, even if the state encounters a revenue shortfall. The key to that assurance is the ability to accumulate in advance a pool of reserves or unused deferrals. The more rapidly

Chart 6
Present Value of Tax Payments*
Hypothetical business cycle

Billions of dollars

- Deferrals
- Reserve funds
- Tax changes
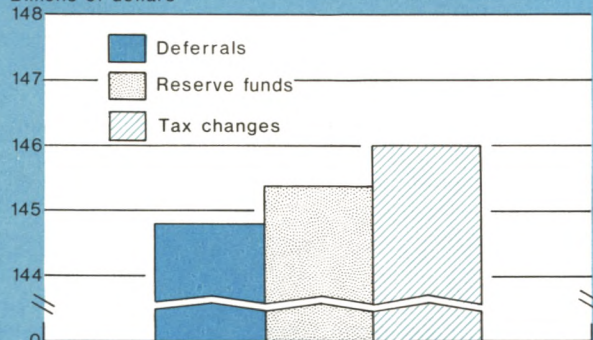
*Eight year tax payments discounted at 10 percent per year.

Source: Federal Reserve Bank of New York staff estimates.

reserves are set aside or deferrals and short-term borrowing are reduced, the greater will be the future pool of emergency resources. A system relying only on tax adjustment obviously provides little assurance that future tax increases can be avoided, because it makes no provision for contingencies.

Thus, tax cuts must be accompanied by the use of deferrals or reserve funds in order to satisfy all three criteria. Use of reserves or deferrals, however, does not guarantee these objectives will be achieved, as New York's past experiences have shown. Their achievement requires that reserves and deferrals must be properly managed so that sufficient resources are always available for use only when an unexpected economic downturn produces a revenue shortfall. The difficulty lies in how New York State can use its existing reserve funds and well-established deferral system to greater advantage than it has in the past.

One way to address this problem is to incorporate into deferral management some of the strengths of a reserve system. Such a combination might provide good overall tax-reduction characteristics while limiting adjustment burdens on local government and reducing uncertainty concerning the future tax reduction. Such a hybrid approach may be possible with the tools already available to New York fiscal managers. The current techniques used in New York, taken as a whole, should be able to provide several ways to implement a controlled system of management incorporating the best characteristics of deferrals and reserve funds. One direction to take could be the following.

New York's ability to defer local aid payments and income tax refunds, and to finance them with short-term debt, can be viewed as an adjustment potential to be tapped when unexpected economic developments lead to a cash shortfall. During periods of economic expansion, this range of flexibility can be enlarged by reducing deferrals and the spring borrowing. This reduction is analogous to a buildup of reserves because it increases the amount of adjustment possible should a downturn occur.

To facilitate the managed reduction of deferrals of tax refunds, New York's Personal Income Tax Refund Reserve could be used each year to set aside enough cash for current estimated tax refund liabilities. Total refunds have remained steady over the past nine years, at 16 to 17 percent of gross collections. A set-aside of this amount will reduce and possibly eliminate the financing of tax refunds through the spring borrowing.

In addition, New York's Tax Stabilization Reserve Fund could be incorporated into fiscal planning. The cash balance of the fund is presently scheduled to grow annually by about $50 million for the next two years and by $16 million for three more years to a total of $200 million. If left untapped until an economic downturn occurs, it will lessen the need for deferrals and thereby limit the burden on local aid.

Future policy

The effects of an economic downturn need to be considered in planning a tax cut program. A multi-year plan combining modest tax cuts and prudent management of deferrals and reserves can provide state residents with even greater tax reduction over the business cycle than a program that simply cuts taxes without any contingency planning. Moreover, the effectiveness of tax reduction and of local aid may also be enhanced. The key to achieving these benefits is more comprehensive overview and control of the fiscal management of New York State.

Allen J. Proctor

What Is Behind the Capital Spending Boom?

Business-fixed investment (BFI) has grown, on average, at a much faster pace so far in this recovery than in previous recoveries. In particular, business equipment spending, by far the largest component of BFI, rose 39 percent over the last seven quarters since the recession trough in 1982-IV, compared with about 16 percent average growth over the corresponding period of earlier postwar recoveries (Chart 1). Many analysts argue that the unusual strength of business investment is the result of changes in business tax policy enacted under the Economic Recovery Tax Act (ERTA) of 1981 and the Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982.[1] These changes are widely believed to have boosted business investment spending by lowering the cost of investing in plant and equipment. In addition, some argue that tax policy changes have created a highly optimistic climate about the future course of general economic conditions and this new wave of optimism or "animal spirits", so the argument goes, is an important element behind the recent investment boom.

If the view that the recent investment boom resulted from the 1981-82 business tax changes is correct, it has important implications for any further reforms of business taxation. In particular, the repeal of several important provisions of the 1981 ERTA, as proposed by the Treasury, would be expected to have a significant adverse impact on business investment. Some analysts,

[1]For example, Paul Craig Roberts, "Consumption Should Not Get Credit for the Expansion", Business Week, July 23, 1984; Maggie McConas, "Did Supply Side Incentives Work?" Fortune, November 26, 1984; and Chamber of Commerce of the United States, Economic Outlook, July 1984 and October 1984.

in fact, believe that the current debate on tax reforms is already beginning to discourage business investment.[2]

We examined the effects of the 1981-82 business tax changes on investment by using two standard econometric models—one is fashioned after the FMP model; the other, after the BEA model. (Note that in neither case, however, did we use exactly the same specifications as the one presently in use at the Federal Reserve Board or at the Bureau of Economic Analysis. For details, see the appendix.) More specifically, we compared the out-of-sample forecasting performance of these models in the recent period with that in earlier periods. Our presumption was that if changes in long-term expectations and new animal spirits have unleashed significant amounts of further investment spending, the standard models would underpredict actual business investment. More generally, their forecasting performance would be considerably weaker after tax policy changes than before. In addition, we looked at the direct influence of changes in business tax policy on investment through their effects on capital cost variables in the standard models.

Our analysis indicates that the conventional econometric models track BFI spending as well in the 1980s as in earlier periods. This suggests that the recent behavior of capital spending is not materially different from past experience. However, our analysis does suggest that business tax changes under ERTA/TEFRA significantly reduced capital costs below what would have existed under the pre-1981 tax laws. But judged

[2]For example, Gary Hector, "Business Planning in a Tax Turmoil", Fortune, November 26, 1984.

in terms of the FMP model, these tax changes appear to have contributed only about one-fifth of the 1983-84 growth in capital spending. That impact is not insubstantial, yet it clearly cannot be considered the principal factor behind the sharp increase in investment during this recovery. Further investigation suggests that a larger share of the 1983-84 investment boom is attributable to two other factors: the personal income tax cuts under ERTA and the sharp drop in interest rates in 1982.

Chart 1

Real Business-Fixed Investment in Recoveries*

Percent

Total real business-fixed investment

Trough

Current recovery

Average previous recoveries

Real producers' durable equipment

Trough

Current recovery

Average previous recoveries

Quarters after trough

*Data are normalized relative to troughs in National Bureau of Economic Research postwar reference cycles.

Sources: U.S. Department of Commerce, Bureau of Economic Analysis.

Empirical strategy and basic estimates

The FMP and the BEA econometric models have long track records and are generally well known among economists. They also accord business taxes and interest rates significant roles as explanatory variables (appendix). In both models, changes in the business tax code affect BFI spending only insofar as they impinge on the marginal cost of capital goods. In principle, the marginal cost of capital goods in a given period is the incremental cost of expanding output, incurred by utilizing an extra unit of capital goods for *one* period. This is also equal to the cost of "hiring" that capital good for one period. Naturally, the renter of the good would want to be paid enough to cover actual physical depreciation plus the opportunity cost of the tied-up funds. The tax laws impinge on this cost in two ways: they set a schedule for depreciation deductions, and they allow a portion of the purchase price of the capital good to be deducted immediately through the investment tax credit (ITC).

However, changes in business tax policy could influence investment spending in other ways as well: by generating optimistic expectations about long-term economic prospects for the economy, they could improve the general business climate. This could, in turn, lead to higher investment spending through increased effort and the application of new technology. Unfortunately, there are no explanatory variables in the standard econometric models to capture this type of effect. If this effect were substantial, the forecasting performance of the conventional models ought to be significantly weaker for the recent period than for earlier periods; specifically, these models would be likely to underpredict the actual change in investment.

In what follows, we first deal with the recent forecasting performance of the FMP and the BEA models and then with the impact of the 1981-82 business tax changes on investment spending in the context of those models. We begin by estimating the two models over two sample periods, 1956 or 1958 to 1973 and 1956 or 1958 to 1979. Both the FMP and BEA models distinguish between equipment and structures and differ in their treatment of each. Thus, in re-estimating the models, separate equations were run for producers' durable equipment (PDE) and non-residential structures (NRS). The estimates are satisfactory in terms of the usual statistical criteria (see the appendix for details of the estimates) and closely conform to those in previous studies.

Based on these estimates we ran three separate experiments:

- The first experiment assesses the models' forecasting accuracy over 1980-84 as a whole. This
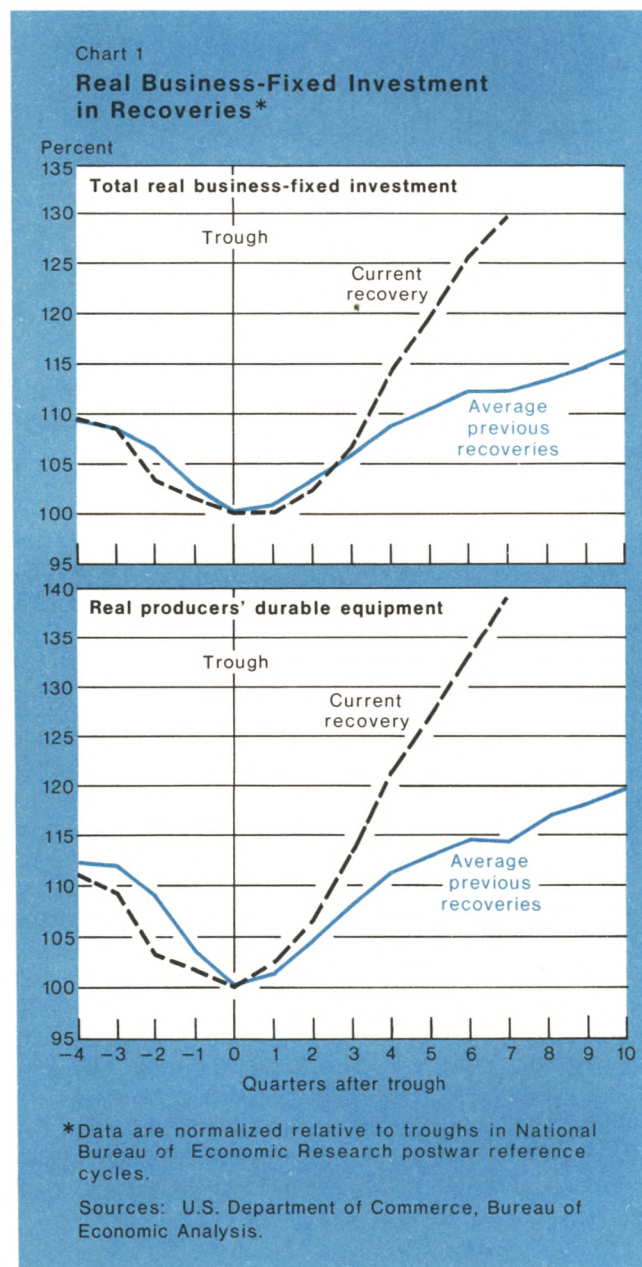
tells us something about the investment tracking performance over what can fairly be described as a tumultuous period.

- The second experiment examines the models' forecasting accuracy and prediction bias before and after the 1981 ERTA. This allows us to see if there is any deterioration in how well the models track after ERTA.

- The third experiment compares the models' forecasting accuracy and prediction bias over the 1982-84 cyclical swing with the 1974-76 episode. Here we are particularly interested in knowing whether the tracking performance of the models is worse in the current recovery than in the comparable period of the 1975-76 expansion.

In addition, we re-estimated the investment equations over successively longer periods starting with 1974, generating out-of-sample forecasts for two years beyond the sample periods. A comparison of out-of-sample forecasts from this experiment provides an additional basis for judging any significant changes in the forecasting performance of the standard econometric models over the recent period.

In considering these various experiments, our basic objective is to see whether the prediction errors from the model forecasts are larger in recent years, especially in 1983-84 than in earlier periods. More generally, we are interested in any significant changes in the forecasting performance of the models. Our presumption is that if ERTA and TEFRA wrought fundamental changes in the economy, the standard models would exhibit a long string of unusually large forecast errors implying a structural shift. In judging the out-of-sample forecasts we utilize two conventional statistics—the mean or average error (ME), and the root mean squared error (RMSE). The first one is a measure of bias in forecasts and indicates the extent of underprediction or overprediction. The second one is a measure of forecast accuracy; it is the square root of the average squared deviations of the predicted from the actual values. This notion of "average" forecast error differs from the more commonly used mean absolute error only in that it assigns heavier penalties to larger errors.

Analysis of out-of-sample predictions
The forecasting performance over 1980-84
The out-of-sample forecasts of the quarterly changes in real producers' durable equipment (PDE) and real non-residential structures (NRS) do not exhibit any significant bias and appear to be reasonably accurate (Chart 2). Indeed, in the case of PDE, the FMP model accu-

rately pinpoints the 1981-III and 1982-IV turning points. (The ability to anticipate turning points is widely believed to be a key element in assessing a model's credibility.) The BEA model does almost as well in forecasting turning points, but misses the 1982-IV trough by one quarter. Also, both the FMP and BEA models are able to capture the broad upsweep in PDE spending during the current recovery. From 1982-IV to 1984-III the actual increase in real PDE amounted to 39 percent. The FMP's forecast called for a 35 percent increase and the BEA's for a 33 percent gain.

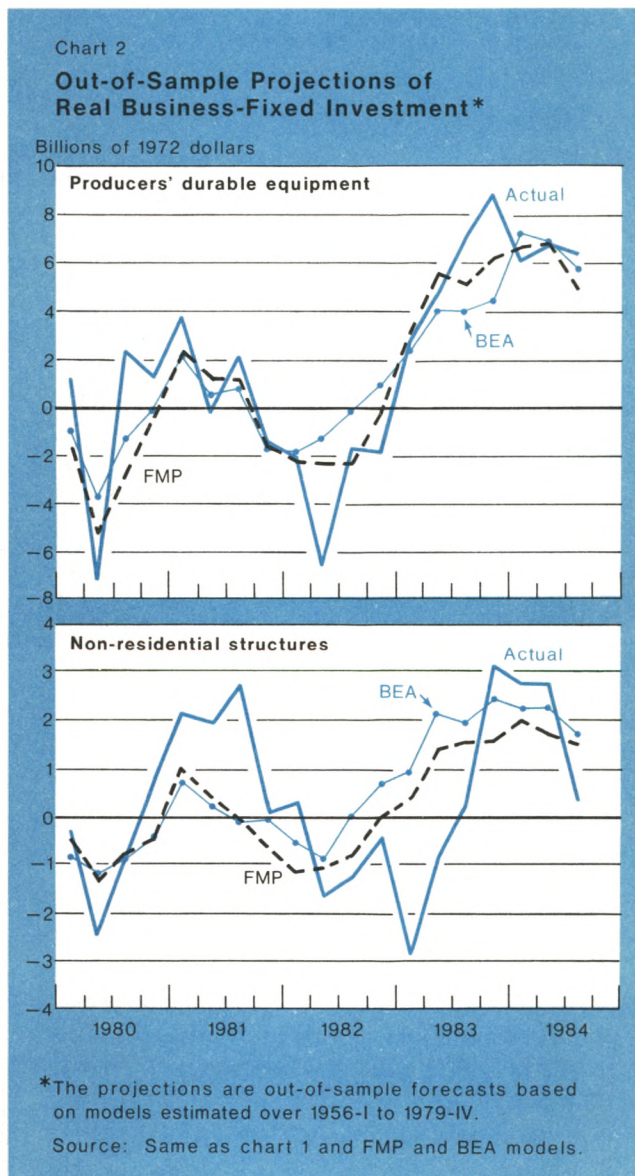The predicted changes in real NRS spending are less

Chart 2

Out-of-Sample Projections of Real Business-Fixed Investment*

Billions of 1972 dollars

*The projections are out-of-sample forecasts based on models estimated over 1956-I to 1979-IV.

Source: Same as chart 1 and FMP and BEA models.

Table 1

Forecasting Accuracy of the Alternative Investment Models, 1980-84

In billions of 1972 dollars

| | 1980-I to 1984-III | | 1980-I to 1981-III | | 1983-I to 1984-III | |
	ME*	RMSE†	ME*	RMSE†	ME*	RMSE†
Producers' Durable Equipment						
FMP Model‡	0.25	2.06	1.21	2.55	0.21	1.37
BEA Model‡	0.09	2.42	0.83	2.31	0.78	2.26
Non-residential Structures						
FMP Model‡	0.08	1.47	0.80	1.42	−0.71	1.81
BEA Model‡	−0.20	1.62	0.93	1.53	−1.16	2.02

*The mean error (actual *minus* predicted) which measures the forecast bias.

†The root mean squared error which measures the forecast accuracy.

‡The models are described in the appendix.

Table 2

A Cyclical Comparison of Out-of-Sample Forecasts: 1974-76 versus 1981-84

In billions of 1972 dollars

| | 1974-76 | | | | 1981-84 | | | |
| | Recession 1974-I to 1975-I | | Recovery 1975-II to 1976-IV | | Recession 1981-IV to 1982-IV | | Recovery 1983-I to 1984-III | |
	ME*	RMSE†	ME*	RMSE†	ME*	RMSE†	ME*	RMSE†
Producers' Durable Equipment								
FMP Model‡	0.71	1.59	−1.05	1.67	−0.19	1.87	0.57	1.98
BEA Model‡	0.22	2.40	−0.28	1.20	−1.51	2.84	1.48	2.06
Non-residential Structures								
FMP Model‡	−1.04	1.39	0.28	1.15	−0.44	0.72	−0.27	1.57
BEA Model‡	−1.04	1.66	0.13	1.14	0.02	0.55	−0.33	1.59

*The mean error (actual *minus* predicted) which measures the forecast bias.

†The root mean squared error which measures the forecast accuracy.

‡The models are described in the appendix. The forecasts in this table are based on models that were estimated over 1956-I to 1983-IV for PDE and over 1958-I to 1973-IV for NRS.

Table 3

A Comparison of Out-of-Sample Forecasts over Successive Two-Year Intervals

In billions of 1972 dollars

| | 1975-I to 1976-IV | | 1977-I to 1978-IV | | 1979-I to 1980-IV | | 1981-I to 1982-IV | | 1983-I to 1984-III | |
	ME*	RMSE†	ME*	RMSE†	ME*	RMSE†	ME*	RMSE†	ME*	RMSE†
Producers' Durable Equipment										
FMP Model‡	−0.93	1.49	1.38	2.40	1.72	3.01	−0.45	1.93	0.57	2.14
BEA Model‡	−0.18	0.96	1.31	2.33	1.30	2.79	−0.81	2.55	1.24	2.49
Non-residential Structures										
FMP Model‡	0.03	1.13	0.32	1.00	0.68	1.18	0.78	1.37	−0.68	1.82
BEA Model‡	0.11	1.11	0.44	0.97	0.67	1.12	0.58	1.40	−1.14	2.10

*The mean error (actual *minus* predicted) which measures the forecast bias.

†The root mean squared error which measures the forecast accuracy.

‡The models are described in the appendix. The forecasts in this table are based on models that were estimated over successively longer sample periods—*e.g.*, 1956-I to 1974-IV, 1956-I to 1976-IV, 1956-I to 1978-IV, etc. in the case of PDE.

accurate than those for PDE, especially at the beginning of the recovery. Comparatively large misses were recorded in the first half of 1983 when both models predicted increases in real NRS spending whereas it actually continued falling. The pattern of NRS spending just before and just after the 1982 business-cycle trough was very unusual. Even a tightly fitting statistical model would have had a difficult time in tracking this experience, and both the FMP and BEA models leave a lot of the quarterly variation in NRS spending "unexplained" (appendix). This spending component has always eluded economists' efforts at modeling.

Still, on a more positive note, both models did anticipate the turning points in real NRS spending, although not the exact timing. And the models can be credited with foreseeing the broad contours of the recovery. Over the four quarters ended in 1984-III, the actual increase in *real* NRS amounted to $8.8 billion, while the predicted increase was $6.8 billion for the FMP model and $8.5 billion for the BEA model.

A comparison of the out-of-sample predictions before and after ERTA

This experiment was designed to reveal whether the forecast errors exhibit any tendency to be larger after the passage of the 1981 ERTA. The out-of-sample forecasts for 1980-I to 1981-III were compared with those for 1983-I to 1984-III; the first period predated the major changes in the tax code while the second postdated them (Table 1).

In the case of PDE, the forecasts underpredict a bit in both periods and actually turn out to be somewhat more accurate over the later period. This outcome suggests that the changes in the tax code did not result in structural instability in the investment equations. In the case of NRS, however, the forecasts overpredict very slightly over 1983-84 but the average prediction errors turn out to be virtually identical over the two periods. There is no significant evidence of a deterioration in forecasting performance due to the liberalization in the tax code.

A cyclical comparison of out-of-sample predictions

Based on the estimates for the period through 1973, we compared the forecasting performance of the FMP and the BEA models over the 1982 downturn and the 1983-84 upturn with the corresponding cyclical episodes in 1974 and 1975-76. This is a stronger test of the forecasting performance in that the bias and accuracy are being judged for up to ten or eleven years beyond the estimation period rather than just three or four years outside the sample. The findings from this experiment are broadly similar to those from the previous one: the models do not exhibit a large systematic underprediction

bias in the recent period relative to the comparable period in the mid-1970s, and the overall forecasting accuracy, at least of the FMP model, is roughly similar over the two periods (Table 2).

The FMP-model forecasts track actual real PDE spending quite well over both recession and recovery periods. The forecast errors over the 1983-84 period are not significantly different from those over the 1975-76 recovery. There is no evidence of severe underprediction or overprediction bias. What little bias there is is well within the limits of statistical probability.

The BEA model for PDE, however, appears to go off track in the current recovery. Its forecast errors are distinctly larger in the current recovery than in the 1975-76 upturn. It could be argued that this is symptomatic of an upward shift in the demand for capital goods. But the fact that the FMP model of PDE spending has stayed on track suggests that the problem, whatever it is, is specific to the BEA model.

The results for structures (Table 2, lower half) are more difficult to interpret. They do not suggest a significant underprediction, but the forecast errors for the 1983-84 recovery are clearly larger than those recorded for the 1975-76 upturn. The deterioration in forecasting accuracy (*i.e.*, as reflected in the higher RMSE) was concentrated in the first two quarters of 1983; the forecasts in those two quarters called for increases in real NRS spending while actual outlays continued falling. Note that, this pattern does not bear out the hypothesis that the 1981 business tax cuts have led to increases in BFI spending beyond what the traditional models would project.

It's hard to know whether the higher observed values of the RMSE for real NRS spending in the current recovery are an "unusual" event. The error statistics are random variables, and so one expects the realized values of these statistics to vary to some extent. The question is: are observed differences between realized and predicted values "significant" in a statistical sense? In this regard, it is worth noting that both the FMP and BEA equations for structures did pass more formal statistical tests for stability over the period 1958-84 (appendix).

Further evidence

One final experiment was undertaken by re-estimating the investment equations over successively longer periods and generating out-of-sample forecasts for two years beyond the estimation period. For example, the FMP equation for structures was first estimated over the period 1958-I to 1974-IV and then used to generate forecasts for the next two years—from 1975-I to 1976-IV.

Next, the sample period was extended two years, the model was re-estimated over the period from 1958-I to 1976-IV, and another two years of out-of-sample forecasts were computed—from 1977-I to 1978-IV. Altogether, five different versions of each model were estimated, and five corresponding sets of forecasts were compiled.

A comparison of the forecasts over successive two-year intervals indicates that the error statistics are not behaving in any systematic fashion (Table 3). For both PDE and NRS, there is no consistent underprediction (or overprediction) bias over the whole period. In the case of PDE, the realized values of RMSE for both the FMP and BEA models vary over fairly wide ranges, with the more recent values lying close to the middle of the range. There is nothing in these results which suggests that the FMP or BEA models have gone haywire since the enactment of the 1981 ERTA. In the case of NRS, the realized values of RMSE remain pretty stable until 1981. But from then on, the forecast errors begin to swell, with the two biggest misses occurring (once again) in the first half of 1983. However, given that the models of NRS investment possess only limited explanatory power, the errors are not outside the normal statistical range for such models.

In sum, our analysis suggests that the FMP and the BEA models track BFI spending as well over the last few years as in earlier periods. And the out-of-sample forecasts do not appear to exhibit any significant underprediction bias in 1983-84.

Business tax policy effects on investment spending through capital costs

Given that the FMP and the BEA models have remained fairly stable, they can be used with some confidence to infer, though not precisely, the extent of recent capital spending attributable to changes in business tax policy. In this section, we do this in terms of the FMP model. More specifically, we assess the impact of the 1981-82 business tax changes on the marginal cost of capital, and estimate the contribution of those changes to investment spending in 1983-84 by re-estimating the FMP model.
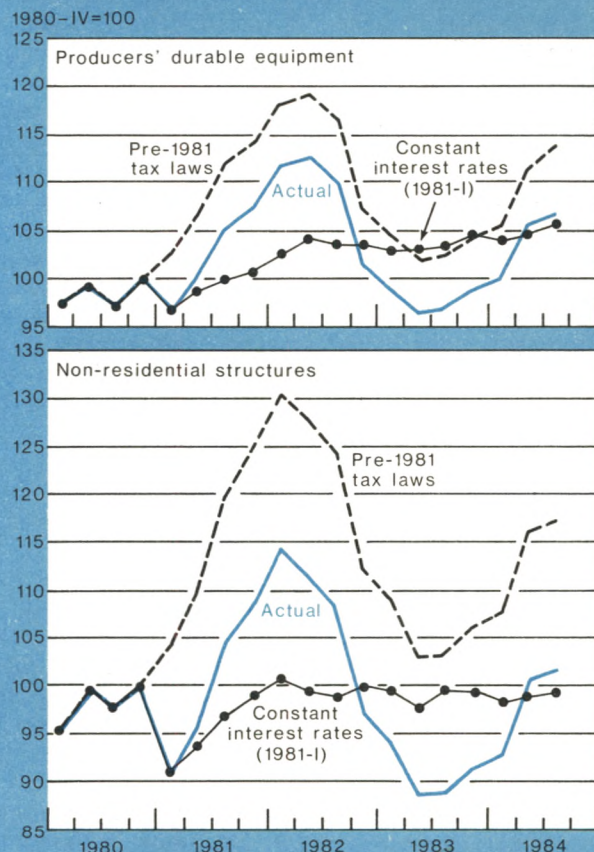
The 1981-82 business tax changes and the marginal cost of capital

For businesses, the main feature of the 1981 ERTA was its Accelerated Cost Recovery (ACR) system. The new ACR system vastly changed the business tax code.[3] Among the changes, three are particularly important:

[3]Joseph C. Wakefield and Richard C. Ziemer, "Federal Fiscal Programs", *Survey of Current Business*, February 1984.

Chart 3
Marginal Cost of Capital Goods

1980-IV=100

Source: Federal Reserve Bank of New York staff estimates based on FMP model (see appendix).

- Tax-service lives (*i.e.*, the periods over which assets are to be depreciated for tax purposes) were lowered materially.

- The investment tax credit on eligible assets was increased. (Structures remained ineligible, as they had been under the previous tax laws.)

- The tax rules governing leasing were liberalized substantially to facilitate the transfer of tax benefits from one party to another.

The new ACR system was designed to reduce the cost of capital goods. And it succeeded in doing so. We use the FMP's specification of the tax laws—both before

and after ERTA—to calculate the impact of the new ACR system on the marginal cost of capital goods.[4] For equipment the present value of the tax-allowable depreciation deductions is estimated to have been raised 13 percent under ERTA. These and the other tax changes translate into a 6.3 percent decrease in the marginal cost of equipment (Chart 3). For structures the changes were even more dramatic. Under ERTA, the present value of depreciation was increased 134 percent, and the marginal cost of these capital goods declined an estimated 15 percent.

One year later, TEFRA was enacted, and it undid some of the liberalization of ERTA. For businesses the main provisions were:

- The scheduled acceleration in depreciation write-offs due in 1985 and 1986 (i.e., the move to 175 percent declining balance in 1985 and then to 200 percent declining balance in 1986) was repealed.

- A "basis adjustment" was adopted to offset part of the ITC. Accordingly, tax payers who claim an ITC are required to reduce the cost-base of that asset (i.e., the dollar amount on which depreciation write-offs are figured) by half the ITC.

- The Safe-harbor Leasing laws were repealed and replaced by a somewhat liberalized version of the pre-1981 leasing laws.

These changes raised the marginal cost of equipment and structures slightly. Yet that cost remained well below the levels that would have existed under the pre-1981 tax laws (Chart 3). According to the Bureau of Economic Analysis, the combined net ERTA/TEFRA tax savings to businesses will end up amounting to roughly $22 1/2 billion over 1983-84, or $10 billion in constant 1972 dollars.[5]

Some observers have noted that the unusually high interest rates prevailing in 1981-82 blunted the impact of ERTA on the marginal cost of capital goods. The argument is that "...the effect of the tax cuts in stimulating non-residential fixed investment has been more than offset by the upward pressure on real debt and equity costs".[6]

Under this line of reasoning, the 1981-82 business tax cuts have contributed supposedly nothing at all to the recent boom. This view seems to rest on the strong assumption that the reduction in the marginal cost of capital goods was fully offset by the rise in interest rates associated with ERTA. This is a questionable assumption, especially insofar as changes in the business tax code are concerned.

The role assigned to high interest rates under the above argument is also somewhat misleading. High interest rates did indeed blunt the impact of the tax cuts, but rates did not remain *uniformly* high after 1981. Subsequent to the adoption of the ACR system at the beginning of 1981, the marginal cost of capital goods continued rising throughout the year and peaked in early 1982 at a level well above where it had stood at year-end 1980—just prior to ERTA. This rise was due partly to a run-up in interest rates and partly to the upward creep in capital goods prices. The line in Chart 3 labeled "constant interest rates" illustrates what the marginal cost of capital goods over 1981-84 would have been under ERTA if interest rates had stayed constant at the 1981-I level. Note that, this line runs below the one for actual marginal cost until late 1982.

After peaking in early 1982, the marginal cost of capital goods then fell precipitously, primarily reflecting a sharp decline in interest rates. This drop in the marginal cost was between three and five times greater than past cyclical declines. And by early 1983, the marginal cost of capital goods had fallen below what it would have been if interest rates had held steady at the 1981-I level. In the absence of the unusually sharp fall in interest rates and consequently in the marginal cost of capital goods, the 1983-84 recovery in investment spending would probably have been weaker. We return to this subject in a subsequent section.

Effects on business investment

The FMP model allows us to estimate the effect of changes in the marginal cost of capital associated with the 1981-82 business tax changes on investment. By assuming that tax-service lives, the ITCs, and the depreciation schedules remained unchanged at their

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[4] The FMP model defines the marginal cost of capital goods in basically the same way as it appears in the appendix. The tax terms in the expression for R_t were duly modified to reflect the ERTA of 1981: For equipment the tax-service life was lowered from 10.5 years to 4.6 years; the depreciation method was changed to 150 percent declining balance, with a half-year convention; and the investment tax credit was raised from 8.8 percent to 9.2 percent. For non-residential structures the tax-service life was lowered from 40 years to 15 years, and the depreciation method was changed to 175 percent declining balance. No attempt was made, however, to model the changes in the leasing laws. (For one attempt at doing so, see Alan J. Auerbach, "Corporate Taxation in the United States", *Brookings Papers on Economic Activity*, Number 2, 1983.) But note that the leasing laws were tightened substantially under the TEFRA of 1982.

[5] Wakefield and Ziemer, *op. cit.*

[6] Adrian W. Throop, "A 'Supply-Side Miracle'?", *Federal Reserve Bank of San Francisco Weekly Letter*, November 2, 1984. A similar argument appears in the Congressional Budget Office, "The Economic and Budget Outlook: An Update", August 1984.

Table 4

The Estimated Impact of ERTA/TEFRA Business Tax Cuts on Capital Spending: 1982-IV to 1984-III

In billions of 1972 dollars

	Actual Increases	Direct Effects*	Full-Model Simulations*
Producers' Durable Equipment	$42.7	$7.9	$11.0
Nonresidential Structures	$5.2	$1.1	$1.2

*Based on the FMP model.

pre-1981 levels, we re-estimated the FMP investment forecasts. The rest of the ERTA package—specifically the personal income tax cuts—was still presumed to have occurred. The personal tax cuts stimulated aggregate economic activity to a considerable extent, and thereby buoyed capital spending. No attempt has been made to net out those indirect effects of the personal tax cuts on investment.

The results of these counterfactual reruns of history are presented in Table 4. They indicate that, even if business taxes had not been cut, capital spending would still have increased at a fast clip in the current recovery. Two alternative pairs of estimates were derived for both PDE and NRS. One pair takes into account the two direct effects: (1) the higher marginal cost of capital goods under the pre-1981 tax regime would have led to lower BFI spending; and (2) lower BFI spending would, in turn, have meant lower output (i.e., on a dollar-for-dollar basis) and thereby dampened BFI spending further. These two direct effects account for only about one-fifth of the cumulative increase in PDE and NRS from 1982-IV to 1984-III.

The other pair of estimates in Table 5 was derived from a full-model simulation of the FMP model in order to take account of the *indirect* feedback effects—the "reactions" in other sectors of the model to the direct effects. These full-model effects are somewhat greater than the direct effects on investment.

What else "explains" the investment boom?
If the 1981-82 business tax cuts contributed only a small part to the current investment boom, then where else has the stimulus come from? The two main candidates appear to be the personal tax cuts and the sharp fall in interest rates in late 1982.

The personal tax cuts amounted to almost $50 billion over 1983-84, according to the Bureau of Economic Analysis. No doubt these tax cuts contributed to the vigorous revivals in housing, car sales, and consumption spending, which initiated the overall recovery. And

once the recovery was under way, BFI spending followed suit, thereby amplifying the activity in other sectors. This is the standard relationship between BFI spending, business output, and the demand for that output.

Insofar as the recovery in business output has been unusually large, the cyclical expansion in BFI spending would also have been unusually big. In fact, the 13 1/2 percent increase in business output over the first seven quarters of this recovery has been larger than past cyclical upturns. Over comparable periods in past recoveries, the average increase amounted to 10 1/2 percent. The faster business output growth in this recovery relative to the average of previous recoveries reflects, to a large extent, the stimulative effects of the personal tax cuts.[7] With this in mind, we used the FMP model to estimate how much smaller the expansion in real PDE spending would have been if business output had proceeded along the slower "normal" recovery path. (The cyclical upturn in real NRS has not been abnormally large, and so we limited the analysis to real PDE.) Our results indicate that real PDE spending over the first seven quarters of this recovery would then have been $7 billion, or 17 1/2 percent, smaller.[8]

Additional stimulus came from a sharp fall in interest

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[7]To the extent that the greater-than-average business output growth in this recovery is not related to the personal tax cuts, our estimates of their contribution to investment are overstated.

[8]This suggests that the whole ERTA/TEFRA package—including both personal and business tax cuts—accounts for a substantial part of the 1983-84 investment boom (around 40 percent of PDE investment growth in terms of our estimates). A similar conclusion is reached by Brayton and Clark in their FMP simulations of the effects of the whole ERTA/TEFRA package, which allow for a flexible output-employment response but hold the growth rate of M1 constant. See Flint Brayton and Peter B. Clark, "The Macroeconomic and Sectoral Effects of ERTA: Some Simulation Results", a paper presented to the Federal Reserve System Committee on Business Analysis, November 1984. The simulations from macroeconometric models indicate that over the long run the positive effect of the personal income tax cut on investment may prove to be transitory. See Darrel Cohen and Peter B. Clark, "The Effects of Fiscal Policy on the U.S. Economy", *Staff Studies No. 136*, Board of Governors of the Federal Reserve System, Washington, D.C., January 1984.

rates in late 1982, which produced a substantial decline in the marginal cost of capital goods. Over the four quarters ended in 1983-II, the marginal cost of equipment declined almost 15 percent, while over comparable periods of past recoveries, the average drop was only 2 percent. Once again we used the FMP model to determine how differently investment spending would have turned out if the marginal cost of equipment had followed along the "normal" cyclical path. We find that real PDE spending from 1982-IV to 1984-III would have been $6 billion, or 15 percent, lower.

To sum up, the personal income tax cuts and the substantially steeper-than-average drop in interest rates appear to account for about one-third of the growth in PDE. Together these two factors seem to be more important in explaining the recent investment boom than the 1981-82 changes in business tax policy.

Concluding remarks

Our detailed examination of the out-of-sample forecasts from the FMP and BEA models indicates that there is no significant change in the investment tracking performance of those models; they perform equally well before and after the 1981-82 tax cuts, and about as well in this recovery as in the 1975-76 episode. In particular, there is no significant evidence of underprediction bias. The models are not perfect. But they are presently no more imperfect than they ever were.

The estimated models do shed some light on the question: what's behind the investment spending boom? An explanation was put together by searching for irregularly sharp movements among the determinants of investment spending included in the models. We focused on the PDE component which accounted for virtually all of the unusual strength in total BFI spending. From 1982-IV to 1984-III the total expansion in real PDE equaled almost $43 billion (1972 dollars). Over past cyclical upturns, the "normal" or average recovery in real PDE amounted to about $15 billion. Our estimates suggest that the "extra" $28 billion comes from three principal factors:

- The 1981-82 business tax cuts: $8 billion in direct effects;

- The faster-than-average recovery in business output associated with the personal tax cuts under ERTA: $7 billion; and

- The steeper-than-average fall in interest rates in late 1982: $6 billion.

These three factors seem to account for all but about $7 billion of the $28 billion discrepancy between an average investment recovery and the current recovery. Of course, these estimates embody a margin of error, but the orders of magnitude would seem to be plausible.

It is obvious from this analysis that the 1981-82 business tax cuts do not provide the principal explanation for the 1983-84 investment boom. But the estimated one-fifth of capital spending growth attributable to those cuts is not inconsequential. (Note that, this estimated contribution is equivalent to nearly 30 percent of the excess of investment growth in this recovery over the average growth in previous postwar recoveries.) It supports the argument that any significant changes in business tax policy could have substantial effects on investment and capital stock.[9] More generally, any proposals for reforming the tax code cannot afford to ignore the possible adverse consequences for business investment, and must attempt to weigh and balance those consequences against other objectives that are considered to be in the public interest.

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[9]So far the current debate on tax reforms has paid very little attention to the possible effects of tax changes on investment. This is highlighted in a recent study which argues that the two major tax reform proposals—the Bradley-Gephardt tax bill and the Kemp-Kasten tax bill—incorporate substantial disincentives for investment in plant and equipment. See Joel L. Prakken, Laurence H. Meyer, and Chris P. Varvares, "Flat Taxes and Capital Formation", *Formal Publication No. 65*, Center for the Study of American Business, October 1984.

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Appendix: The Estimated Investment Models

The FMP and BEA models of BFI spending are different empirical representations of the same theory.[*] In both versions, the optimal or cost-minimizing ratio of capital to output is determined by relative prices, *i.e.*, the marginal cost of capital goods (discussed below) relative to the price of output. The higher the marginal cost of capital goods relative to output prices, the lower the optimal ratio of capital to output.

At a point in time, the "target-capacity" stock of capital is equal to the optimal capital-output ratio times the quantity of output firms wish to produce. Should the actual stock of capital be different from the "targeted" one, businesses will close the gap by adjusting their investment spending. Suppose, for example, that the actual stock exceeded the "targeted" one. Businesses would then slow down their investment spending to a level below what was needed just to replace those machines and factories that had worn out. Gradually, the stock of capital would shrink to the targeted level.

The two models differ in two respects. First, they define "desired" output differently. The FMP model assumes that it may be adequately represented as a weighted average of current and past levels of actual output. The BEA model defines it as "permanent" output, that is, actual output divided by capacity utilization. (This definition of permanent output is used only in the BEA's equation for structures; actual output is used in the equation for equipment.) Second, the two models adopt different specifications of the adjustment of the actual stock of capital to the "targeted" level. Both models presume that businesses close this gap by stepping up or slowing down the pace of their BFI spending. The FMP model depicts this as a gradual process but one that is invariant to economic conditions. Alternatively, the BEA model also depicts this as a gradual process, but allows the speed of adjustment to vary with economic conditions.

The marginal cost of capital goods
In principle, the marginal cost of capital goods in a given

[*]Both the FMP and the BEA investment equations are based largely on the work done by Charles W. Bischoff, "The Effect of Alternative Lag Distributions", *Tax Incentives and Capital Spending*, Gary Fromm, editor, Brookings Institution, 1971; and his "Business Investment in the 1970s: A Comparison of Models", *Brookings Papers on Economic Activity*, Number 1, 1971. Bischoff's model was refined by Albert Ando, Franco Modigliani, Robert Rasche, and Stephen Turnovsky, "On the Role of Expectations of Price and Technological Change in an Investment Function", *International Economic Review*, June 1974; the current version of the FMP model of equipment is an updated reworking of their equation.

For a description of the BEA model, see Robert S. Chirinko and Robert Eisner, "Tax Policy and Investment in Major U.S. Macroeconomic Econometric Models", *Journal of Public Economics*, March 1983.

period is the incremental cost incurred when output is expanded in that period by adding an extra unit to the stock of real capital goods. Yet capital goods are durable and yield productive services for many periods, and this makes it difficult to specify just what the incremental cost of that extra unit of capital goods is for a given period.

The problem can be resolved by comparing the cost (in present-value terms) of purchasing the capital good today and then maintaining it forever versus the cost of doing so one period later. Let C_t be the present value of the stream of current and future costs connected with purchasing an additional unit of capital in period t, and let the cost of capital be denoted as r. (Note that the cost of capital is the interest rate or the discount rate that

Table A-1

Alternative Investment Equations

The FMP Model
Producers' Durable Equipment: (putty-clay)

$$(1) \quad \Delta I_{Et} = a + \sum_{i=0}^{11} b_i \Delta [(\frac{PQB}{RE})_{t-i-1} \, QB_{t-i}]$$

$$+ \sum_{i=0}^{11} c_i \Delta \, [(\frac{PQB}{RE})_{t-i-1} \, QB_{t-i-1}] + u_t$$

Non-residential Structures: (putty-putty)

$$(2) \quad \Delta I_{st} = a + \sum_{i=0}^{15} b_i \Delta [(\frac{PQB}{RS})_{t-i}^{0.25} \, QB_{t-i}] + u_t$$

The BEA Model
Producers' Durable Equipment: (putty-clay)

$$(3) \quad \Delta I_{Et} = a + \sum_{i=0}^{11} b_i \Delta [(\frac{PQB}{RE})_{t-i}^{0.75} \, (QB_{t-i} - 0.87QB_{t-i-1})]$$

$$+ \sum_{j=0}^{8} c_i \Delta [(\frac{PQB}{RE})_{t-i}^{0.75} \, (\frac{QB}{CU} - QB)_{t-i}] + u_t$$

Non-residential Structures: (putty-putty)

$$(4) \quad \Delta I_{st} = a + \sum_{i=0}^{15} b_i \Delta [(\frac{PQB}{RS})_{t-i}^{0.25} \, (\frac{QB}{CU^{0.5}})_{t-i}$$

$$- 0.94 \, (\frac{PQB}{RS})_{t-i-1} \, (\frac{QB}{CU^{0.5}})_{t-i-1}$$

$$+ \sum_{i=0}^{15} c_i \Delta [(\frac{PQB}{RS})_{t-i}^{0.25} \, (\frac{QB}{CU} - QB)]_{t-i} + u_t$$

Definitions of Symbols:
I_E = real PDE spending
I_S = real NRS spending
PQB = price deflator for gross private domestic business output
QB = gross private domestic business output
RE = marginal cost of capital goods, equipment
RS = marginal cost of capital goods, structures
CU = rate of capacity utilization

Appendix: The Estimated Investment Models *(continued)*

investors use in evaluating the present worth of a company's earnings prospects.) Then the marginal cost of capital goods (R_t) may be defined as the difference between C_t and $C_{t+1}/(1+r)$, plus the foregone interest on this difference:[†]

$$(1) \quad R_t = \left(C_t - \frac{C_{t+1}}{(1+r)}\right)(1+r)$$

This is what it costs firms, in present-value terms, to "hire" the *services* of that extra unit of capital for period t alone. In the absence of market imperfections, the "rental" cost would be the same irrespective of whether a firm leased the equipment from another firm or "rented" the equipment from itself.

An explicit expression for R_t can be obtained once C_t has been specified. One gets the following result:

$$(2) \quad R_t = [1 - k - (1 - bk) \, u \, z] \, v_t \, (r_t + g)$$

where:

k = investment tax credit;

u = marginal corporate tax credit;

b = proportion of investment tax credit which must be deducted from depreciation base;

z = present value of tax-allowable depreciation deductions which may be taken over the allowable service life;

v = purchase price of new capital goods; and

g = (geometric) rate of economic depreciation.

[†]Ralph Turvey, "Marginal Cost", *Economic Journal*, June 1969.

This expression defines the price of the capital good on a net-of-tax basis, *i.e.*, net of the investment tax credit and the present-value of the depreciation deductions. The marginal cost of capital goods is equal to the sum of the opportunity cost of the funds used to purchase a unit of capital plus the value of the capital services used up in the period.

The same specification of the marginal cost of capital goods was used in estimating both the FMP and BEA models. The variables which comprise R_t *(i.e.,* k, u, and b) were defined in accordance with those in the latest version of the FMP model—with two exceptions: (1) Corcoran and Sahling's measure of the cost of capital was used in the equations for both equipment and structures.[‡] (2) In computing the present value of depreciation (z), the formulas from the FMP model were used, but Moody's Baa industrial bond rate was substituted for the fictional interest rate constructed in the FMP model.

Estimation results

It has been several years since the FMP and BEA models have been updated, and so we re-estimated them with quarterly data from the mid- to late-1950s to the end of 1979.[§] Separate equations were run for pro-

[‡]Patrick J. Corcoran and Leonard Sahling, "The Cost of Capital: How High Is It?", this *Quarterly Review*, Summer 1982.

[§]For two recent efforts at updating the FMP equations, see Peter K. Clark, "Investment in the 1970s: Theory, Performance, and Prediction", *Brookings Papers on Economic Activity*, Number 1, 1979; and Richard W. Kopcke, "Forecasting Investment Spending: The Performance of Statistical Models", *New England Economic Review*, November/December 1982.

Table A-2
Estimation Results*

	a	Σb_i	Σc_i	$\overline{R}^2$	SEE	DW	LaGrange-Multiplier Tests 1956(8)-I/1979-IV	1956(8)-I/1984-III
FMP: Equipment†	0.019 (0.96)‡	0.433 (6.55)	−0.413 (6.15)	0.603	1.33	2.25	7.42	14.92
FMP: Structures§	−0.604 (2.81)	0.088 (4.39)	‖	0.303	0.89	1.88	4.50	1.53
BEA: Equipment†	0.087 (0.43)	0.508 (5.09)	0.374 (2.08)	0.572	1.39	2.14	9.10	15.14
BEA: Structures§	−0.834 (2.62)	5.220 (1.69)	−0.081 (3.69)	0.333	0.87	1.96	11.56	8.88

*Estimated by ordinary least squares, in terms of first differences.
†Sample period: 1956-I to 1979-IV.
‡t-statistics in parentheses.
§Sample period: 1958-I to 1979-IV.
‖Not applicable.

Appendix: The Estimated Investment Models *(continued)*

ducers' durable equipment (PDE) and non-residential structures (NRS). One notable feature of these results is that the models were estimated in terms of first differences. Other studies have generally estimated investment equations in terms of levels of time series variables, with a suitable adjustment for the autocorrelation of the errors. As a practical matter, the autocorrelation coefficients have been so high (*i.e.*, in the range of about 0.85 to 0.95) that the estimates based on levels would have been little different from those based on first differences.

In estimating these models, we wanted to keep the specifications of the models as close to the "standard" ones as possible. Nevertheless, we did experiment a bit (a) with the distinctions between "putty-putty" (where factor proportions can vary with respect to both old and new capital) and "putty-clay" (where factor proportions can vary only as far as new capital is concerned); (b) with alternative values of the nonlinear parameters; and (c) with alternative lengths of the distributed lags. The forms of the models that we finally chose are presented in Table A-1. The corresponding estimated coefficients and summary statistics are set out in Table A-2. Some of the $\bar{R}^2$s appear to be low—especially for structures. But if one allows for the distinction between levels and first differences, and its impact on the summary statistics, these results are just as good (or bad) as those in earlier studies.

A formal test of model stability is afforded by the Lagrange-multiplier statistics.‖ This test was applied to each of the four equations, and the results are reported in the last two columns of Table A-2. Essentially, the Lagrange-multiplier statistic tests whether the errors are homoscedastic over the sample period. If a model were unstable, that would show up as an unusually long string of large positive or negative errors. Thus, the finding that the errors in a model are not homoscedastic is often a symptom of instability or structural change.

Two Lagrange-multiplier statistics were computed for each model. In one case, the sample period extended from 1956-I to 1979-IV for real PDE and from 1959-I to 1979-IV for real NRS. In the other, the sample period was lengthened on the far side to 1984-III. The Lagrange-multiplier statistics are asymptotically distributed as a chi-square, χ^2. The estimated model for PDE has 8 degrees of freedom; the one for NRS, 4 degrees of freedom. At the 5 percent confidence level, the tabular values for the χ^2 distribution are 15.507 for 8 degrees of freedom and 9.488 for 4 degrees of freedom. Upon comparing the computed statistics in Table A-2 with the corresponding tabular values, it turns out that none of the Lagrange-multipliers in Table A-2 is statistically significant. Hence, all four models appear to be structurally stable.

‖For information about this test statistic, see A. Steven Englander and Cornelis A. Los, "The Stability of the Phillips Curve and Its Implications for the 1980s", Federal Reserve Bank of New York Research Paper No. 8303, January 1983.

Explaining the Recent Level of Single-Family Housing Starts

Considering the high mortgage rates in the current recovery, housing activity has been quite strong. Single-family housing starts averaged about 1.1 million units at an annual rate over the first eight quarters of this economic recovery, about the same as the average in the 1975 expansion. However, fixed-rate mortgage (FRM) rates have averaged about 13.5 percent in the current recovery, almost 4.5 percentage points higher than the average in the 1975 upturn. In this article, we analyze why single-family starts reached their 1975 levels even though rates are much higher now.

Two recent developments in the mortgage market may explain the strength of housing in the face of such high interest rates: adjustable-rate mortgages (ARMs) and deposit deregulation. The housing sector may have benefited from ARMs, which often link monthly mortgage payments to short-term interest rates. When short-term rates are lower than long-term rates, the lower initial monthly payments on an ARM may allow more households to obtain mortgage financing. Deregulation (which removed ceiling rates on most deposit accounts) may have spurred housing activity by increasing funds at thrifts and the amount of available mortgage credit. In addition to these developments, the rapid growth of the secondary market may also have had an effect.

In this article, we present yet another explanation for the similar level of housing starts in the 1975 and 1983 recoveries. Our findings point to the transition of the

"baby boom" generation into the prime homebuying age bracket as an important factor in this expansion.

Our analysis is based on a model of housing demand that takes into account various factors traditionally considered to affect housing starts. We used this model to test the hypothesis that ARMs have increased the level of starts in this recovery. Next, we examined the role of deregulation and the secondary market in explaining the level of starts. None of these developments, alone or in combination, fully describe the current situation. Demographics, as our analysis shows, is also a major factor behind the high level of housing starts in this recovery. Our results imply that in the late 1980s and 1990s, as the baby boom generation moves out of the prime homebuying age group, this stimulus to single-family housing demand will recede.

Demand for single-family housing

In this section, we look at how various factors influence the level of single-family housing starts.[1] The level of these starts can be explained by four principal factors: interest rates, deposit flows to thrifts, household liquidity, and demographics (Appendix 1).

Interest rates affect the demand for single-family housing through two channels. First, by altering the cost of capital of homeownership and the cost of capital of rental housing, real aftertax mortgage rates influence the

[1]We tested to see if multi-family starts could be explained by the same factors as single-family starts. Our results showed that the coefficients of the estimated equations for single- and multi-family starts were very different. This is probably because most multi-family units started are rental units. We focused on modeling the demand for single-family housing, which accounts for over 60 percent of total starts.

Table 1

Estimated Impact of Various Factors on the Level of Single-Family Housing Starts

Variable	Change	Estimated effect on starts (in thousands of units, SAAR)
Adult population 25 to 34 years of age	+1 million	+85
Per household liquidity	+1 thousand	+54
Deposit flows to S&Ls	+1 billion	+4
Nominal mortgage rate	−1 percentage point	+146
Qualification index		+105
Cost of capital of:		
homeownership		+209
rental housing		−168

Chart 1

The Cost of Capital of Homeownership Relative to the Cost of Capital of Rental Housing

Source: The Federal Reserve-M.I.T.-University of Pennsylvania (FMP) econometric model.

household's decision to buy rather than rent a home. Everything else being equal, more households will decide to buy if the cost of homeownership falls relative to the cost of renting. In our model, therefore, housing starts should rise when the cost of capital of home-ownership falls relative to the cost of renting, as proxied by the cost of capital of rental housing. These two cost of capital measures take account of the differences in both the tax treatment and the expected price appre-ciation for owner-occupied and rental housing (Chart 1).[2] We estimate that a one-percentage-point decrease in mortgage rates increases starts by about 50 thousand units through its effect on the relative cost of capital of homeownership (Table 1).

Second, mortgage rates are also important because lenders commonly rely on rules of thumb that set limits on monthly mortgage payments as a share of household income. For example, the Federal National Mortgage Association (FNMA) suggests that monthly mortgage payments not exceed 28 percent of the household's stable monthly income.[3] So the share of qualifying

households rises as the mortgage rate declines (Chart 2). We constructed an index representing the share of households that meet these qualification requirements and found that, through this affordability channel, a one-percentage-point decrease in interest rates raises starts by about 100 thousand units (Table 1).[4]

Overall, we estimate that a one-percentage-point decline in interest rates increases the level of single-family starts by approximately 150 thousand units (at an annual rate) through these two channels. This interest rate effect is in line with estimates from previous studies.[5]

Deposit flows to thrift institutions also affect the level of housing starts. Since thrifts are primarily mortgage lenders, deposit inflows increase the supply of available mortgage credit and put downward pressure on mort-gage rates. This effect of deposit flows is captured by the interest rate variables discussed earlier. Besides reducing the mortgage rate, deposit flows to thrifts may also improve the non-price terms of mortgage loans,[6] such as loan-to-price ratios or terms to maturity, which

[2] For a detailed definition of the cost of capital measures used in our analysis refer to Appendix 2. An analysis of the role of the cost of capital in explaining the strength of the housing market in the 1970s can be found in Patric Hendershott, "Real User Costs and the Demand for Single-Family Housing", *Brookings Papers on Economic Activity*, 1980-II, pages 401-44.

[3] Stable monthly income is defined as gross monthly income from the borrower's primary source of employment, plus acceptable secondary income. Further, the FNMA suggests that a household's "total obligations-to-income ratio", which includes monthly mortgage payments plus other obligations such as auto and consumer loan payments, should not represent more than 36 percent of the borrower's stable monthly income. For further details, see Section 102 of the Federal National Mortgage Association's Underwriting Guidelines, January 3, 1983, pages 5-8.

[4] To compute this index we assumed that income is distributed lognormally with a standard deviation estimated from 1983 disaggregated income data; the house price is the median price of a new single-family home; and the household makes a 20 percent downpayment on the home purchase.

[5] For example, Jaffee and Rosen found that a one-percentage-point decrease in nominal rates raises single-family starts by about 140 thousand units. Dwight Jaffee and Kenneth Rosen, "Mortgage Credit Availability and Residential Construction", *Brookings Papers on Economic Activity*, 1979-II, pages 333-66.

[6] At the start of the pickup in deposit flows in early 1982, the percentage of all major lenders offering mortgages (of any type) with loan-to-price ratios of 95 percent was about 35 percent. By the

increase housing starts. We estimate that a $1 billion deposit inflow to savings and loans increases single-family starts by about 4 thousand units through this channel (Table 1).

Before deregulation and the elimination of usury ceilings, deposit outflows could also result in credit rationing in the mortgage market. When usury ceilings prevented mortgage rates from rising in response to a scarcity of funds, non-price rationing was used to allocate credit. Housing starts dropped as a result (Appendix 1).

Household liquidity (short-term assets less short-term liabilities per household) is an important factor that reflects two determinants of housing demand. First, this measure represents funds that are easily liquidated for a downpayment on a house. Second, we assume that changes in household liquidity reflect changes in permanent income. An increase in permanent income makes it more likely that a household will buy a home. So a rise in household liquidity increases housing starts. According to our estimates, a $1000 increase in per household liquidity (in 1972 dollars) raises the level of single-family housing starts by about 50 thousand units (Table 1).

Finally, demographic factors are a key determinant of the level of single-family housing starts. The prime homebuying age is between 25 and 34 years, when many individuals buy their first home. According to one survey of homebuyers, the average age of a first-time homebuyer was about 29 years in 1983.[7] The percentage of households that own a home (*i.e.* the homeownership rate) also shows its largest rise for the 25 to 34 age group. In 1983, the homeownership rate was about 18 percentage points higher for the 25 to 29 year than for the 20 to 24 year age group. The homeownership rate increases by about the same amount between the 25 to 29 year and the 30 to 34 year age brackets.[8] So the larger the population share in this prime homebuying age group, the higher the demand for single-family housing. An increase of one million people in this age group (holding the total adult popu-

lation constant) results in an 85 thousand unit increase in the level of single-family starts, according to our estimates (Table 1).

We have outlined our model of housing demand, but we still must explain why housing starts have reached the same levels as in 1975, when rates were much lower. In this article we show that ARMs, deposit deregulation, and the secondary mortgage market cannot fully account for this phenomenon. We find that demographic factors were also important in this recovery.

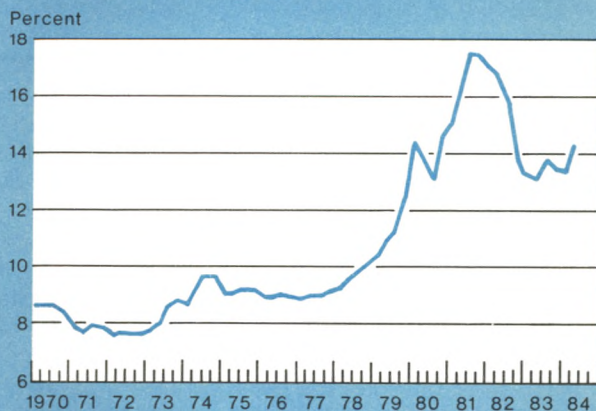## Impact of adjustable-rate mortgages

The current recovery is the first in which adjustable-rate financing played an important role. Since federally-

Chart 2

Index of Share of U.S. Households Meeting Qualification Requirements for a Fixed-Rate Mortgage on a Median-Priced New Single-Family House
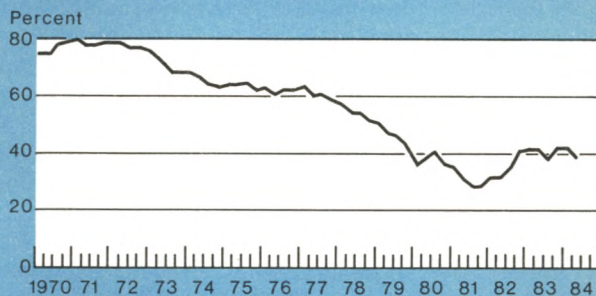
Percent

Fixed-Rate Mortgage Rate

Percent

Sources: Federal Housing Administration, and United States: Department of Commerce, Department of Housing and Urban Development, Bureau of the Census.

Footnote 6, continued
second quarter of 1984, over 45 percent of lenders offered these mortgages. The terms to maturity of mortgage loans have also increased, from 24.7 years in December 1982 to 27.1 years in April 1984. "Conventional Home Mortgage Rates...", Federal Home Loan Bank Board (various issues 1982-84).

[7]The Chicago Title Insurance Company's Survey of Homebuyers samples homebuying trends in 11 major metropolitan markets. The average age of a repeat buyer surveyed was about 37 years. Chicago Title Insurance Company, *The Guarantor*, January/February 1984, page 12.

[8]United States Bureau of the Census, "Household and Family Characteristics: March 1983", Current Population Reports, Series P-20, Number 388, May 1984.

chartered thrifts were authorized to originate ARMs in April 1981, ARM issuance has grown considerably and currently accounts for about 60 percent of all conventional mortgage loans closed (Chart 3). ARM rates, which are often linked to short-term rates, have averaged about 200 to 250 basis points lower than FRM rates in 1984, in part reflecting the positive slope of the yield curve.

There are two ways ARMs may affect housing starts. First, some lenders may base qualification requirements on the initial ARM rate rather than the higher FRM rate. This loosening of lenders' credit standards would allow more households to qualify for financing and increase housing starts. Second, some households may base their decision to buy a home on the initial ARM rate (or at some other rate less than the FRM rate), even though the rate paid on the ARM may go up later. This could occur because they expect interest rates to increase by less than the amount embodied in the yield curve and/ or they plan to sell or refinance their house after a short time. This would reduce the perceived relative cost of capital of homeownership and increase housing starts.

While some lenders may indeed be qualifying borrowers at low initial ARM rates, it is not clear to what extent overall credit standards have been reduced. A June 1984 survey by the United States League of Savings Institutions indicated that 63 percent of the savings institutions offering ARMs used the same underwriting standards for ARMs as for FRMs, while 31 percent used stricter underwriting standards for ARMs. Only about 5 percent of the thrifts surveyed used less stringent underwriting standards on ARMs than on FRMs.[9]

Nor is it clear that ARMs have affected the perceived cost of capital of homeownership. People who expect interest rates to rise by less than the amount indicated by the yield curve may base their relative cost of capital on the lower ARM rate. However, homebuyers who anticipate the future increases in interest rates embodied in the yield curve will base their decision on the FRM rate. So the impact of ARMs through this channel depends on households' expectations of future interest rate movements.

We adapted our empirical model to see to what extent looser credit standards or lower relative cost of capital on ARMs has increased the level of housing starts. An index of the share of households that qualify based on the initial ARM rate, but not the FRM rate, was added to our basic equation. The difference between the cost of capital of homeownership based on the FRM and the ARM rate was also included (Table 2).

[9]ARMs: A Study of Adjustable-Rate Mortgages Being Made by Savings Institutions, United States League of Savings Institutions, 1984.

Chart 3

Adjustable-Rate Mortgages as a Percent of All Mortgage Loans Closed
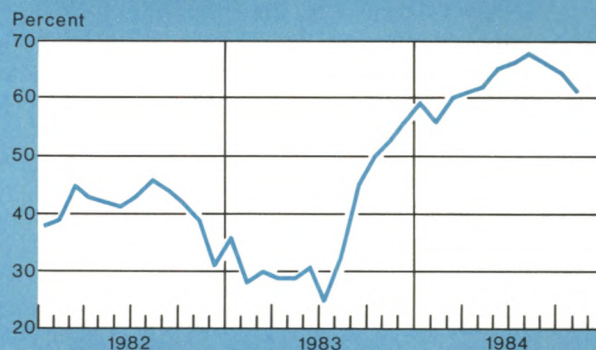
Source: Federal Home Loan Bank Board.

We found that the coefficients of both the ARM-related variables were small and not significantly different from zero. Then, we tested the impact of ARMs on the level of housing starts in several other ways and could not find an ARM-related variable significantly different from zero.[10] As a further test, we checked to see how our basic equation for single-family starts, which uses the FRM rather than the ARM rate, predicts out-of-sample. We estimated the equation through the third quarter of 1982 and then extrapolated eight quarters out-of-sample. The mean absolute percentage error of the forecast is only 6 percent and there is no noticeable tendency to underpredict the level of housing starts (Table 3). The equation predicts the sharp upturn in housing starts in 1983, as well as the dip in starts in the third quarter of 1984, without including any effect of ARMs.

Since data on ARMs have only been available for a short time, it is possible that ARMs have had some effect that we were not able to isolate econometrically. However, these tests do suggest that the effect of ARMs is probably not large enough to be a major factor in

[10]Variables included in other equations to pick up the effect of ARMs were: the spread between the FRM and the ARM rate; the difference between monthly payments as a percentage of personal income based on FRM and ARM rates; the percentage of total loans closed that were ARMs; and a dummy variable for the period that ARMs were available. The ARM-related variables discussed in the text were also weighted by the percentage of total mortgage loans closed that were ARMs. None of these variables had large coefficients and none were significantly different from zero at the five percent level of confidence. The coefficients were often of the wrong sign. The largest impact we were able to find used the percentage of total loans closed that were ARMs, which gave an increase of about 22,000 starts at an annual rate.

explaining the high level of single-family housing starts at current interest rates.

Effect of deposit deregulation and the secondary market

Deregulation eliminating ceiling rates on deposit accounts has made it easier for thrifts to raise funds during periods of high interest rates. Previously, thrift institutions experienced large deposit outflows when market interest rates rose above regulated ceiling rates on deposit accounts. In the early 1980s, despite the phase-in of some new deregulated time deposit accounts, thrifts continued to lose funds. But by late 1982, the introduction of money market deposit accounts (MMDAs)—which are highly liquid, government-insured, and pay a market rate of interest—reversed this trend (Chart 4).

The rapid growth of the secondary mortgage market has also made it easier for thrifts to raise funds. By selling off mortgages in the secondary market, thrifts can continue to originate new mortgages even in the face of deposit outflows. In response to the deposit outflows in the early 1980s, thrifts raised a large amount of funds in the secondary market.

Without deregulation of deposit accounts, the high level of interest rates in the current recovery would have resulted in disintermediation. If deposit outflows had continued at the same rate as before the introduction of MMDAs, and if there were no well-developed secondary market, we estimate that housing starts would have averaged about 100 to 200 thousand units less (at an annual rate) in this recovery.[11] However, deposit flows and net sales of mortgages in the secondary market by thrifts increased by an average of about 10 percent (at an annual rate, in 1972 dollars) over the first eight quarters of both the 1975 and 1983 expansions. So deregulation and the secondary market cannot explain the similar level of starts in the 1983 and 1975 recoveries if funds raised by thrifts still have the same effect on housing starts as in the past.

But have deregulation and the secondary market changed the overall impact of these funds on housing starts? This could account for the high level of single-family starts in this recovery even if the growth in deposits and net sales in the secondary market were not above average. The removal of rate ceilings on deposits, which has given thrifts a more stable deposit base, may have made them willing to lend out more funds and hold less in more liquid assets. The development of the secondary mortgage market may also have had a similar effect.[12] On the other hand, this may be offset by the recent broadening of thrift asset powers

Table 2

Index of Share of Households that Meet Lenders' Qualification Requirements and the Cost of Capital: ARM Versus FRM Rates
In percent

Period	FRM rate	ARM rate	Index of share of households qualifying based on ARM rate but not FRM rate	Difference between the cost of capital of homeownership based on FRM rate and ARM rate
1982-I	17.1	15.0	7.0	2.3
1982-II	16.7	15.2	4.8	1.7
1982-III	15.7	14.8	2.9	1.1
1982-IV	13.8	13.6	0.6	0.4
1983-I	13.3	12.8	2.0	0.8
1983-II	13.2	12.1	4.8	1.2
1983-III	13.8	11.8	8.6	2.1
1983-IV	13.5	11.7	7.6	1.8
1984-I	13.4	11.3	9.0	2.1
1984-II	14.3	11.2	13.0	3.0
1984-III	14.4	11.8	10.8	2.6

Sources: Federal Housing Administration, Federal Home Loan Bank Board, Federal Reserve-M.I.T.-University of Pennsylvania econometric model, and the United States: Department of Commerce, Department of Housing and Urban Development, and Bureau of the Census.

Table 3

Actual and Forecasted Single-Family Housing Starts, 1982-IV to 1984-III*
In thousands of units

Quarter	Actual starts	Predicted starts	Forecast error	Percentage error
1982-IV	813	771	42	5.1
1983-I	1,056	1,079	−22	−2.1
1983-II	1,101	1,188	−86	−7.8
1983-III	1,070	1,164	−94	−8.8
1983-IV	1,037	997	41	3.9
1984-I	1,278	1,097	182	14.2
1984-II	1,137	1,191	−54	−4.8
1984-III	977	992	−15	−1.6

*The equation in Appendix 1 was re-estimated from 1959-IV to 1982-III and an eight-quarter out-of-sample forecast was made. The mean absolute forecast error is 6.0 percent.

[11] The lower estimate uses our basic equation and our estimated effect of deposit flows on mortgage rates. The higher estimate comes from the Jaffee and Rosen (1979) equations for single-family starts and the mortgage rate.

[12] We also tested for a direct impact of net sales of mortgages by thrifts in the secondary market on housing starts. We found that their effect was not significantly different from zero. However, the secondary market may have an indirect effect on starts by lowering mortgage rates.

Factors Affecting Housing Starts Over the First 8 Quarters of Recovery 1975-1977 and 1982-1984

Thousands of single-family starts, annual rate

	1982-84*	1975-77*	Change	Effect on starts
Starts per household	0.0125	0.0143	−0.0018	−130
Households (in millions)	85.1	72.7	+12.4	+160
Percentage of adult population 25-34 years of age	0.2276	0.2013	+0.0263	+336
Average household liquidity (in thousands of 1972 dollars)	9.907	8.173	+1.734	+79
Cost of capital of owner-occupied housing (in percent)	11.79	8.37	+3.42 ⎫	−138
Cost of capital of rental housing (in percent)	14.12	10.14	+3.98 ⎭	
Dummy for credit rationing	0	0.25	−0.25	+24
Percentage growth in S&L deposits	2.66	2.60	+0.06	+1
Percentage of households qualifying for a mortgage ...	41.45	62.99	−21.54	−526
Residual	†	†	†	+94
Actual starts	1059	1029	+30	†

*Averages for first eight quarters of recovery.
†Not applicable.

Chart 4

Growth in Small Time and Savings Deposits at Savings and Loan Institutions

Annual rate, in 1972 dollars

Source: Flow of Funds, FMP econometric model.

to include more non-mortgage assets. Even if thrifts are willing to make a larger amount of loans, not all of these funds will necessarily go to the mortgage market. All in all, it is not clear that deposit deregulation and the secondary market can fully explain the similar level of starts in 1975 and 1983.

Impact of demographics

What else is important in explaining the high level of starts at current interest rates? As discussed earlier, the average level of single-family starts in the first five quarters of the 1975 and 1983 expansions were virtually the same. However, other things being equal, the 4.5 percentage point difference in mortgage rates should have kept starts about 675 thousand units lower (at an annual rate) in 1983 (Table 4).

We find that demographic factors offset a large part of the effects of higher nominal interest rates in this recovery, contributing almost 350 thousand units (Table 4). Actually, this result is not particularly surprising in light of past analyses of the housing sector, which have frequently cited demographics as an important determinant of housing demand.[13] The number of individuals age 25 to 34 increased from about 15 percent of the population in 1976 to about 17 percent in 1983 (Chart 5). This represents an increase of about 3.6 million households in the prime homebuying age group. About two-thirds of these households are in the 30 to 34 year age group with a homeownership rate of about 60 percent, while one-third are in the 25 to 29 year category with a homeownership rate of about 40 percent. Multiplying the homeownership rates by the increased number of households in each age bracket since 1976 gives an increase in housing starts of about 200 thousand units at an annual rate.[14]

Our econometric estimate of the impact of the baby boom generation is higher than this rough calculation, but this may partly reflect the relationship between our demographic variable and other demographic factors that may influence housing starts. Our demographic variable may be picking up other demographic trends, such as the increase in the number of households in the 35 to 44 or the 20 to 24 year age brackets, which also have high marginal rates of homebuying. Although separating out these effects is difficult, the transition of the baby boom generation into the prime homebuying age group seems to have been one reason that single-
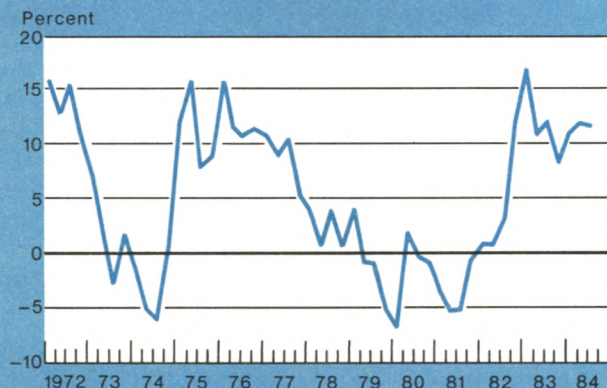
[13]For a survey of the impact of demographics on the housing sector see Louise B. Russell, *The Baby Boom Generation and the Economy*, The Brookings Institution, 1982, pages 102-19.

[14]The number of additional starts would be somewhat less, since some households either buy an existing home or enter the age bracket already owning a home.

Chart 5

Percent of Total Population Between 25 and 34 Years

Percent
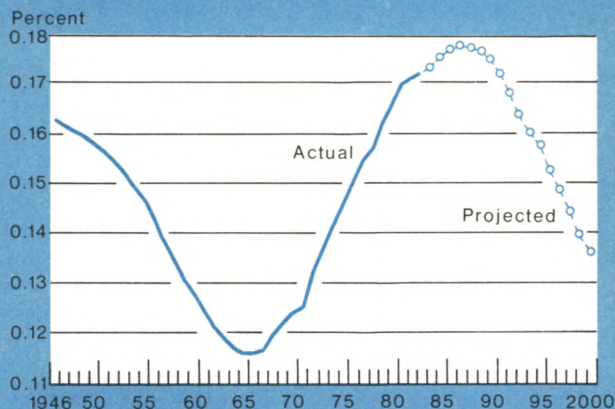
1984 to 2000 projections from Gregory Spencer, "Projections of the Population of the United States by Age, Sex, and Race: 1983 to 2083", Current Population Reports, Population Estimates and Projections, Series P-25, No.952, United States Bureau of the Census, May 1984.

family housing starts reached such a high level at current interest rates.

Conclusions

The changing composition of the population is a key factor in explaining the high level of single-family housing starts in this recovery despite high mortgage rates. A large and steady rise in the number of people age 25 to 34 offsets a large part of the dampening effect of higher market interest rates. In addition, increased credit availability and a rise in household liquidity have contributed to the strength of single-family housing in this expansion. We found little evidence that the increasing use of adjustable-rate mortgages has contributed to single-family housing demand in the current recovery.

This result has important implications for the future. The population share in the 25 to 34 year age bracket will decrease as the baby boom generation matures (Chart 5). This prime homebuying age group is expected to decline from 17.2 percent of the total population in 1983 to about 15.5 percent in 1993. This means that demographics will have less of a stimulative effect on single-family housing starts in the future.

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Appendix 1: The Empirical Model of Single-Family Housing Demand

The results presented in the table are the coefficient estimates of the following equation from 1959-IV to 1984-III:

$$(1) \; STARTS = a_0 + a_1 \, PCTFAM_{-1}$$
$$+ a_2 \, HHLIQ_{-1} + a_3 \, MSLDOT_{-1}$$
$$+ a_4 \, DCR_{-1} + a_5 \, RCHO_{-1}$$
$$+ a_6 \, RCHR_{-1} + a_7 \, DEM_{-1} + e_0$$

where:

$STARTS$ = single-family housing starts per household (in thousands of units, SAAR).

$PCTFAM$ = an index representing the share of households who meet qualification requirements for a fixed-rate mortgage on the median-priced new single-family house.

$HHLIQ$ = four-quarter average of short-term assets minus short-term liabilities per household (in 1972 dollars).

$MSLDOT$ = real growth in small time and savings deposits at savings and loans (in percent).

DCR = a dummy variable for credit rationing caused by disintermediation. $DCR = 1$ if the growth of deposits at savings and loans over two quarters earlier is negative or less than 1 percent at a compound annual rate. Otherwise $DCR = 0$. (It is also assumed that with the relaxation of usury ceilings on mortgage rates after 1978, scarcity of funds is reflected in the mortgage rate and credit rationing no longer occurs.)

$RCHO$ = the cost of capital of owner-occupied housing. (Appendix 2 for definition of this variable.)

$RCHR$ = the cost of capital of rental housing. (Appendix 2 for definition of this variable.)

DEM = ratio of the population in the 25 to 34 year age group to the total U.S. adult population.

Regression of Per Household Single-Family Housing Starts on Selected Variables, 1959-IV to 1984-III

Variable	Coefficient	t-statistic	Mean value of variable
Constant	−0.042	−2.6	1.0
Index of share of qualifying households	0.0334	3.9	0.66
Cost of capital of owner-occupied housing (in percent)	−0.0029	−2.0	8.89
Cost of capital of rental housing (in percent)	0.0020	1.6	10.68
Share of adult population age 25 to 34	0.1755	3.7	0.195
Average household liquidity (in thousands of 1972 dollars)	0.00063	1.7	7.61
Change in deposits at S&Ls (in percent)	0.0003	2.4	1.52
Dummy for credit rationing	−0.0013	−3.0	0.13

$\overline{R}^2 = 0.91$ Estimated rho = 0.62   Durbin Watson = 2.16
S.E. = 0.0010   Number of observations = 99
Mean of dependent variable = 0.01511   S.E./Mean = 0.066

e_0 = a randomly distributed error term.

The coefficients are of the expected sign. We tested for possible shifts in the equation at several points in time. In particular we tested for shifts: at the end of 1979 when the Federal Reserve shifted its policy target; at the end of 1982 when the introduction of MMDAs resulted in large deposit inflows to thrifts; and at the end of 1981 when thrifts started issuing ARMs. A joint F-test of the stability of all the coefficients at the 5 percent level of confidence supported the null hypothesis that the equation is stable over time. Similar tests were conducted to determine the stability of the individual slope coefficients. They were all found to be stable.

Appendix 2: Cost of Capital Definitions*

$RCHO$ = the cost of capital of owner-occupied housing

$$= (PEH/PCON) \, [(1-T)(RMEFF + 100 \, UTP) + 2.4 - 0.6 \, PRHDOT]$$

$RCHR$ = the cost of capital of rental housing

$$= (PEH/PCON)[((1-T)VWRH/(1-T)) \; ((1-T) \, RMEFF + 2.4 - 0.6 \, PRHDOT) + 100 \, UTP]$$

where:

T = $0.01 \, UTPF + TPS/YTF$
$UTPF$ = effective personal income tax rate

UTP = property tax rate
TPS = state and local government tax receipts
YTF = taxable income
PEH = price deflator for residential construction
$PCON$ = price deflator for consumption
$RMEFF$ = effective fixed-rate mortgage rate
$VWRH$ = percentage depreciation allowance for rental housing
$PRHDOT$ = expected increase in the rent index for residential structures (computed from a distributed lag on past increases in the index).

*From the Federal Reserve-M.I.T.-University of Pennsylvania econometric model.

Structural Change and Slower Employment Growth in the Financial Services Sector

New York City's post-1978 economic revival has been largely due to rapid employment growth in the banking and securities industries. These industries account for 40 percent of the new jobs created in the city since the turnaround began. It is not the case that after 1978 New York became more attractive to these industries. In fact, New York City's share of total securities industry employment has continued to decline and the share of bank employment has remained stable (Chart 1). Instead, New York has benefited from a large, albeit constant or slowly declining, share of the rapid national employment growth of these industries.

In the future, total U.S. employment in the banking and securities industries is likely to grow much more slowly than it has in the past, and some absolute declines in employment levels are possible. Employment in New York City's financial services sector may fare somewhat better than in the United States as a whole, but even local employment growth in these industries is likely to be slower than it has been since 1978.

For the last six quarters, for the first time since the early 1960s, U.S. bank employment has been essentially flat (Chart 2). There are three main reasons to believe that this slower growth in banking employment is the result of fundamental changes in the industry, and not the effect of a short-term squeeze on profits. First, the deregulation of interest payments on deposits has changed the incentives facing banks in ways that are likely to make the industry's retail operations less labor-intensive. Second, the automation of the United States

payments system—the process by which checks, credit card slips, and electronic funds transfers are cleared—is continuing rapidly and even accelerating. Finally, the banking industry is facing new competition from other financial services industries, particularly the thrifts and brokerage houses.

Employment in some banking activities may continue to grow. And new legislation may grant banks the power to expand into fields previously reserved for insurance companies, securities firms, or investment banks. But the retail branch and payments functions of banks are their most labor-intensive activities. So, in spite of the expansion of other functions, it is likely that total employment growth will be slow or even negative.

Employment growth in the securities industry has been rapid since 1978, and some data sources report continued increases,[1] but during the second quarter of 1984 employment at New York Stock Exchange (NYSE) member firms declined for the first time since the fourth quarter of 1977. One quarter's reversal of a trend may not mean much, but there are a number of reasons to believe that this could be the beginning of a period of much slower growth. As with banks, the retail functions of securities firms are the most labor-intensive. However, through most of the postwar period, the individual investor has been withdrawing from the direct ownership of corporate securities, choosing instead to invest through pension systems and mutual funds.

[1]The United States Department of Labor reports a continued increase through June 1984.

Chart 1

New York City's Share of U.S. Employment

Percent
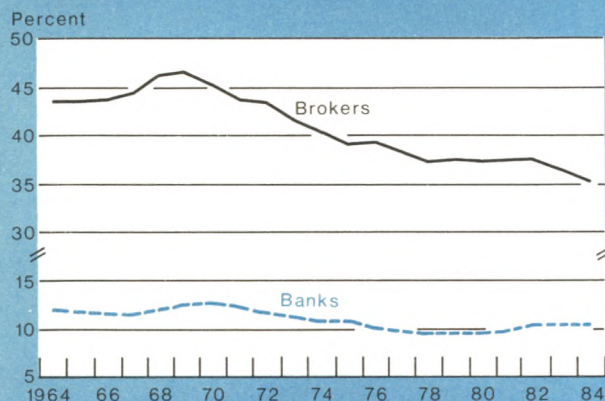
Source: New York State Department of Labor,
Division of Research and Statistics.

Between 1978 and 1982 there was a rather sharp, temporary reversal of that trend. Now the trend toward withdrawal of the individual investor has resumed, and at an accelerated pace. The reduction of work forces at NYSE member firms this year probably represents the industry's initial adjustment to the resumption of the postwar trend.

As with the banks, again, there will probably continue to be employment growth in the "wholesale" activities of securities firms—investment banking, serving institutional clients, and so on. Also, the sale of bank-like services by securities firms—cash management accounts, mortgage lending, and the like—could also increase employment within the industry. But the most labor-intensive function of brokerage firms, servicing actively managed retail securities accounts, shows relatively less promise of rapid growth.

Banking employment: longstanding trends

Between the early 1960s and mid-1970s growth in bank employment was driven by four very powerful forces, beyond the general demographic and macroeconomic factors affecting all industries. First, the role of banks in the economy was expanding throughout the period[2] as bank assets grew faster (on average) than GNP. Accordingly, the number of officers and employees needed to manage the banks' balance sheets rose faster than total employment. Second, with the secular

[2]Friedman, Benjamin M., "Postwar Changes in the American Financial Markets", Martin Feldstein, editor, *The American Economy in Transition*, National Bureau of Economic Research, 1980, page 4.

rise in nominal interest rates and the increased volatility of financial markets, more staff resources were devoted to cash float and portfolio management. Third, the volume of commercial transactions cleared through banks was growing rapidly. Through the 1970s the number of checks cleared in the United States grew at a rate of about 7 percent a year,[3] and the volume of credit card transactions increased even more rapidly.

Finally, as interest rates rose and Regulation Q limitations on deposit interest payments became binding, banks were induced to engage in a variety of "non-price" competitive activities. In other words, because banks were not allowed to attract deposits by offering market interest rates, they were forced to find other ways to compete. One of the ways they tried to expand their market share was by establishing widespread, and labor-intensive, branch networks. Another way banks competed for market share was to set the fees charged for services to depositors below the cost of production. With charges for clearing or stopping checks held down, consumers had little incentive to economize on their use of these services. Heavy use of depositors' services, in turn, stimulated further employment growth.

The last two forces—the increased volume of transactions and the incentives created by Regulation Q—probably had the greatest effect on overall bank employment. This is because transactions clearance and retail services are the most labor-intensive bank activities. None of the available breakdowns of bank employment by function categorize activities in exactly the way we do here. But available data indicate that about 70 percent of bank employees are engaged in the demand deposit and other retail-related functions (Chart 3).

Furthermore, as the volume of transactions cleared through banks grew rapidly through the 1970s, the payments system was being automated extensively and quickly. The computerization of check and credit card receipt processing substantially dampened the job-creating effects of volume growth. Consequently, the most powerful and unambiguous force increasing bank employment through most of the past two decades was the incentives created by the regulation of deposit interest payments.

Recent shifts in the fundamental forces

There are three reasons to expect slower employment growth in the banking industry. First, the deregulation of interest payments on bank deposits has changed banks' incentives substantially and in ways which tend to reduce the labor intensiveness of bank operations. As banks have been freed to offer market rate interest

[3]*Checking Account Usage in the United States,* Bank Administration Institute, 1979.

payments on retail deposits, their incentive to maintain expensive branch networks has been reduced. In fact, the year after the passage of the Monetary Control Act, which authorized NOW accounts nationwide, saw an abrupt decrease in net creation of bank offices (Chart 4). Net office creation became positive in 1983, but at a much lower level than had been typical before interest rate deregulation, and a substantial proportion of the post-1982 branch creation probably involves the placement of automatic teller machines (ATMs) at locations away from established bank offices. So the strongest force behind bank employment growth through the past two decades was eliminated by interest rate deregulation.

As the deregulation of interest payments on deposits proceeded through the early 1980s, banks also began to raise service fees to cover the cost of production. To the extent that these fee increases induce depositors to make less use of services, this change, too, could reduce employment per dollar of deposits.

The second force retarding bank employment growth in the future will be the next phase of automation of the payments system. At present paperless electronic funds transfer is mostly confined to very large, wholesale transactions among financial institutions. Smaller business and consumer transactions are still largely handled by moving and processing paper checks and credit card receipts. Now, with the development and dissemination of automatic teller machines, point-of-sale terminals, and home banking, electronic transfer can begin to replace

a larger share of paper transactions. As the potential of these technological innovations is exploited we can expect that employment in banks' payments function will contract, perhaps very sharply.

Finally, total bank asset growth, which had been consistently strong until the mid-1970s, has become much more erratic and slower on average since then.[4] Some of the financial service markets that have been traditionally reserved for commercial banks are now contested by other institutions. Thrift institutions offer checkable accounts and make commercial loans; securities firms offer cash management accounts and money market mutual funds; and investment houses offer commercial paper underwriting as an alternative to short-term bank loans. One example of the employment effects of this new competition: between the first quarter of 1981 and the second quarter of 1984 employment at S&Ls grew by 18 percent, compared with the banks' 5 percent.[5]

To be sure, employment in some bank functions is likely to increase, in some cases substantially in percentage terms. The trend toward more sophisticated

[4]Board of Governors of the Federal Reserve System, Division of Research and Statistics, Flow of Funds Table.

[5]United States Department of Labor, Bureau of Labor Statistics, *Employment and Earnings* (various issues). Employment at mutual savings banks is included in SIC 60. In this paper, therefore, no distinction is made between commercial banks and the much smaller mutual savings bank sector.

Chart 2

Employment Growth 1964-84

Four-quarter moving average

Index: 1964-IV=100

Sources: National Bureau of Economic Research; United States Department of Labor, Bureau of Labor Statistics.
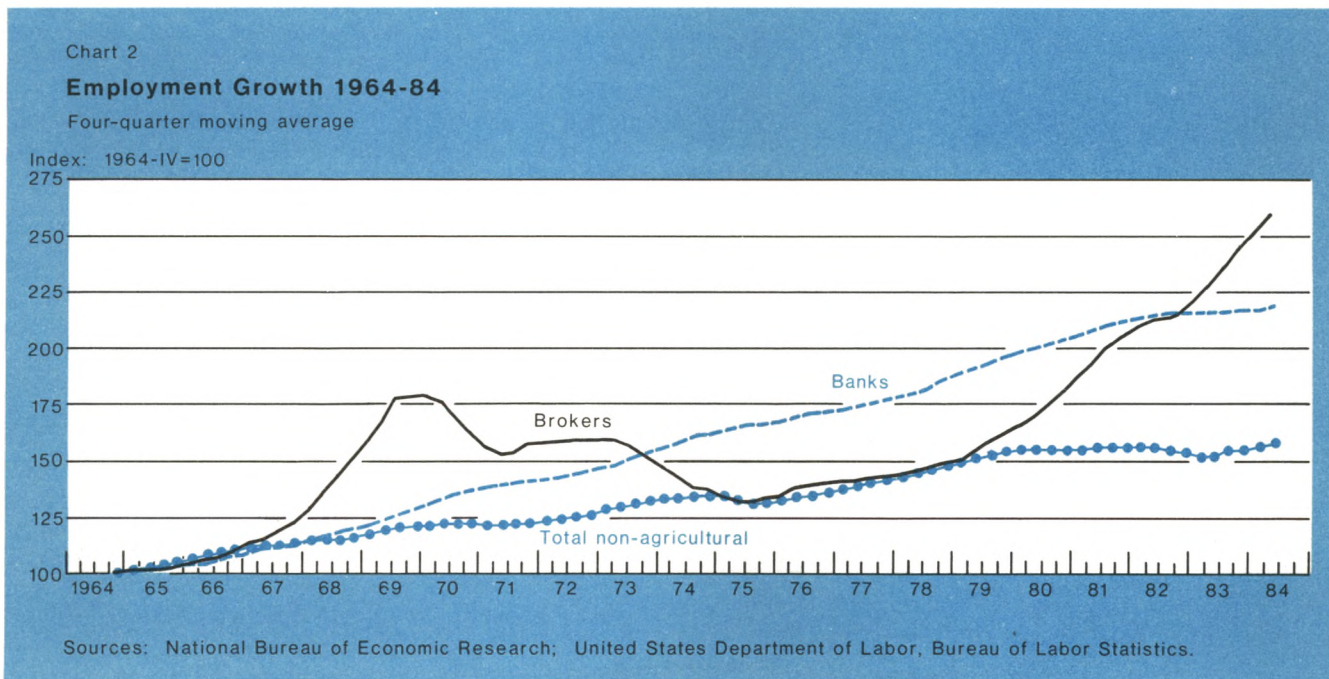
cash and float management, both on the banks' own account and as a fee-generating service to corporate customers, and the attendant growth in the staffing of this function will continue as long as interest rates remain high. Banks are also becoming more involved in off-balance sheet, fee-generating services: writing letters of credit, managing pension fund portfolios, originating loans for sale to third parties, and so on. And the larger banks are entering new lines of business such as insurance and securities brokerage. All these new functions will have to be staffed. Finally, the continuing movement toward interstate banking, especially through the establishment of "loan production offices" nation-wide, could increase some categories of bank employ-ment until regional market shares stabilize.

However, the sources of continued growth are all concentrated in the least labor-intensive banking func-tions. The forces for slower growth or contraction affect the functions that employ, by far, the most people. Therefore, the net effect of recent changes in the banking industry on employment growth will probably be negative. And it is possible that the contraction of branches (exclusive of unstaffed ATM locations) and the movement toward electronic funds transfer will result in substantial absolute employment reductions.

Chart 3

Bank Employment by Function

Banks with over $200 million in deposits, 1982
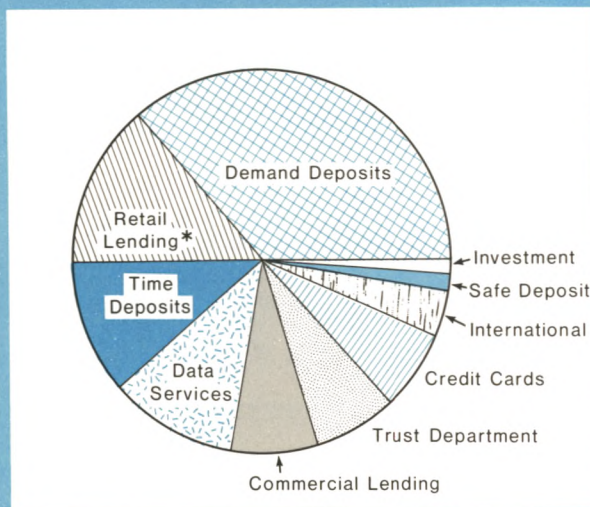
*Mortgage and installment.

Source: Federal Reserve Board, Functional Cost Analysis.

Securities industry revenues and employment

The securities industry is notorious for its patterns of "boom and bust".[6] In the late 1960s there was a sharp boom in industry employment followed by a marked bust in the early 1970s (Chart 1). Since 1978 the industry has been in another boom and the question naturally arises as to whether the most recent employment reduction is the beginning of another bust.

It is unlikely that the history of the late 1960s will simply repeat itself. The employment increases at that time were largely due to a serious but temporary paperwork crisis that followed some very large per-centage increases in market volumes. Since then exchange procedures have been modernized, the securities industry has been computerized, and the share of total volume accounted for by large, institu-tional block trades has more than quadrupled.[7] All of these innovations made it possible for NYSE volume to increase almost ten times faster than securities industry employment over the past 20 years. Even though no simple repetition of the early 1970s "bust" in securities industry employment is likely, the period of most rapid growth is probably over for now.

Like banks, securities firms perform a number of related but different functions: retail brokerage, insti-tutional brokerage, investment banking, securities trading, and so on. Retail brokerage is the most labor-intensive of these activities (Chart 5), but, over a long period of time, this segment of the securities industry has had a relatively poor record of growth.

The fundamental reason for slow average growth of the retail segment of the brokerage industry is that individual investors have been withdrawing from direct ownership of corporate securities through most of the postwar period (Chart 6). As the individual investor has withdrawn, the institutions have come to dominate securities markets and the securities industry has become, proportionally, much more of a "wholesale" operation. To be sure, the number of individual stock and bondholders has been increasing over the same period with general population growth and increasing real incomes. Furthermore, in the absence of data, we do not know whether individual investors have become much more active traders. However, the inflation-adjusted market value of directly-held household equity portfolios has been flat, on average, since 1975.
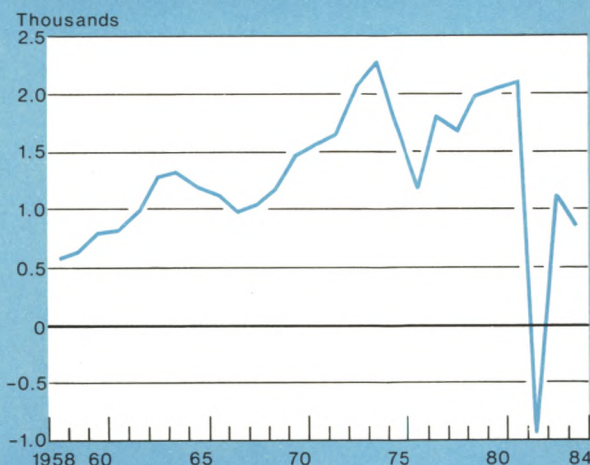
As the clientele of the most labor-intensive securities industry activity grew slowly, employment in the industry also grew slowly. Between 1964 and 1977, in spite of the marked boom of the late 1960s, industry employ-

[6]Most of the information in this section was gleaned from a review of The Economist over the past 20 years.

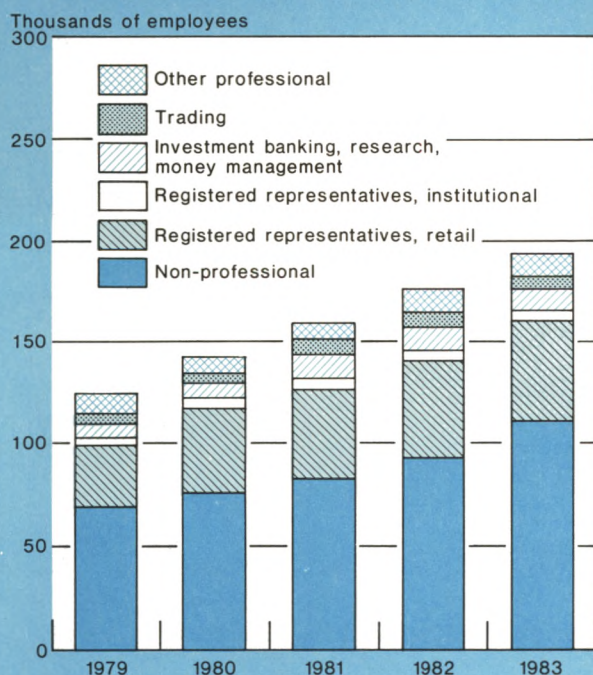[7]Fact Book 1984, The New York Stock Exchange, 1984, page 74.

Chart 4

Changes in U.S. Bank Offices

Thousands

Source: Federal Deposit Insurance Corporation.

Chart 5

Securities Industry Employment by Activity

Thousands of employees

- Other professional
- Trading
- Investment banking, research, money management
- Registered representatives, institutional
- Registered representatives, retail
- Non-professional

Source: Securities Industry Association, Securities Industry Yearbook.

ment only grew as fast as total U.S. employment. Then, in 1978, individual investors began to return to the equities market in a rather substantial way.

For the securities industry the retail investor is a particularly lucrative customer. This has been especially true since 1969 when the institutional investors began winning major concessions on commissions from their brokers. Before the relatively recent growth of the retail discount segment of the industry, individuals had little choice but to pay full commissions. In addition, a large retail clientele offers distinct advantages when a firm begins marketing new financial services such as cash management accounts and money market funds. The securities industry may, therefore, have a tendency to over-react to any reappearance of the retail investor and to react slowly to a resumption of the household sector's withdrawal from direct ownership of equities.

This seems to be what has happened since 1978. Industry employment began growing rapidly at the same time as the individual investor began "returning", and, in terms of number of professionals, most of the increase has been in the retail segment (Chart 5).

There are three reasons why this increase is probably not sustainable. First, the return of the individual investor proved to be only temporary. The share of corporate equities held directly by the household sector began falling again early in 1981 and the rate of decline has accelerated. Second, even if the brokerage firms wanted to maintain a large retail sales force in hopes of increasing market share, they would be under some immediate pressure not to. The total pretax net income of NYSE member firms peaked in the fourth quarter of 1982 and has been falling fairly steadily since then (Chart 7). Finally, even though total securities firm revenues have increased substantially since 1978, real commission revenues have been essentially flat. Most of the increase in operating incomes has come from the investment underwriting and "other securities-related" activities of the firms (Chart 8). The latter include, for example, the asset and money management and investment advisory functions. But this means that most of the revenue growth has been in the least labor-intensive functions of the securities industry.

Of course, there is a close connection between a firm's retail activities and the non-commission revenue. For example, a substantial portion of interest income is paid by retail clients borrowing on margin, and the mutual fund management fees a firm earns can depend on the success of its account executives in marketing those funds to retail clients. Nevertheless, servicing actively managed retail securities portfolios still pays the bulk of the salaries of the most numerous professional employees of securities firms, the retail registered representatives. Unless the household sector permanently

Chart 6
Household Share of U.S. Corporate Equity
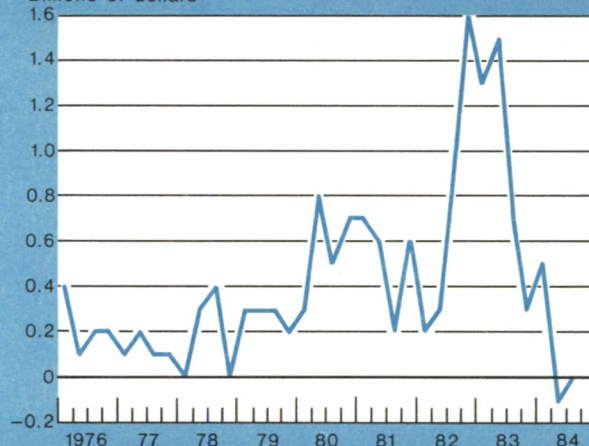Excluding mutual funds

Percent
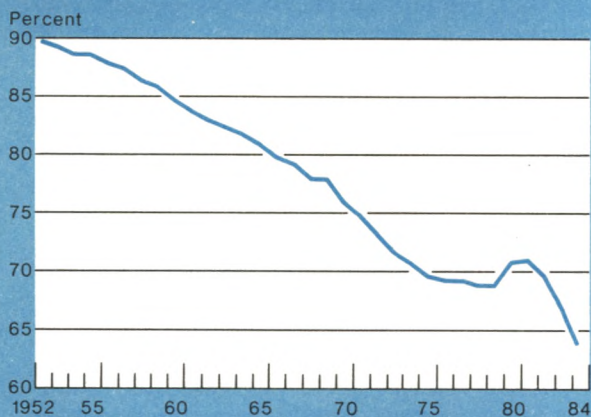
Source: Board of Governors of the Federal Reserve System, Division of Research and Statistics.

Chart 7
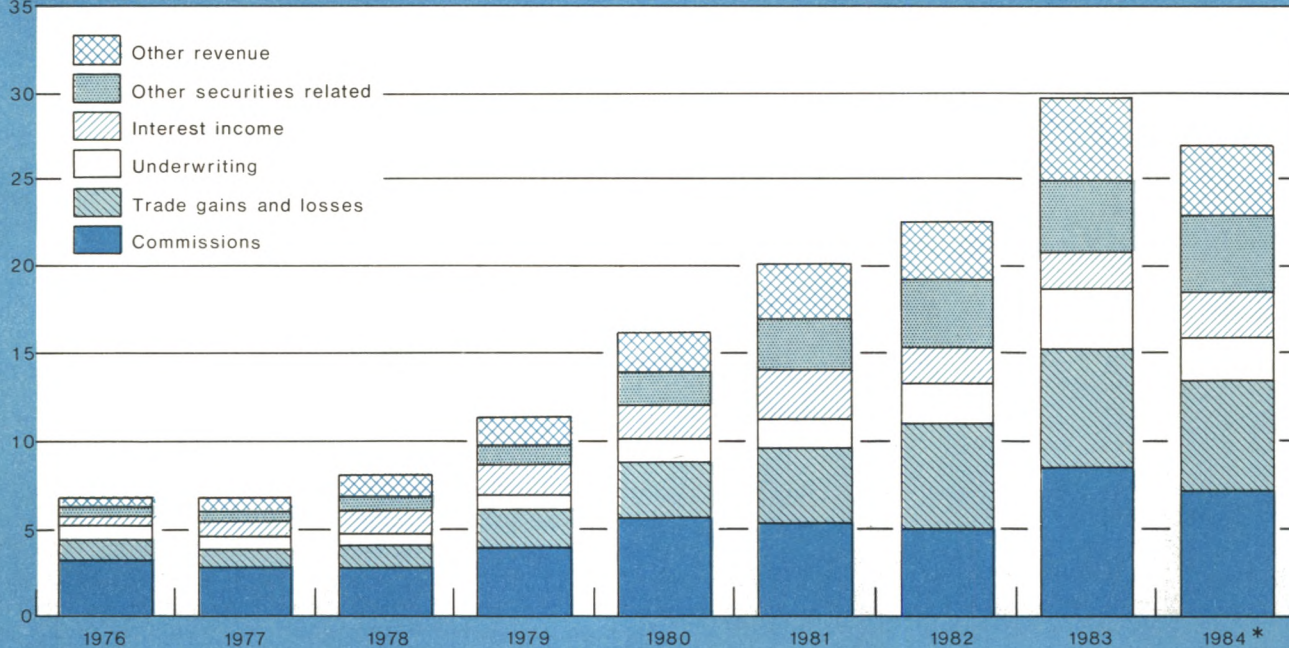### Securities Industry Pretax Net Income
Billions of dollars

Source: Securities Industry Association.

Chart 8
Securities Industry Revenues by Source
Billions of dollars

Other revenue
Other securities related
Interest income
Underwriting
Trade gains and losses
Commissions

* 1984 data based on first two quarters annualized.

Source: Securities Industry Association.

reverses its long-standing withdrawal from direct participation in securities markets or those individuals who do hold securities increase their trading activity sharply, it will be hard to sustain rapid growth in total industry employment.

The securities industry could benefit from some current demographic trends. As the baby boom generation enters the peak earning and saving years of the life cycle the number of retail securities customers could increase. But it remains to be seen whether this generation will choose to build directly-held and actively managed portfolios.

New York City as a special case

Our analysis of the prospects for employment growth in these two industries nationwide requires some modification when applied to New York City. Most of the changes that are taking place in the banking and securities industries are likely to have a smaller negative impact, or even a positive effect, on employment in New York City. A theme running throughout the body of this paper is that employment in the "wholesale" or institutional segments of the banking and securities industries is likely to fare better than the retail segments. Indeed, there are many reasons to expect that wholesale employment will continue to grow fairly rapidly. New York, *the* national center for institutional financial services, is likely to benefit from continued growth of the "front office" work force.

New York is also the center for the international segments of the banking and securities industries. After several years of rapid growth, foreign bank employment in the United States—most of it concentrated in New York—decreased by 10 percent in 1983.[8] Nevertheless, there is a strong secular trend toward an increasing internationalization of capital markets, and as this trend continues employment in related activities will increase in New York.

[8]*The Banker,* February issues, 1980-84.

Also, the trend toward employment reductions in the retail end of the banking industry may be more advanced in New York than nationwide. NOW accounts were available in New York before they were authorized nationwide, and net bank office creation began to slow in this region before it did nationally. Hence, New York may have already experienced more of the total employment reduction brought about by deposit interest deregulation than the rest of the country.

Finally, the New York City and State governments have embarked on a number of efforts which could enhance the city's relative attractiveness to the banking and securities industries. Policies and programs aimed at rationalizing bank taxes, reducing the aggregate tax burden, lowering utility bills, etc., could, if they are successful, reduce some of the handicaps that have eroded the city's share of U.S. financial services employment.

For all of these reasons, the impact of the broad trends tending to reduce financial services employment could be smaller in New York than elsewhere. Nevertheless, there remain a number of threats to local employment in this sector. Other states have become more aggressive in competing to attract bank employment away from New York and some, notably Delaware and South Dakota, have been successful. For many years New York's suburbs have offered financial service firms attractive alternatives for location of back office operations.

A number of bank and to a lesser extent securities industry operations have moved out of New York City, but many still remain. How long they stay will depend on the operational linkages between the front office activities—which are tied to New York locations—and the relatively mobile back office functions. Predicting how financial services employment will develop in New York in the future requires an analysis of those linkages, as well as an assessment of the City's ability to attract a larger share of employment in two industries that will be growing more slowly.

Aaron S. Gurwitz and Julie N. Rappaport

Treasury and Federal Reserve Foreign Exchange Operations

During the three-month period August to October, the dollar continued to advance from the levels reached in mid-summer. After pausing in August, it resumed its rise to set new highs against many European currencies in September and again in October. Although it eased somewhat in the final weeks of the period, the dollar closed up on balance over 3 percent against the German mark and other European Monetary System currencies and 6 percent against sterling. Against the Japanese yen, the Canadian dollar, and the Swiss franc, however, the dollar registered little net change. On a trade-weighted basis the dollar closed up almost 3 percent.

Throughout this period, the dollar drew support from its role as a major medium of investment. Inflationary expectations worldwide moderated further in response both to price performance in the United States that was better than generally expected and to renewed weakness in several important commodity prices, especially petroleum. This development enhanced the climate for investment in financial assets in general and in U.S. dollar-denominated securities in particular. Dollar interest rates, after taking account of anticipated future inflation, were perceived to be relatively attractive, even though

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market interest rates declined almost continuously in the United States and by considerably more than in most other major countries. Moreover, investors remained impressed by the current economic strength of the United States relative to Europe, by the flexibility of our markets, and by the perceived lower level of labor management conflict. They expected the Administration's economic policies to be reaffirmed in the forthcoming election. The repeal of the withholding tax on foreign-held U.S. securities and anticipation of the first of the Treasury's "foreign-targeted" issues were also cited at times as stimulating interest in U.S. securities.

In the weeks after Labor Day, the dollar was bid up further in response to a variety of shorter-term factors. With the dollar firm in the face of a record U.S. trade deficit reported for July, evidence of some slowing of the domestic economy, and easing U.S. interest rates, many market participants began to purchase dollars to meet their remaining requirements for the year. Recurrent reports of commercial demand for dollars, together with the investment interest, helped to turn sentiment toward the dollar decidedly more bullish. As the dollar rose to break through anticipated resistance levels, some market professionals began to position more aggressively. The dollar moved above the DM 3.00 level against the German mark by September 11 and ten days later hit an 11½ year high of DM 3.1765.

In this atmosphere, market observers decided that foreign central banks were less likely than before to

resist depreciation of their currencies, either through intervention or through a tightening of domestic monetary policy. The economic recovery in Europe was viewed as disappointingly weak, with unemployment rates holding néar all-time highs. The further stimulus given to these countries' export industries was thought to be welcome. And, with inflationary expectations more subdued, the impact of a weakening of the European currencies on their domestic prices was thought to present less of a risk to the authorities' anti-inflation policies. These perceptions appeared to be confirmed during the first three weeks of September by the lack of forceful official action designed to curb the dollar's rise. In addition, market professionals interpreted statements of foreign officials as tolerating developments in the exchange markets.

On September 21, however, the Bundesbank entered the exchange market to sell aggressively a substantial amount of dollars, and the dollar fell sharply. This was the first of several highly visible Bundesbank operations that took place during the remainder of the period under review. The U.S. authorities had intervened on one occasion earlier in September to buy $50 million equivalent of marks. Following the German operation of September 21, the U.S. authorities again entered the market, buying $135 million of marks during three days in the subsequent week.

The dollar then moved back up in mid-October to test the highs reached in September. The Bundesbank again operated substantially to sell dollars. On October 17, the U.S. authorities also entered the market and bought $95 million equivalent of marks. All of these U.S. operations, which totaled $280 million during the three-month period and were evenly divided between the Federal Reserve and the Treasury, were undertaken to counter disorderly trading conditions.

In response to the operations during September and October by various central banks, market participants were more sensitive to the possibility that the Bundesbank and other central banks might intervene, either individually or concertedly. They also came to believe that the central banks on the continent would be slow to let short-term interest rates in their countries ease in sympathy with the declines taking place in the United States, preferring to let a narrowing of adverse interest rate differentials give some further support to their currencies. Also, after mid-October the decline in U.S. short-term interest rates accelerated. The Federal Reserve was perceived as having room to be more accommodative in its monetary policy given the decline in GNP growth for the third quarter, slow monetary growth for the period under review, and further evidence of weak oil prices and moderate inflation. Market professionals were therefore more reluctant to buy dol-

lars until they could gauge the extent that a narrowing of interest differentials would come to influence exchange rate relationships. As a result, the dollar eased somewhat in late October.

During the three-month period there were no drawings on credit facilities of the U.S. monetary authorities. On

Table 1

Federal Reserve Reciprocal Currency Arrangements
In millions of dollars

Institution	Amount of facility October 31, 1983	Amount of facility October 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	700	700
Netherlands Bank	500	500
Bank of Norway	250	250
Bank of Sweden	300	300
Swiss National Bank	4,000	4,000
Bank for International Settlements:		
Swiss francs-dollars	600	600
Other authorized European currency-dollars	1,250	1,250
Total	30,100	30,100

Table 2

Net Profits (+) or Losses (−) on United States Treasury and Federal Reserve Current Foreign Exchange Operations
In millions of dollars

Period	Federal Reserve	United States Treasury Exchange Stabilization Fund
August 1 through October 31, 1984	-0-	-0-
Valuation profits and losses on outstanding assets and liabilities as of October 31, 1984	− 1,233.6	− 802.0

Data are on a value-date basis.

October 12, however, the Treasury Department announced that it had joined with the Bank of Japan and the Bank of Korea in arrangements to provide short-term financing to the Central Bank of the Philippines totaling $80 million in support of the Philippine economic adjustment program which had been agreed upon with the management of the International Monetary Fund (IMF). The Treasury, through the Exchange Stabilization Fund (ESF), agreed to provide $45 million, the Bank of Japan $30 million, and the Bank of Korea $5 million. Drawings on the arrangements were to be made available when the Managing Director of the IMF confirmed that the IMF had received assurances of the availability of adequate financing in support of the Philippine economic adjustment program and had formally submitted the Philippine request for a standby arrangement to the Executive Board of the IMF. It was understood that the drawings would be repaid at the time the Philippines draws from the fund. Shortly after the end of the period, the conditions for the disbursement of the funds were met and the financing provided.

In the period August through October, the Federal Reserve and the ESF realized no profits or losses from exchange transactions. As of October 31 cumulative bookkeeping, or valuation, losses on outstanding foreign currency balances were $1,233.6 million for the Federal Reserve and $802.0 million for the ESF. Valuation gains and losses represent the increase or decrease in the dollar value of outstanding currency assets and liabilities, using end-of-period exchange rates as compared with rates of acquisition. These valuation losses reflect the dollar's appreciation since the foreign currencies were acquired.

The Federal Reserve and the Treasury invest foreign currency balances acquired in the market as a result of their foreign exchange operations in a variety of instruments that yield market-related rates of return and that have a high degree of quality and liquidity. As of October 31, under the authority provided by the Monetary Control Act of 1980, the Federal Reserve had invested the equivalent of $1,121.3 million of its foreign currency resources in securities issued by foreign governments. In addition, the ESF held the equivalent of $1,683.6 million in such securities.