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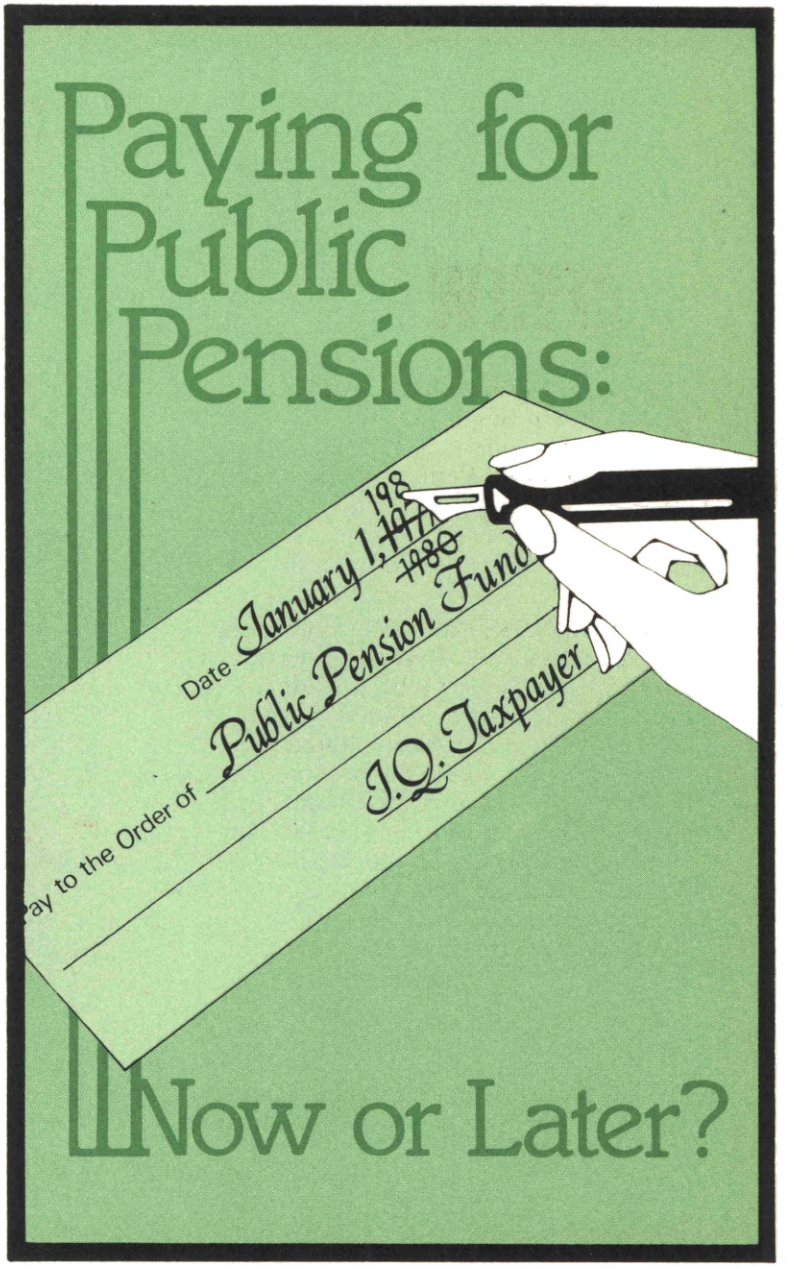
# Paying for Public Pensions: Now or Later?

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*Robert P. Inman*

. . . Coping with the nation's large and growing public pension debt will test the ingenuity of policymakers.

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*Howard Keen, Jr.*

. . . Interest rate futures may help bankers protect their portfolios against adverse changes in interest rates.

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# Paying for Public Pensions: Now or Later?

*By Robert P. Inman**

Retirement is an important moment in the American worker's life—for corporate president, blue-collar technician, soldier, and civil servant alike. Building a secure retirement has become part of the American dream. But how secure that retirement will be has a lot to do with how carefully retirement income has been planned. And public-sector workers at all levels of government are finding that the pensions they have planned on for their retirement years are becoming more and more controversial.

The reason is that public pension programs typically show large funding gaps. Not enough has been put aside in working years to cover promised payments during retirement years, and the difference must be made up somehow if the expected benefits are to be paid. There are ways to deal with the funding gap. But because of its size, and because the whole matter is so complex and sensitive, finding a timely answer to the public pension funding question will test the ingenuity of policymakers.

## PENSION GROWTH

The past 30 years have seen a significant expansion in the retirement benefits afforded this nation's public employees. In 1950, public employee retirement systems for state and local and for Federal civil service and military personnel paid approximately $1 billion of benefits to a little more than half a million beneficiaries—an average annual payment of $1,666 per retiree. By 1977, those numbers had grown to $27.1 billion of benefits and five million retirees; the average annual benefit now is $5,400 per retired worker.[1] Thus public employee pensions have become a significant

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[1]Social Security Administration, Social Security Bulletin, Annual Statistical Supplement, 1975; and "Benefits and Beneficiaries under Public Employee Retirement Systems, 1977," Research and Statistics Note, 1980.

portion of public workers' expected compensation and a significant cost to taxpayers.

Public pension obligations seem destined to grow still larger in future years. The aggregate financial position of major public employee retirement systems in the U.S. shows a fourfold growth in the current value of promised pension payments from 1950 to 1975. The workers who were promised pensions in 1975 will be retiring in the 1980s and 1990s with the expectation that the promises made to them will be fulfilled. But the level of public pension assets needed to meet those promises has not kept pace. The gap between promised pensions and accumulated assets—the unfunded liability of the pension system—has grown (see PENSION PROMISE COMMITMENTS . . .). At some point between now and the time these workers retire, either the gap must be closed with increased taxes or they will be denied their full pensions. Even though the gap has been growing larger for some time, current retirees still are receiving their pensions. But tax relief bought in the past through unfunded pensions has created a ticking tax bomb that may explode in the not too distant future. The question confronting policymakers now is how best to defuse it.

## PENSION UNDERFUNDING: THE DANGERS

Underfunding public pension plans has one obvious danger—the money to pay benefits may not be there on the day it's due to the pensioner. But it also has more subtle dangers connected with levels of public service consumption and of private savings and capital formation. These dangers depend on how the funding is structured and on what level of government administers the plans.

**Benefits and Contributions.** Retirement systems currently in effect for employees of state and local governments, the Federal civil service, and the Armed Forces all promise the public employee a pension upon retirement. This pension is to be paid as an annuity equal to a fixed percentage of the worker's preretirement salary. Such public employee pensions are *benefit* plans defined by rules which set the fraction of preretirement salary to be paid as the retiree's annuity.[2] Defined benefit plans are different from defined *contribution* plans, sometimes used in the private sector, where the amount of the pension is dependent upon only what the employee and the employer actually contribute over the worker's working life to a retirement fund. Defined *contribution* pension plans can be managed poorly and yield low returns, but by definition they can't be underfunded. Defined *benefit* plans, however, can be underfunded whether or not they are poorly managed, since promised benefits are unrelated to contributions.

Should defined benefit plans for public employees be fully funded to make sure that the assets of the plan can meet the pension obligations promised to current workers and retirees? The answer is not obvious. The current social security system is a form of defined benefit pension plan and it is far from fully funded. Indeed, no less an economist than Nobel Prize winner Paul Samuelson has argued that underfunding the social security system is exactly the right thing to do to maximize the well-being of current and future taxpayers and retirees.[3]

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[2]The rules which set the fraction of preretirement salary—the so-called replacement rate (since the annuity replaces salary)—vary across all public employee plans. But the usual pattern is to give the worker two percent of preretirement salary for each year of service up to a maximum of 50 percent or 60 percent of salary. Therefore a worker who serves 25 years will receive one-half (25 years times two percent) of salary. The definition of preretirement salary also can vary across plans. In the simplest case, it is just the last year's base pay. Some plans allow overtime pay to be included, others average salary over three to five years before retirement, and still others average salary over the worker's whole career. For more detail, see Robert Tilove, *Public Employee Pension Funds* (New York: Columbia University Press, 1976).

[3]See Paul Samuelson, "An Exact Consumption-Loan Model of Interest with or without the Social Contrivance of Money," *Journal of Political Economy* 66 (December

## PENSION PROMISE COMMITMENTS EXCEED EXPECTED FUTURE ASSETS

The accompanying Figure presents new estimates of the funding status of public employee pension plans through 1975.* Columns 1, 5, and 9 give the present value level of pensions promised to public employees in billions of 1972 dollars. Columns 2, 6, and 10 estimate the present value of pensions less employees' and employers' contributions over the working life of the employee. These estimates approximate the employees' net gain in wealth (pension minus contributions) from the pension plan. The military retirement system, which is a pay-as-you-go pension plan, has no accumulated assets. Columns 4, 8, and 12 approximate the uncovered liabilities of each public employee pension. Uncovered liabilities are estimated here as the gap between the present value of the pensions which have been promised and the expected contributions and assets now available to cover those promises.

The gap is sizable, and over the past 25 years it has grown significantly. When 1975 is compared to 1970, it appears that Federal uncovered liabilities have stabilized; yet state and local uncovered liabilities continue to grow. The size of the burden is unsettling: an *additional* $1,270 per person must be found if 1975 pension promises to public employees are to be met.

The results here are not strictly equivalent to an estimate of what actuaries define as the unfunded liability of a pension plan. Hence the use of the term 'uncovered liability'. The key difference is how employees' and employers' contributions are estimated. The Philadelphia Fed estimate is based upon a continuation of recent funding behavior, while a true actuarial estimate calculates the level of contributions needed to fund all future benefits fully (the normal cost of the plan), thus leaving only the effects of past underfundings in unfunded liabilities. The estimate of uncovered liabilities seems more appropriate for understanding the current economic status and implications of public pensions.

### PUBLIC PENSION WEALTH AND ASSETS

**(billions of 1972 dollars)**

| | CIVIL SERVICE | | | | MILITARY | | | | STATE AND LOCAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Gross Wealth | Assets† | | | Gross Wealth | Assets† | | | Gross Wealth | Assets† | | |
| | | Net Wealth | | Uncovered Liabilities‡ | | Net Wealth | | Uncovered Liabilities‡ | | Net Wealth | | Uncovered Liabilities‡ |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| 1950 | 39.42 | 37.76 | 6.73 | 31.03 | 56.87 | 55.20 | 0 | 55.20 | 32.96 | 29.82 | 9.65 | 20.17 |
| 1960 | 66.91 | 63.56 | 14.06 | 49.50 | 84.73 | 81.30 | 0 | 81.30 | 93.25 | 75.55 | 25.86 | 49.69 |
| 1970 | 103.28 | 95.78 | 24.25 | 71.53 | 133.45 | 122.42 | 0 | 122.42 | 184.65 | 144.98 | 59.37 | 85.61 |
| 1975 | 129.75 | 105.72 | 30.32 | 75.40 | 135.88 | 118.12 | 0 | 118.12 | 239.86 | 184.09 | 77.52 | 106.57 |

*For details of these estimates see R. P. Inman and L. S. Seidman, "Estimates of Public Employee Pension Wealth," Research Paper No. 60, Federal Reserve Bank of Philadelphia, forthcoming.

†Asset data from A. Munnell and A. Connolly, "Funding Government Pensions: State-Local, Civil Service, Military," in *Funding Pensions: Issues and Implications for Financial Markets*, Federal Reserve Bank of Boston, 1977.

‡Uncovered liabilities equals net wealth minus assets.

When a pension system is totally underfunded, so that its accumulated assets are zero, it is a pay-as-you-go plan and current taxpayers contribute to cover only the benefits of current retirees. Such a scheme works well as long as future retirees can be assured that payments will be made when they retire *and* as long as promised pension obligations do not grow much faster than the tax base, placing an oppressive burden on future taxpayers. If either of these two conditions for pay-as-you-go funding is not met, then partial funding or full funding is preferred. For each of the three major public employee retirement systems—state and local, civil service, and military—there are good reasons to believe that a move towards full funding is in order.

**State and Local Pensions.** The argument for fuller funding of state and local pension plans turns crucially on their being paid for at the state or local level. This arrangement creates a unique incentive to underfund. Current residents of the governing jurisdiction can receive the benefits of local labor services, promise to compensate the workers who provide them through a defined benefit pension, and then fail to contribute towards that promise by not funding today and by moving out tomorrow.

It's easy to imagine the trouble that this can cause in a highly mobile society. State and local pension funding begins to look very much like a fancy dinner party where public services are the main dish and the tab is split evenly among the diners no matter what or how much they consume: each has an incentive to buy the most expensive entree, because all the other diners will be paying part of the extra cost. Since households can move from town to town and from state to state, and since everyone must live somewhere, people end up sharing each others' local and state pension obligations. Just as at the dinner party where all have an incentive to buy the expensive entree when they share the check, so too here there is an incentive for residents to overconsume their local services. If every group of local taxpayers buys local services and pays public employees with the idea of shifting some of the burden to other taxpayers through underfunding, then clearly the state and local system as a whole will overbuy when underfunding of defined benefit pensions is allowed.[4]

Underfunding also can create significant inequities, since those who pay the cost don't garner a commensurate benefit. Future residents, not current ones, pay a major fraction of the costs of current services. Yet future residents do not receive any of the benefits of such services. Those particularly hurt are taxpayers who leave a jurisdiction that does fund its pensions and who move into a jurisdiction that has large unfunded liabilities to be covered. New residents might claim that these large tax obligations for unfunded pension liabilities are not their responsibility. They could refuse to pay.[5] In that instance, the burden would shift either to retired workers (who would receive only a fraction of their

1958), pp. 467-482. Samuelson's arguments have been analyzed in more detail by M. S. Feldstein, "Perceived Wealth in Bonds and Social Security: A Comment," *Journal of Political Economy* 84 (April 1976), pp. 331-336 and Robert Barro, "Reply to Feldstein and Buchanan," *Journal of Political Economy* 84 (April 1976), pp. 343-349 in their recent debate over the savings effects of social security.

[4]In the course of research on public pensions recently conducted at the Federal Reserve Bank of Philadelphia, a significant incentive to overbuy local fire services was discovered for a sample of 70 large U.S. cities that use defined benefit pension plans as compensation for their firefighters. See R. P. Inman, "Public Pensions, Public Unions, and the Local Labor Budget," Research Paper No. 58, Federal Reserve Bank of Philadelphia, forthcoming.

[5]The courts usually have upheld the rights of workers to their full pensions and have required payment, and often the state will assist localities whose pension plans are nearly bankrupt. See, for example, U.S. House of Representatives, Committee on Education and Labor, Subcommittee on Labor Standards, *Pension Task Force Report on Public Employee Retirement Systems*, 95th Congress, March 15, 1978, pp. 98-99.

promised pensions) or to a larger pool of taxpayers (if the state or Federal government offers grants assistance to bail out the local plan). Again, tax dollars are redistributed from current nonresidents to current residents. And underfunding is the vehicle that transfers these dollars.

While the mobility of area residents tends to produce inequities when pensions are underfunded, some have suggested that it might generate a cure as well. The cure, like most medicines, has an imposing name—'capitalization'. Capitalization is the process by which all the advantages and disadvantages of owning an asset, including the relative size of its tax liability, are reflected in its price. To work its wonders, capitalization requires that all buyers and all sellers of the assets know fully just what those advantages and disadvantages are—for example, when they sell a house in one community and buy a new house elsewhere. With the residence comes not only a living space but also a tax obligation for any past pension underfunding. More rooms and larger yards presumably are advantages that increase the value of a house, but a tax obligation for past pension underfunding is a disadvantage and should reduce its value. If buyers and sellers were fully informed of the size of the underfunded obligation, then the price of the house should decline by just the dollar amount needed to cover the unfunded pension promises.

How is such perfect capitalization supposed to solve the problems of pension underfunding? First, with the capitalization of any unfunded pension obligations, current residents no longer would be able to escape the full price of the public services they consumed. They would pay for those services through current tax payments or, if they attempted to shift those costs of current services onto new residents with pension underfunding, through a decline in the resale value of their houses. Either way, they would pay the full cost of currently provided services. The incentive to overbuy would be removed.

Second, the redistribution from future residents to current residents or from workers to current residents would cease. Future residents would receive a fully compensating reduction in the price they paid for housing. Current workers would get their pensions because all new residents had been compensated in anticipation of covering, in full, the pensions promised to workers.[6] Capitalization would operate as a perfect antidote to the major ills caused by state and local pension underfunding.

But the capitalization cure for state and local underfunding works only in special circumstances, and these may be so special as to be uninteresting. Both buyers and sellers of housing must know the true level of pension underfunding. But most state and local pensions are reviewed by actuaries only every three or four years, and even then the results, if publicized, are hard for the layman to interpret. So it probably is unrealistic to look to capitalization as a remedy for pension underfunding at the state and local level. Other measures, directed at increasing the assets of pension funds, may be necessary.

**Civil Service and Military Pensions.** Civil service and military pensions are different from state and local pensions in one fundamental respect: they are national pension plans whose liabilities are hard to evade. Thus high resident mobility will not occasion difficulties for them as it does for state and local plans. But the underfunding of these pensions will not be problem free.

These plans have the same advantages and disadvantages as the other major underfunded national pension program—social security.

The current pay-as-you-go method of funding social security has come under renewed scrutiny in recent years. Pay-as-you-go has come to be seen for what it really is—a scheme of intergenerational transfers in which current workers subsidize the retirement benefits of current retirees.

[6]The courts are the ones who enforce this promise.

Current workers need not be net losers under social security. They can legislate retirement benefit increases in excess of the taxes they have just paid to the current elderly and then ask the next generation of workers to fund their increased benefits. The increase in benefits over taxes will constitute an increase in the net wealth of the current working population, and the burden of funding passes once again to the next working generation. And this next generation, like its predecessor, can increase benefits in excess of taxes paid and make itself better off as well. And so it goes. Through pay-as-you-go financing and legislated retirement benefit increases, each generation of workers can continue to increase its net wealth at the expense of the next generation.

Unfortunately, however, the game may not go on forever.[7] If benefits grow faster than worker income, the day may come when one working generation, having been asked to contribute what it considers an excessive share of its earned income, refuses to contribute any more and declares the system bankrupt. The losers would be the retirees who had lost their social security pensions or the last round of workers who had contributed something to the system with no hope of recouping their contributions. Something like this could happen to civil service and military pension plans as well as to social security.

There is a second, more subtle difficulty with national pay-as-you-go pension plans. As Martin Feldstein has pointed out, the increases in net wealth enjoyed by plan members before the system goes bankrupt may encourage these workers to save less and consume more. In effect, the creation of wealth through social security displaces each generation's incentive to save for its own retirement. Feldstein estimated the size of this effect.[8] And although Social Security Administration economists have uncovered a programming error that biased the initial estimates sharply upward, Feldstein reports that his corrected estimates are "very similar" to the conclusions reported in the earlier study (*The New York Times*, October 5, 1980). Another recent study estimated that the stock of productive equipment is smaller by some 14 percent as a result of the social security program.[9]

Unfunded civil service and military pensions face both the bankruptcy and the savings loss which threaten social security. There is nothing to prevent current taxpayers from financing civil service and military pensions through Federal government borrowing, thereby shifting the tax burden onto future generations, while continuing to enjoy the services today of those Federal employees. But eventually the debt must be repaid.

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[7]Though Samuelson thought it might. If the working population and worker productivity together grow at a faster rate than legislated benefit increases, then retirement benefits need not become an excessive share of earned income and Samuelson is correct. The current evidence, however, is against him.

[8]See M. S. Feldstein, "Social Security, Induced Retirement, and Aggregate Capital Accumulation," *Journal of Political Economy* 82 (September/October 1974), pp. 905-926.

[9]See L. Kotlikoff, "Social Security and Equilibrium Capital Intensity," *Quarterly Journal of Economics* 93 (May 1979), pp. 233-254.

Professor Barro has presented the ingenious argument that social security wealth, like all government debt, will not affect private savings because households fully anticipate the future taxes which such debt will impose. While the future income from publicly created wealth is expected to reduce current savings (Feldstein's position), families will realize they will have to pay taxes at a later date to cover the associated wealth creation, and in anticipation of this tax increase they will save more (Barro's counterargument). The two effects offset each other, according to Barro, and thus government debt should have no effect on savings.

Deciding who is correct—Feldstein or Barro—will have to wait for the empirical evidence. Some empirical analysis shows a significant public wealth effect on savings, but Barro's work shows no such effect. The Philadelphia Fed work on this question generally supports the conclusion that public wealth does reduce private savings, but the issue still must be treated as an open question.

Further, current government employees reduce their private savings in anticipation of their promised retirement annuity. And so do nongovernment employees, since they needn't set anything aside to cover future civil service and military pension costs. Thus the total savings of government employees and nongovernment workers could be decreased with unfunded Federal pensions.[10] This same depressing effect on private savings can occur with underfunded state and local pensions. A recent study of U.S. savings behavior conducted at the Federal Reserve Bank of Philadelphia, for example, has found a significant private savings offset from unfunded public employee pension plans. Of course, the unfunded public employee pension system is much smaller than social security. But in the aggregate the Philadelphia Fed study estimates a 10-percent to 20-percent reduction in the current rate of capital accumulation because of unfunded public employee pensions.[11]

Thus the underfunding of state and local pensions may create a false incentive to expand the provision of state and local services while at the same time redistributing tax dollars from future residents (and possibly workers if the system goes bankrupt) to current residents. Full capitalization of state and local pension underfunding would prevent these misallocations, but there are good reasons to doubt that full capitalization will occur in very many cases. Further, the underfunding of civil service and military pensions also raises the specter of bankruptcy. And finally, the underfunding of either state and local, civil service, or military pensions could lead to a reduction in private savings without any compensating increase in government pension fund accumulation. The net effect would be a drop in U.S. capital accumulation. But these difficulties can be dealt with.

## DEFUSING THE TIME BOMB

While the new contributions required to fund public pensions are large—approximately $5,000 for a family of four—the funding need not take place all at once. The outstanding pension bill will come due in small amounts as workers retire over the next 30 years, and so the payments can be spread out over time. Further, the exact payment schedule is less important than the commitment to make those payments.

In 1971 the Federal government made this kind of a commitment to the civil service retirement fund. To stabilize the level of uncovered liabilities, the Treasury began to make additional contributions. Such contributions are expected to reach 33 percent of payroll in the 1980 budget. Yet for Federal pension funds such as the civil service and the military funds, contribution increases must be matched by an increase in taxes or a reduction in spending for the funding increase to be meaningful. If the debt from the civil service pension fund goes down by $10 billion but general government debt rises by $10 billion, for example, the whole exercise is just an economically meaningless bookkeeping transfer. Taxpayers still face a $10-billion liability. It is not sufficient to run surpluses in the Federal pension accounts; full and meaningful funding will require a larger surplus or a smaller deficit in the total Federal budget (see TREASURY CONTRIBUTIONS . . .).

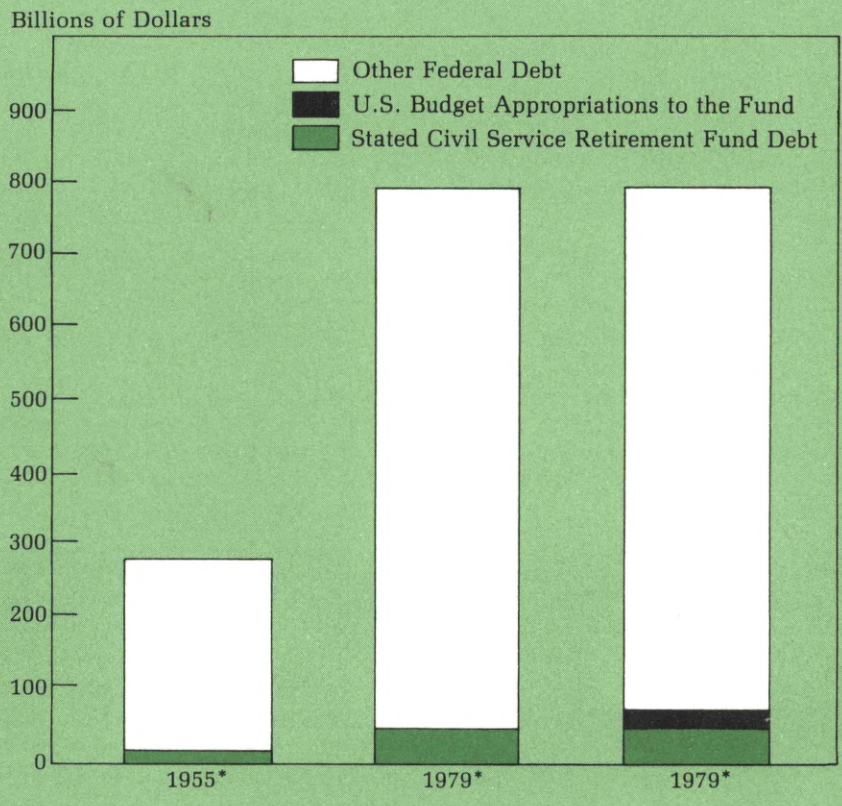
There is evidence also of a growing commitment to increased funding of state and local employee pensions. Federal legislation similar to that which covers private pensions has

[10] Professor Barro's arguments against a savings effect with social security apply here as well. Again it becomes a matter for empirical analysis.

A savings offset may occur also with unfunded state and local pensions, but here the argument is complicated further by the possibility of capitalization. Capitalization of unfunded pensions means lower property wealth which should stimulate private savings to replace the lost wealth. Whether capitalization in fact will increase aggregate private savings is an important question for empirical work.

[11] R. P. Inman, "Public Employee Pensions and U.S. Aggregate Savings Behavior," Research Paper No. 59, Federal Reserve Bank of Philadelphia, forthcoming.

## TREASURY CONTRIBUTIONS TO THE CIVIL SERVICE RETIREMENT FUND MAY HOLD THE LINE ON THE FUND'S STATED LIABILITIES WITHOUT RESTRAINING GROWTH IN THE TOTAL DEBT




*Fiscal Years

SOURCES: U.S. Bureau of the Budget, U.S. Treasury Department.

been proposed,[12] and this legislation would mandate insurance and funding for state and local pensions. Whether such legislation passes remains to be seen, but legislators at

[12]The Pension Reform Act of 1974, also known as the Employee Retirement Income Security Act or ERISA. For a useful discussion of the economic implications of this act, see Jeremy Bulow, "Analysis of Pension Funding under ERISA," National Bureau of Economic Research, Working Paper No. 402, November 1979.

both the Federal and state levels have become aware of the dangers of large unfunded state and local pensions. Massachusetts, for example, ran its public employee pension schemes on a pay-as-you-go basis for many years. But recently the Massachusetts legislature established a pension reserve account to which it is making voluntary contributions.[13] Local governments also may make voluntary contributions to this fund to cover their local pension liabilities, but to date only 15 of the 99 eligible localities have contributed. Boston, with the largest local pension debt in the state, has not.

Pennsylvania too has felt the urgency of funding local pensions. Sensing the need to rationalize a system of over 1,400 local pension plans governed by more than 40 separate state laws, the Pennsylvania Senate passed a resolution in 1979 calling for a special committee "to undertake a complete and thorough investigation of all aspects of the local pension systems and legislation which would be necessary to correct any deficiencies found therein."[14] In February 1980, the committee submitted its report with a detailed list of recommendations. It included a call for a pension recovery fund to be financed by the state and local governments. This fund is designed to assist communities whose pension plans are nearing bankruptcy and to encourage less immediately threatened communities to increase their own funding.[15] The state legislature has yet to act.

Recognizing the situation and dealing with it are two different matters. Whether the states will respond with new legislation to regulate their own and their localities' funding practices remains to be seen.

The speed with which the states act will have an important bearing on whether the U.S. Congress steps in to fill the void. Congress clearly is concerned. The U.S. House of Representatives study of public employee pensions notes the high level of underfunding and concludes that it would "be sheer folly for individual plans and the purse collectively to continue to ignore the true level of pension costs by . . . resorting to actuarial gimmickry in order to reduce contribution levels."[16] Legislation has been introduced in each of the last two sessions of Congress to impose funding, disclosure, and investment standards upon state and local pension systems.

But while increased pension underfunding should not be tolerated, rules to improve pension funding are hard to formulate. Any Federal regulation of increased state and local pension funding must be sensitive to the benefit levels, workforce characteristics, and local public economies (is there capitalization?) of each state. Simple, enforceable funding rules that make sense for all states and localities will be very hard to write. Perhaps the most sensible governmental level at which to legislate pension funding regulations is the state level, but most states have avoided this responsibility so far. Whether they will meet their policy obligation in the future or let their public employee pension systems sink still further into debt is the unanswered $100-billion question.

## SUMMING UP

In short, the issue of public pension underfunding is not an easy one to deal with. The sheer size of the funding gap has become staggering with the passing of the years. And no one single approach will cure the funding ills of all public pension programs everywhere.

[13]The legislature rejected, however, the recommendation of their advisory committee to amortize their unfunded liability over 40 years through required percent-of-salary contributions. See A. Munnell and A. Connolly, "Financing Public Pensions," *New England Economic Review*, January/February 1980, pp. 30-42.

[14]Senate Resolution 34 passed June 11, 1979.

[15]Report of the Special Senate Committee on Municipal Retirement Systems, Senator H. Craig Lewis, Chairman, and S. Howard Kline, Esq., Special Counsel, February 8, 1980.

[16]U.S. House of Representatives, *Pension Task Force Report*, p. 181.

But measures can be taken to improve the structure of public pensions. Policymakers at all levels of government are considering methods for gradual reduction of unfunded pension liabilities. The task is not only to find the right set of formulae for reducing these liabilities without increasing other government debt in the process, but to do so before the funding gap becomes even larger and more unwieldy.

# Interest Rate Futures:
## A Challenge for Bankers

*By Howard Keen, Jr.**

Contracts for future delivery of commodities have been around for what seems time immemorial. For the most part, these have been contracts for agricultural goods such as grains and livestock. Recently, however, markets have been organized to trade contracts for future delivery of debt securities—contracts whose price goes up and down with changes in the interest rate on the underlying securities.

These interest rate futures contracts debuted in October 1975 when trading in Government National Mortgage Association (GNMA) certificates began at the Chicago Board of Trade. Since that time, futures contracts have been developed for Treasury securities (bills, notes, and bonds) and commercial paper as well. Trading volume has grown rapidly. By year-end 1979, interest rate futures were being traded at four organized exchanges in the U.S., and the New York Stock Exchange opened its own futures floor in August of this year.

Interest rate futures contracts provide an opportunity to protect against changes in market interest rates, and so they may be attractive for commercial banks. They are not without pitfalls, however, and the challenge to bankers is to get the gains they offer while avoiding the pitfalls. At the same time, bank regulators face the challenge of adopting a regulatory stance that both provides appropriate safeguards and lets banks get the most mileage out of this financial innovation.

### NEW TWIST ON AN OLD IDEA

Trading in contracts for future delivery has a long history. It's reported that a futures market in rice was operating in Japan as early as 1697, and a futures transaction was recorded in England in 1826. In the United States, trading in futures first took place at the Chicago Board of Trade in the 1860s. By 1880, futures contracts were being traded in wheat, corn, oats, and cotton, and as time went by,

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contracts for other commodities came into use. Futures trading in sugar, oats, rye, barley, eggs, and butter started about the time of World War I. Contracts for soybeans, potatoes, and copper and silver began to be traded in the 1930s, for turkeys in the 1940s, and for platinum in the 1950s. Cattle, hogs, lumber, and frozen orange juice concentrate were added to the list in the 1960s.[1]

Like contracts for other commodities, interest rate futures contracts are traded on commodity exchanges—nonprofit organizations that provide facilities for trading. An integral part of each exchange is a clearing agency or corporation. All futures contracts and related financial settlements are handled through the clearinghouse.

The exchanges and clearinghouses together establish rules governing the operations of futures markets. (Futures trading is regulated also by the Federal government through the Commodity Futures Trading Commission.) These rules standardize the contracts traded on a given exchange by stipulating precise descriptions of commodities traded, delivery methods, delivery times, requirements for security deposits (margins), frequencies of adjusting the value of contracts, and limits on daily price fluctuations. These standards are roughly similar across the several exchanges, though they differ according to the kind of security for which the contract is being traded (see Appendix).

Besides regulating futures trades, the clearinghouse plays a central role in every futures transaction. While futures are bought and sold by traders on the floor of the exchange (in the trading pits), the resulting contracts have the clearinghouse on one side and a trader on the other rather than traders on both sides as buyers and sellers. Buyers of futures contracts are obliged to make payment to the clearinghouse while sellers are entitled to receive payment from it. Consequently, buyers and sellers of futures contracts need not be concerned with the creditworthiness of each other but only with that of the clearinghouse. This arrangement lowers the risk of default and adds to the attractiveness of futures markets.[2]

Thus the markets for interest rate futures offer well-organized trading opportunities for prospective investors.

## HEDGING CAN BENEFIT BANKERS

The real usefulness of futures markets is that they provide a relatively low-cost method for transferring the risk of unanticipated changes in interest rates. In principle, futures can be used both to increase exposure to interest rate risk (speculate) and to reduce exposure (hedge). But because current regulations prohibit banks from speculating (see SPECULATING WITH INTEREST RATE FUTURES), if bankers are to find interest rate futures beneficial, it has to be as a tool for hedging.

**Hedging With Interest Rate Futures.** To make money, banks borrow at one rate and lend at a higher one. But changes in interest rates can complicate this seemingly simple process, especially if they're unanticipated. If borrowing costs rise relative to lending rates, earnings may be reduced. And if bank stockholders have a preference for steady income, frequent interest rate changes can cause

[1]The history of early futures trading can be found in Henry H. Bakken, "Futures Trading: Origin, Development, and Present Economic Status." Reprinted from *Futures Trading Seminar Volume III* (Madison, Wisconsin: Mimir Publishers, Inc., 1966). A listing of commodities traded on organized exchanges in the U.S. along with dates of initial trading is given in *Annual Report 1978* (Washington: Commodity Futures Trading Commission). A detailed treatment of interest rate futures can be found in Allan M. Loosigian, *Interest Rate Futures* (Princeton: Dow Jones and Company, 1980).

[2]Agreements for delivery in the future can also be made with *forward contracts*. The latter differ from futures contracts in that they are not usually traded on organized exchanges, lack standardized terms, can be canceled only by both transactors, and typically require no margin payments.

## SPECULATING WITH INTEREST RATE FUTURES

A speculator is a person or firm that is willing to bear added risk for the opportunity of earning a profit. With interest rate futures, the risk that speculators are willing to bear is the risk of unexpected changes in interest rates. Speculators can make a profit if they guess correctly about rate movements; but they can lose if they guess incorrectly.

| If Cash Market Rate Turns Out To Be: | Winning Strategy Would Have Been: |
|---|---|
| Below Futures Rate | Long (buy then sell) |
| Above Futures Rate (yield on futures contract) | Short (sell then buy) |

If the actual rate is expected to be lower than the rate implied in the futures contract today, a speculator can profit from buying a contract (going long) and then selling it as the delivery date approaches. Because yields and prices move in opposite directions, an actual rate in the future that is below the futures rate today implies an increase in the value of the underlying securities and therefore an increase in the value of the futures contract itself. Thus the speculator gains as he sells the contract for more than he paid for it. Similarly, an actual rate in the future that is above the implied futures rate today will cause the price of the underlying securities and thereby the price of the futures contract to fall so that a short (sell then buy) strategy would result in a gain as the sale price is higher than the purchase price. For example:

On October 1, 1976 the implied yield in the futures contract for delivery of three-month Treasury bills in the third week of December 1976 was 5.28 percent—above the then current cash market yield of 5.04 percent. A speculator who thought that by mid-December the rate would be below 5.28 percent would take a long position in October then offset it by selling another futures contract before the delivery date in December. If the anticipation was for the rate to be above 5.28 percent, the reverse strategy could be followed.

By December 1, 1976, three-month Treasury bill yields in the cash market had fallen to 4.41 percent while yields on the December futures contract fell to 4.43 percent and its price rose by $2,125, or $25 for every basis point. The long strategy would have resulted in a gain while a short strategy would have shown a comparable loss.

| | Yields | | Futures Contract |
|---|---|---|---|
| Date | Cash Market | Futures Market* | Price† |
| October 1, 1976 | 5.04% | 5.28% | $986,800 |
| December 1, 1976 | 4.41% | 4.43% | $988,925 |
| Change | -.63% | -.85% | +$2,125 |

Strategy Results: ‡

| | |
|---|---|
| Long | +$2,125 |
| Short | -$2,125 |

*Treasury bill futures are reported on an index of 100 minus the futures market yield. The index for the above was 94.72 and 95.57 on October 1 and December 1 respectively.

†Futures contract price is computed as $1 million minus (yield times $1 million times 90/360) for 90-day T-bills.

‡Ignores brokerage fees and commissions and any opportunity cost of margins.

additional problems for bank managers by creating volatility in earnings. Hedging with interest rate futures could help bankers deal with both of these problems.

A banker might find futures useful when other methods of hedging are closed off by regulation or are considered to be too costly. If rates on all of a bank's financial assets and liabilities were to adjust proportionately in line with some common rate, for example, then unexpected changes in interest rates would have no impact on that bank's earnings. An unexpected change in the common rate would raise or lower the prevailing rates on assets and liabilities by the same amount while leaving earnings unchanged. But things usually don't turn out this way. Bank assets and liabilities aren't perfectly homogeneous, and their rates don't move exactly in line with each other. At the same time, regulatory restrictions such as ceilings on interest rates restrict movement in explicit rates of certain assets and liabilities. Finally, competitive pressures might discourage a bank from issuing floating rate loans even though its own sources of funds are sensitive to changes in rates.[3] Under such conditions bankers should consider the use of interest rate futures to protect their positions against unanticipated changes in interest rates.

Bankers can use futures for three purposes —protecting the value of a portfolio, locking in borrowing costs, and locking in the return on investments. In the first two cases, the sale of a futures contract (a short hedge) would guard against interest rates that turn out to be higher than expected, while in the third, the purchase of a futures contract (a long hedge) would protect against interest rates that turn out to be lower than expected. In each case the objective is to protect or hedge against the impact of unexpected changes in interest rates on the profitability of anticipated cash market transactions. These are transactions that involve the purchase or sale of securities for immediate delivery. The cash market position is hedged by taking an opposite position in the futures market (see MECHANICS OF TRADING . . . ).[4]

**A Short Hedge.** A short hedge involves the sale of one futures contract with the intention of offsetting it later by buying another contract for the same instrument with the same delivery date. If the price of the futures contract falls, the investor gains. A futures position of this kind can be used to protect the value of a portfolio and to lock in the cost of borrowing at some future date.

Consider a mortgage banker who in June makes a commitment to buy a pool of mortgages the following January at a set price with the intention of profiting by reselling them to investors at a higher price. If the value of the mortgage pool falls by January, the banker could take a loss on this transaction. Because the prices of fixed-income securities (like mortgages) fall when their interest rates rise (and vice versa), the mortgage banker will suffer a loss if long-term interest rates increase.

To hedge his exposure to loss, the banker may want to take a position that will produce a gain in the futures market if long-term rates do rise. This could be done by selling (shorting) a GNMA futures contract in June and then buying an identical contract in January. Just as the increase in rates will reduce the value of

[3]For a discussion of this point and a more complex example of using interest rate futures to lock in borrowing costs, see James Marvin Blackwell, "The Ramifications of Hedging Interest Rates by Commercial Banks," The University of Texas at Austin, May 1979.

[4]Hedging can be viewed from several different perspectives. Traditional theory focuses on the potential for reducing risk and probably is the view most applicable to commercial bank use of interest rate futures. Hedging also has been viewed as undertaken primarily to earn a profit from a change in the relationship of the cash and futures prices. These two approaches are combined in the framework of portfolio theory, and its implications for hedging differ from those of the other two alone. For a discussion of these views, see Louis H. Ederington, "The Hedging Performance of the New Futures Markets," *Journal of Finance* 34 (March 1979), pp. 157-170.

## MECHANICS OF TRADING INTEREST RATE FUTURES

Suppose an individual or business firm decides in January to buy a futures contract for delivery of three-month Treasury bills two months out (in March). This would be a March futures contract. The first step is to contact a futures broker (a futures commission merchant). After deciding on acceptable bid prices and providing the broker with a security deposit, the buy order is sent to a broker on the floor of the commodity exchange. The floor broker shouts out the bid in the trading pits, and if a seller can be found, the transaction takes place. After the trade is consummated, the buyer and seller have no further dealings with each other as far as this transaction is concerned. But the buyer has an obligation to make payment (in March) to the clearinghouse while the seller is obliged to deliver securities (in March) to the clearinghouse.

Although the minimum amount for a futures contract is $100,000, buyers and sellers do not have to provide the full amount of cash or the actual securities at the time the futures contract is bought or sold. Instead, each puts up a relatively small amount of cash (margin) as a security deposit. The clearinghouse requires a minimum initial margin of between approximately $500 and $2,500, depending on the contract. At the end of each trading day, the clearinghouse adjusts the value of each outstanding contract to reflect final settlement prices for that day. This procedure, known as marking-to-market, means that gains and losses on futures contracts are computed daily.

In essence, the broker has an account with the clearinghouse and the customer has one with the broker. When the value of a contract rises, the buying broker's account with the clearinghouse is credited. If the value of a contract falls, the two accounts are reduced accordingly. And if the value falls sufficiently, it might drop below the maintenance margin at which the broker's account with the clearinghouse (and the customer's account with the broker) must be replenished (through a margin call) to restore it to the initial margin. Such daily marking of contracts to market value together with maintenance margins ensure that the minimum security deposit will be preserved.

Consider an example—the IMM's $1-million par value 90-day Treasury bill contract with initial margin of $1,500 and maintenance margin of $1,200. If the value of this contract falls by more than $300, a call for funds would occur to restore the margin to $1,500. Because each basis point (.01 percent) represents $25 for this contract ($1 million times .01 percent times 90/360 days), a rise in yield of more than 12 basis points would trigger a margin call.

Once buyers and sellers are holding futures contracts, they can satisfy their obligations by taking or making delivery of the specified securities according to the terms of delivery in the contract, or they can cancel their contract by taking an offsetting position. Buyers cancel by selling identical contracts and sellers cancel by purchasing identical contracts. Most futures contracts are terminated by cancellation, which suggests that participants use the markets for something other than locking in future sales or purchases.

the mortgage pool, it will lower the price of the GNMA futures contract and result in a gain for the banker, as he buys a contract for less than he sold one for earlier (Figure 1 overleaf).

In a similar manner, a short hedge can be used to lock in future borrowing costs. Such a strategy might be used, for example, if a fixed-rate loan of some particular maturity is to be financed by rolling over shorter term liabilities during the life of the loan. If interest rates increase, the bank would have to pay higher rates on its liabilities, but these higher rates would be offset to some degree by the gain that results from the transaction in the futures market when rates increase.

**A Long Hedge.** In contrast to a short hedge which is used to guard against a rise in rates, a long hedge is designed to protect against a fall in rates. A long hedge entails the purchase of a futures contract with the intention of offsetting it later by selling an identical contract. This type of hedge can be used to lock in the return on an investment that is planned for a date in the future.

Suppose, for example, that on April 1 a

**FIGURE 1**

## A SHORT HEDGE CAN PROTECT A PORTFOLIO AGAINST A RISE IN RATES

| | Cash Market | Futures Market |
|---|---|---|
| June | Mortgage banker commits to buy pool of mortgages in January to be resold to investors at that time. | Sells March GNMA futures contract. |
| | Long-term rates rise; the value of the pool of mortgages as well as the value of the GNMA futures contract falls. | |
| January | Acquires mortgage pool and resells to investors at a loss. | Buys March GNMA futures contract. |
| Net Result * | Loss. | Gain. |

*Ignores brokerage fees and commissions and any opportunity cost of margins.

SOURCE: *Hedging Interest Rate Risks*. 1st revised edition. Chicago: Chicago Board of Trade, September 1977, p. 17.

banker anticipates that on June 1 he will receive $1 million from a maturing investment. He plans to reinvest the funds in three-month Treasury bills when the older investment matures. The yield on the bills as of April 1 is 13 percent, but the banker has a premonition that rates will fall in the meantime and he wants to hedge against such a fall. The hedging can be done by purchasing a three-month Treasury bill futures contract for delivery in June.[5] By June 1, if rates in the cash market had fallen to 12.55 percent, the investment in Treasury bills would result in an opportunity loss of $1,125. But if expected future short-term rates were to fall equally, the price of the futures contract would rise and the sale of the contract would result in an exactly offsetting gain of $1,125. The net effect would be a yield of 13 percent, since $1 million of bills could be purchased in June for a net outlay of $967,500—$968,625 less the $1,125 gain from the futures transaction (Figure 2).

In the case of both short and long hedges, interest rate futures can benefit a banker by enabling him to ensure (before paying brokerage fees and commissions of about $50-$60 per hedge) either the value of a portfolio, the cost of borrowing, or the investment yield

[5]Other methods of hedging a cash market position include use of forward contracts, standby contracts, repurchase agreements, and spot market transactions. See *Treasury/Federal Reserve Study of Treasury Futures Markets*, Volume II, May 1979, pp. 23-29 and Appendix A, pp. 5-6.

**FIGURE 2**

## A LONG HEDGE CAN PROTECT AN ANTICIPATED INVESTMENT AGAINST REDUCED YIELDS

| | Cash Market | Futures Market |
|---|---|---|
| April 1 | Proceeds of $1 million from maturing investment expected June 1. Banker wishes to lock in current yield of 13%. Cost of $1 million in 3-mos. T-bills at 13% is $967,500.* | Purchases one ($1 million) June 3-mos. T-bill contract for $967,000 (13.20%). |
| June 1 | Buys $1 million of 3-mos. T-bills for $968,625 (12.55%). | Sells (offsets) one ($1 million) June 3-mos. T-bill contract for $968,125 (12.75%). |
| Net Result † | Opportunity loss = $1,125. | Gain = $1,125. |

* The price of $1 million of 3-mos. T-bills in both the cash and futures markets is computed as $1 million minus (yield times $1 million times 90/360).

† Ignores brokerage fees and commissions and any opportunity cost of margins.

SOURCE: Mark F. Polanis and David C. Fisher, "Banking on Interest Rate Futures," *Bank Administration*, August 1979, p. 39.

from a transaction in the future. In this way, the banker is getting an insurance policy which like any such policy reduces the risk associated with unexpected events.

### BUT THERE ARE PITFALLS

While interest rate futures provide opportunities for bankers to reduce exposure to interest rate risk, they have their pitfalls as well. Their use actually will increase risk under certain conditions, and it can result in lower earnings in some cases. Further, in the extreme case, the use of interest rate futures could jeopardize bank solvency.

**Risk Can Be Higher, Earnings Lower.** Although interest rate futures can help a banker to reduce exposure to adverse movements in rates, they also can increase that exposure. An increase in exposure could occur if a bank's assets and liabilities are affected equally by changes in market interest rates.[6] In this case the portfolio would be hedged already, and taking a position with futures would serve only to establish a new unhedged position. In short, the impact of interest rate futures on a bank is determined by its total balance sheet. Thus an analysis of the extent to which a bank's earnings are sensitive to interest rate changes is an absolute must if hedging is to reduce a bank's exposure to interest rate risk.

Bankers undertake a futures market hedge expecting to lock in a level of earnings from a particular investment strategy. However, the outcome may differ from their expectations. A change in earnings relative to anticipations

[6]See George M. McCabe and Robert W. McLeod, "Regulation and Bank Trading in the Futures Markets," *Issues in Bank Regulation* 3 (Summer 1979), pp. 6-14.

can occur because the so-called basis (the cash market yield minus the futures market yield) may not be the same at the time a futures position is offset as it was when the position first was taken.[7] If a hedge is perfect, the opportunity loss in the cash market will be offset exactly by the gain in the futures market. But sometimes a gain or loss in the cash market won't be offset exactly. Thus a crucial element to the success of hedging with interest rate futures is what happens to the basis. Regardless of which direction rates in the cash market move, if the basis does not change, the loss in one market will be just matched by the gain in the other market. If futures rates don't move proportionately with cash market rates and the basis does change, however, the extent of the offset will be affected. Depending upon the size and direction of the change in basis, income could rise or fall (Figure 3).

Bankers need not be completely in the dark about how a change in the basis will affect their earnings. As the delivery date of a futures contract approaches, the price of that contract and the cash market price of the underlying securities should move toward equality. Thus the basis should be approximately zero by the last trading day of a futures contract, and this characteristic can be used to get some idea of how the basis might change.

If the basis for a June-delivery contract is -.20 on April 1, for example, a reasonably good guess is that from April 1 to the last trading day around the third week in June, the change in the basis would be +.20. An increase in the basis would add to the earnings from a long hedge and reduce those from a short hedge. This is not to say that the basis won't jump around prior to the last trading day of a contract. But recognizing that the basis should be about zero at delivery can provide a fairly good idea of how the basis will move as the delivery date approaches.

For bankers contemplating the use of interest rate futures, it's a good idea to become familiar with past behavior of the basis. Hedging substitutes basis risk for risk from the cash market, and the less volatile the change in the basis, the greater the potential for reducing risk by hedging with interest rate futures.[8] When the entire cash market position is matched with a futures position, risk can be reduced if, as is typical, the volatility of the change in the basis is less than that of the change in the cash price.[9]

Hedging with interest rate futures can reduce

[7]Although the basis usually is defined as the cash market price minus the futures market price, numerical examples typically compute the basis as the difference between the cash market yield and the futures market yield. Examples in this article follow the latter and the only point to be aware of in this regard is that when the basis increases algebraically as measured by the difference in yields, it decreases algebraically as measured by the difference in prices and vice versa. Whichever measure of the basis is used, the appropriate cash market component will be determined by the transaction to be hedged. For example, if a short hedge is undertaken to protect the value of securities held by an investor, the cash market component in the calculation of the basis would be that for securities with the same term to maturity as those in the investor's portfolio.

[8]This is illustrated by Ederington, p. 161. In this article it is estimated that in the period 1976-77, some reduction in interest rate risk could have been achieved in two-week and four-week hedges with 8-percent GNMA futures and with 90-day T-bill futures, although the GNMA futures seemed to be more effective in reducing risk, especially for two-week hedges. For both GNMAs and T-bills, greater risk reduction was possible in four-week than two-week hedges. It should be noted that the relationship between the cash price of one type of security and the futures price of a different security is usually not as close as it is for similar securities. As a result, *cross hedging*—hedging a cash market position with a different security in the futures market—is considered to provide less opportunity for reducing interest rate risk than the straight hedging illustrated in the text.

[9]Whether hedging reduces the variance of returns depends upon two things. One is the relative volatility of the change in the basis and that of the cash price and the other is the percentage of the cash market position that is hedged. Although traditional theory assumes this percentage to be one hundred, portfolio theory implies that the risk-minimizing percentage can be different. See Ederington.

## FIGURE 3
## A CHANGE IN BASIS WILL HAVE AN IMPACT ON A LONG HEDGE*

| | Cash Market | Futures Market | Basis | Net Result |
|---|---|---|---|---|
| April 1 | $967,500 (13.00%) | $967,000 (13.20%) | -.20 | |
| | **Rates Fall, Basis Unchanged** | | | |
| June 1 | $968,750 (12.50%)<br>(-$1,250) | $968,250 (12.70%)<br>(+$1,250) | -.20 | 0 |
| | **Rates Fall, Basis Increases** | | | |
| June 1 | $968,750 (12.50%)<br>(-$1,250) | $968,875 (12.45%)<br>(+$1,875) | +.05 | $625 |
| | **Rates Fall, Basis Decreases** | | | |
| June 1 | $968,750 (12.50%)<br>(-$1,250) | $967,625 (12.95%)<br>(+$625) | -.45 | -$625 |
| | **Rates Rise, Basis Unchanged** | | | |
| June 1 | $966,250 (13.50%)<br>(+$1,250) | $965,750 (13.70%)<br>(-$1,250) | -.20 | 0 |
| | **Rates Rise, Basis Increases** | | | |
| June 1 | $966,250 (13.50%)<br>(+$1,250) | $966,375 (13.45%)<br>(-$625) | +.05 | $625 |
| | **Rates Rise, Basis Decreases** | | | |
| June 1 | $966,250 (13.50%)<br>(+$1,250) | $965,125 (13.95%)<br>(-$1,875) | -.45 | -$625 |

*Changes in the cash market yield and the basis represent average two-month changes for 90-day T-bills using figures for the first business day in each month over the period January 1976 through March 1980. Although changes in both directions are illustrated above, averages were positive for both measures.

earnings in another way by limiting any gains from unexpected changes in interest rates. Recall that the goal of the long hedge in Figure 3 is to guard against a rate of return less than 13 percent. If the banker has correctly anticipated a fall in interest rates, he'll be better off having locked in that higher rate than he would have been if he hadn't used the futures market. If rates unexpectedly rise, however, his hedge will limit the rate of return to 13 percent instead of the unhedged return of 13 1/2 percent. Thus the possibility that hedging could limit earnings in certain instances should be viewed as part of the price for reduced exposure to loss.

**Regulatory Concern.** Because of these pitfalls and because relatively low required margins may make it easier for trading to take place without the authorization of top bank decisionmakers, interest rate futures are a concern to regulators who are charged with maintaining the soundness of individual banks

as well as the banking system. [10]

The prime concern over banks' use of interest rate futures is that it might result in insolvency. Trouble could occur, for example, if highly risky futures positions were taken or if lack of experience led to injudicious trading. In response to such concerns, Federal regulators have issued trading guidelines to the banks. [11]

Futures positions that increase exposure to loss from interest rate changes are not to be taken (though regulators may not always find it an easy matter to distinguish speculative from hedging transactions). And a bank's participation is to take place in a prescribed manner. Involvement is to begin at the top with a bank's directors endorsing a policy on strategies, internal monitoring and control, position limits, and the like. In addition, regulations prescribe explanatory notes in financial statements to describe futures activity that materially affects a bank's financial condition. At the same time, Federal regulators plan to keep a close watch on how banks use interest rate futures.

## SUMMING UP

All in all, interest rate futures pose a challenge for both bankers and bank regulators. On the positive side, interest rate futures provide bankers with a convenient way to hedge their exposure to interest rate risk. At the same time, however, they have pitfalls, and some of these could lead to serious financial difficulties. For bankers the challenge is to decide how futures can be used to improve their banks' performance, while for policymakers the challenge is to provide an environment within which banks can take advantage of the benefits of interest rate futures while at the same time maintaining the soundness of the banking system. As time goes by and bankers gain more experience with interest rate futures, both they and the policymakers should find these challenges easier to meet.

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[10] For a fuller discussion of this point, see Brian Charles Gendreau, "The Regulation of Bank Trading in Futures and Forward Markets" (Washington: Board of Governors of the Federal Reserve System, June 1979). There are additional areas of concern about interest rate futures that are not covered in this article. They include the possibility of cornering or squeezing the market, the effect on the stability of spot prices, trading of futures by uninformed users, the impact on the flexibility of Treasury debt management, adequacy of required margins, and the accounting and tax treatment of interest rate futures transactions. Many of these worries emanate from the growing popularity of financial futures in recent years and the ensuing proliferation of contracts. Concern was heightened, however, by events in the silver market earlier this year when prices plummeted and there was difficulty in satisfying calls for additional margin.

[11] Guidelines were announced by the Comptroller of the Currency, the Federal Deposit Insurance Corporation, and the Federal Reserve Board on November 15, 1979 and became effective January 1, 1980. Revisions to the guidelines were announced March 14, 1980 and dealt primarily with the accounting treatment of futures, forwards, and standby contracts. Details can be found in *Federal Register*, November 20, 1979, pp. 66673 and 66722; November 28, 1979, p. 68033; March 20, 1980, pp. 18116 and 18120.

# Appendix . . .

# APPENDIX

## DIFFERENT EXCHANGES STIPULATE DIFFERENT CHARACTERISTICS FOR INTEREST RATE FUTURES CONTRACTS*

| | Treasury Bills | | | | Intermediate-term Treasury Coupon Securities | | Treasury Bonds | |
|---|---|---|---|---|---|---|---|---|
| | ACE | COMEX | IMM | IMM | CBT | IMM | ACE | CBT |
| Deliverable items | $1 million par value of Treasury bills with not more than 92 days or less than 77 days to maturity | $1 million par value of Treasury bills with 90, 91, or 92 days to maturity | $1 million par value of Treasury bills with 90 days to maturity | $250 thousand par value of Treasury bills due in 52 weeks | $100 thousand principal balance US Treasury notes and noncallable bonds bonds with an 8% coupon rate. Maturity no less than 4 years and no greater than 6 years from the day of delivery | $100 thousand principal balance US Treasury notes with a 7% coupon rate. Maturity no less than 3 years 6 months and no greater than 4 years from day of delivery | $100 thousand face value US Treasury bonds with a maturity of at least 20 years | $100 thousand face value US Treasury bonds. Maturity at least 15 years from delivery day |
| Initial margin† (per contract) | $800 | $1,500 | $1,500 | $600 | $900 | $500 | $2,000 | $2,500 |
| Maintenance margin (per contact) | $600 | ‡ | $1,200 | $400 | $600 | $300 | $1,500 | $2,000 |
| Daily limits | $1,250 (50 basis points) | $1,500 (60 basis points) | $1,250 (50 basis points) | $1,250 (50 basis points) | $2,000 | $750 | $2,000 | $2,000 |
| Delivery months | January, April, July, October | February, May, August, November | March, June, September, December | March, June, September, December | March, June, September, December | February, May, August, November | February, May, August, November | March, June, September, December |

| | Government National Mortgage Association Modified Pass-through Mortgage-backed Certificates | | | | Commercial Paper | |
|---|---|---|---|---|---|---|
| | CBT (old) | CBT (new) | ACE | COMEX | CBT (30-day) | CBT (90-day) |
| Deliverable items | $100 thousand principal balance of GNMA 8% coupon or equivalent | $100 thousand principal balance of GNMA certificates | $100 thousand principal balance of 8% GNMA certificates | $100 thousand principal balance of 8% GNMA certificates | $3 million face value of prime Commercial paper rated both A-1 by Standard and Poor's and P-1 by Moody's. Maturity not more than 30 days from date of delivery | $1 million face value of prime Commercial paper rated both A-1 by Standard and Poor's and P-1 by Moody's. Maturity not more than 90 days from date of delivery |
| Initial margin† (per contract) | $2,500 | $2,500 | $2,000 | $2,000 | $1,500 | $1,500 |
| Maintenance margin (per contract) | $2,000 | $2,000 | $1,500 | ‡ | $1,200 | $1,200 |
| Daily limits | $2,000 | $2,000 | $2,000 | $1,000 | $1,250 (50 basis points) | $1,250 (50 basis points) |
| Delivery months | March, June, September, December | March, June, September, December | February, May, August, November | January, April, July, October | March, June, September, December | March, June, September, December |

* Information in this table was received from the commodity exchanges in late June-early July 1980 and is subject to change. More detailed information is available from a futures broker or from the exchanges themselves. Exchange abbrevations are as follows: ACE = AMEX Commodity Exchange; COMEX = Commodity Exchange; IMM = International Monetary Market; and CBT = Chicago Board of Trade.

† The speculative margin is shown where margins vary according to whether the contracts cover speculative, hedged, or spread positions.

‡ The amount of the maintenance margin is not specified by COMEX; however, brokerages often apply maintenance margins that run about 75 percent of the initial margin.

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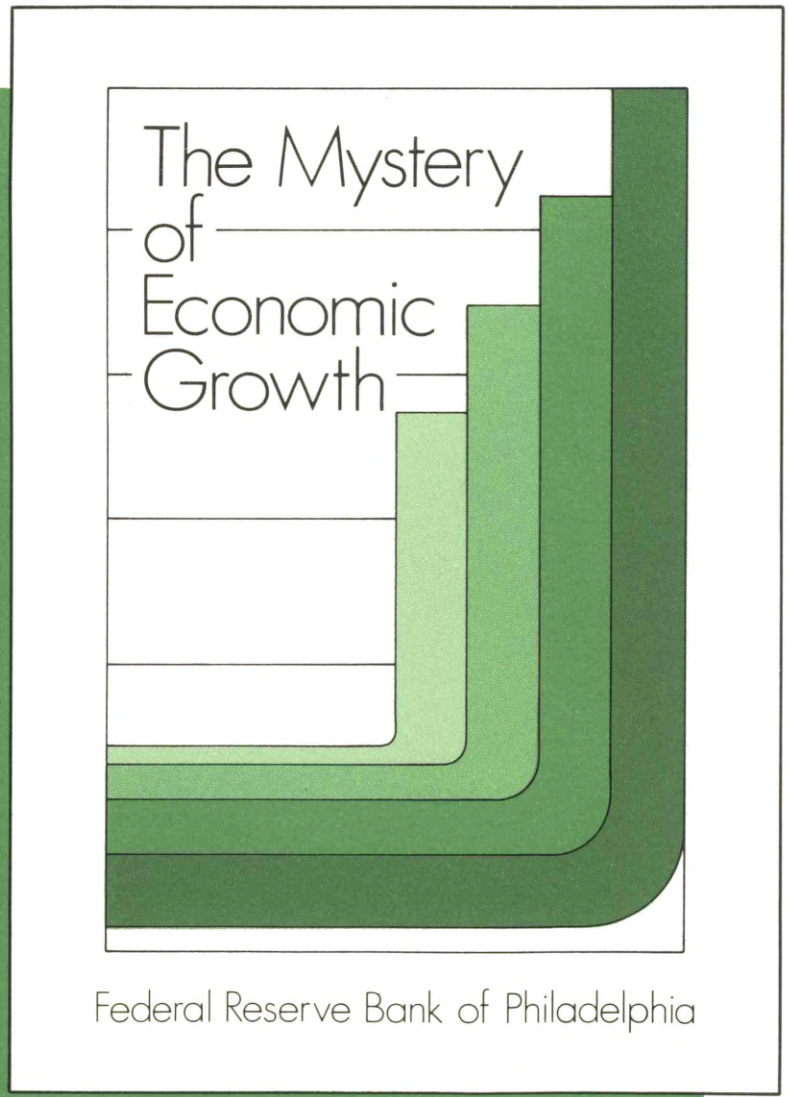


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