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New England Economic Review

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*Eric S. Rosengren
and Katerina Simons*

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The Advantages of "Transferable Puts" for Loans at Failed Banks

*Eric S. Rosengren
and Katerina Simons*

In testimony on February 3, 1992 before the Committee on Banking, Housing, and Urban Affairs of the United States Senate, Richard F. Syron, President of the Federal Reserve Bank of Boston, proposed a mechanism to help relieve current credit availability problems by making existing FDIC guarantees of loans transferable throughout the private financial system. This article examines Mr. Syron's rationale for the proposal and how it might work.

Under this scheme, when performing nonperforming loans are placed in the equivalent of "bad banks" by the FDIC, the borrower could transfer the loan to any willing financial institution, bringing along the same government guarantee on the loan that is currently extended to acquirers of failed banks—in effect, making the put transferable. The resulting competition for "puttable" failed bank assets would provide a market for performing nonperforming loans that would reduce the number of liquidated loans and potentially reduce costs to the FDIC. 3

Current Taxation of Qualified Pension Plans: Has the Time Come?

Alicia H. Munnell

The U.S. Treasury estimates that personal income tax receipts in fiscal year 1992 would have been \$51 billion higher without the special provisions accorded employer-sponsored pension plans. It is at best unclear that taxpayers are getting their money's worth from this large tax expenditure. Despite a myriad of legislative changes, all of which combine to increase the likelihood that persons covered by pension plans will actually receive benefits, the U.S. pension system is still a very erratic and unpredictable way to provide retirement income and it benefits a relatively privileged subset of the population.

This article argues that the time has come for the current taxation of compensation received in the form of deferred pension benefits. Such treatment is feasible, and is consistent with the broad definition of income envisioned under a comprehensive personal income tax and incorporated in the language of the Internal Revenue Code. 12

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Profits and Stock Prices: The Importance of Being Earnest

Richard W. Kopcke

While the prospect for equity values naturally concerns traders and investors, it also is a concern for public policy. Because investors' wealth depends on the value of corporate equity, the demand for consumption goods can vary with the price of stocks. The valuation of corporations' productive assets on stock exchanges also influences businesses' willingness and ability to undertake new investments. If the falling price of stocks should retard the pace of capital formation in the future, it also would retard the potential growth of output and living standards.

This article examines the relationship between the earnings of nonfinancial corporations and the value of their equity. It concludes that the price of stocks corresponds more closely to the earnings that companies disclose in their financial reports than it does to the earnings for nonfinancial corporations reported in the national income accounts. This analysis also suggests that the value of equity does not necessarily reflect corporations' incentives for undertaking investments. If the opportunities for profitable growth, both here and abroad, remain sufficiently attractive, lower prices of stocks would not foretell a commensurate drop in corporations' capital budgets. 26

Mutual-to-Stock Conversions by New England Savings Banks: Where Has All the Money Gone?

Katerina Simons

In the aftermath of the real estate slump and the attendant financial troubles of the New England banks, it is natural to look for causes and contributing factors. One phenomenon that has received its share of the blame is the rush of conversions by thrifts in the mid 1980s from mutual to stock form of ownership. Conversions were hailed initially as a way to fortify the eroded capital of thrifts and increase their safety and soundness.

This article compares the behavior of converted thrifts with that of the mutuals. It finds that converted institutions took greater risks, suffered bigger losses, and failed at a higher rate than the mutuals despite being very highly capitalized after conversion. Three conclusions are reached. First, converted thrifts accounted for a substantial share of the increase in real estate financing during the boom of the mid 1980s. Second, ability to take greater risk, rather than efficiency, appears to have been a dominant motive for thrift conversions in New England. And third, even very high capital ratios may not prove sufficient if an institution takes big risks in its loan portfolio. 45

The Advantages of 'Transferable Puts' for Loans at Failed Banks

In testimony on February 3, 1992 before the Committee on Banking, Housing, and Urban Affairs of the United States Senate, Richard F. Syron, President of the Federal Reserve Bank of Boston, proposed a mechanism to help relieve current credit availability problems by making existing FDIC guarantees of loans transferable throughout the private financial system. This article examines Mr. Syron's rationale for the proposal and how it might work.

Problems with reduced credit availability have always received widespread attention. Previous episodes resulted from the flow of deposits out of banks in response to rising market interest rates, in the face of regulatory ceilings on bank interest rate payments. The current "credit crunch" has occurred even though interest rates have been falling, rather than rising, and even though deregulation has eliminated the regulatory impediments to banks' offering market rates to depositors. Because this credit crunch is taking place in a very different economic environment, alternative explanations are needed for the conditions motivating problems in credit availability. Recent research by Bernanke and Lown (1991) and Peek and Rosengren (1992a, 1992b) has focused on the role of capital regulation. Banks with depleted capital have been forced to shrink their balance sheets, frequently by reducing loans, in order to satisfy capital-to-asset ratios enforced by regulators. This article focuses on a second mechanism reducing credit availability, namely the procedure for resolving the assets of failed banks.

The number of failed banks is much larger than in previous recessions. In 1991, 124 commercial banks were closed in the United States, compared to 42 in 1982. In some regions, and particularly in New England, the recent problems have been especially acute, with 46 failures in 1991 compared to one in 1982. Not only did the institution with the most deposits in New England fail (Bank of New England), but in New Hampshire, five of the seven largest depository institutions failed. In regions with many failed institutions, the handling of loans by

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the Federal Deposit Insurance Corporation (FDIC) is a critical determinant of credit availability.

A second distinctive feature of the current problems has been the rapid growth in "performing nonperforming loans," loans current on payments of principal and interest whose collateral value has dropped below the value of the loan. In a healthy institution, the lender would have an incentive to work with the borrower so long as the lender had a reasonable expectation of receiving full payment eventually. Now, however, many of these loans are in the portfolios of failed banks whose assets are controlled by the FDIC. In just one failed bank acquisition, that of Bank of New England, \$1.4 billion in performing nonperforming loans was transferred to the FDIC.

When a bank fails, the FDIC normally tries to find a bank to buy the deposits and good assets of the failed bank. Because the extent of problem assets may not be immediately clear, the FDIC normally allows the acquiring banks to return substandard loans, including performing nonperforming loans, to the FDIC for full face value during the first year after the acquisition. This "put" to the FDIC is at a discount to the full face value after the first year and normally does not exceed three years.

Once assets have been put back to the FDIC, they are normally transferred into a "bad asset" pool. The FDIC usually contracts to have these assets managed by collecting agencies, which are instructed to maximize the cash flow to the FDIC, after appropriately discounting for the time value of money for cash received in the future.¹ These management contracts provide neither the incentive nor the ability to work out loans in the way that might have been done, had the borrower had a relationship with a well-capitalized bank. As a result, too many loans are foreclosed.

This article discusses an alternative way to treat performing nonperforming loans.² Under this scheme, when performing nonperforming loans are placed in the equivalent of "bad banks" by the FDIC, the borrower could transfer the loan to any willing financial institution, bringing along the same government guarantee on the loan that is currently extended to acquirers of failed banks—in effect, making the put transferable. The resulting competition for "puttable" failed bank assets would provide a market for performing nonperforming loans that would reduce the number of liquidated loans and potentially reduce costs to the FDIC.

The next section of the article discusses how a

drop in the liquidity of assets serving as collateral for bank loans will cause an increase in performing nonperforming loans. The second section discusses FDIC procedures for managing failed bank assets. The third section shows why the current resolution of failed banks may not be an optimal contract. The fourth section shows how transferable puts could improve the disposition of failed bank assets, and the final section offers conclusions and recommendations.

I. Performing Nonperforming Loans

Banks have always specialized in evaluating businesses with little publicly available information. Their expertise in assessing risks of small and mid-sized businesses and valuing illiquid assets distinguishes banks from most other financial intermediaries. (See, for example, Gertler and Gilchrist 1991.) Analysis done by banks frequently involves much more monitoring than is commonly done by pension funds and insurance companies, which hold a higher percentage of assets in marketable securities for which they are passive investors.

For intermediaries such as broker-dealers, valuing assets is straightforward. In the highly liquid market for Treasury and agency securities, for example, the large volume of transactions for these assets allows large positions to be sold or bought without materially altering the price of the asset. The same is not true for most collateral for bank loans. Frequently, the loan collateral is highly specialized structures or equipment that, if sold, will receive a price close to the replacement value only after a substantial search for potential buyers. If forced sales occur, the asset would sell for liquidation value, which could be significantly below the price that would be achieved if the seller had time to actively search for a buyer interested in the specialized asset. The difference in valuation of liquid and illiquid assets (with no inflation) is illustrated in Figure 1. The valuation of a

¹ The FDIC would prefer to receive its money now rather than in the future. Money received now can be invested to receive a flow of income. Thus, to make money received in the future equivalent to money received now, the future payments must be discounted by the opportunity cost of the funds.

² This proposal was discussed with the FDIC in November 1991. As of this writing, the FDIC is considering the adoption of transferable puts both in its agreement with Fleet/Norstar Financial Group for the management of the assets of the failed Bank of New England and in future failed bank resolutions.

Figure 1

Valuation over Time of Liquid and Illiquid Assets, with No Inflation

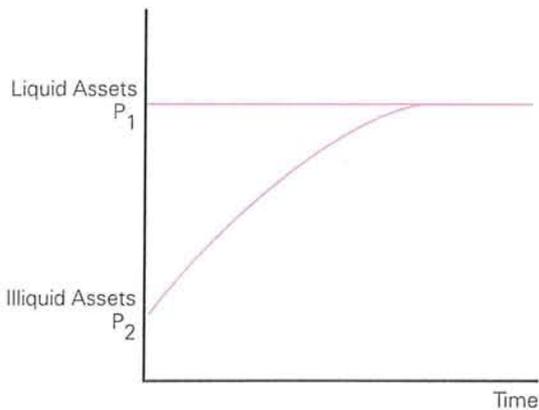
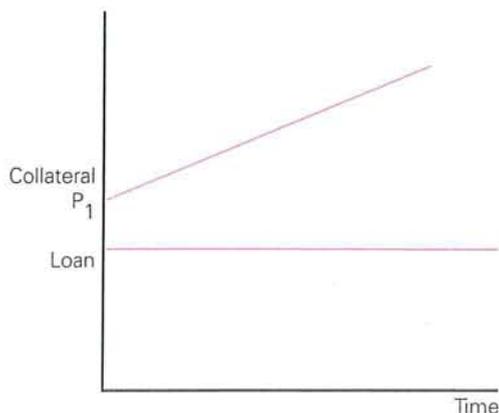


Figure 2

Valuation over Time of Loan Amount and Its Collateral, with Inflation



liquid asset would be unaffected by time, as illustrated by the horizontal line at P_1 , the price of the liquid asset. An illiquid asset would sell at P_2 if it had to be sold immediately, but with enough time would fetch a price of P_1 , its long-term value.

While asset values for illiquid assets are a function of time, illiquid assets have always served as collateral for bank loans. Why have performing nonperforming loans become so critical to banks recently? To understand the sudden emergence of

performing nonperforming loans requires considering several additional factors.

The first factor is inflation. With inflation, the nominal price of the collateral increases at every point in time. Of course, other aspects of the loan, such as the real value of the earnings, may be adversely affected by inflation. In particular, unexpected increases in inflation will decrease the value of a fixed-rate loan to the lender. Since loan contracts agree to pay a fixed nominal amount at a future date, the value of collateral during periods of high inflation will quickly surpass the loan amount. This is shown in Figure 2. The valuation line for the principal of the loan is horizontal (or declining if the loan balance is amortized), while the valuation line for collateral increases at the rate of inflation. Thus, if a business cannot make the cash flow payments on a loan, and the lender intercedes quickly, the lender can be protected from loss by selling the collateral. The rate of inflation, however, has dropped sharply in the last three years. Without inflation, the valuation line for the collateral is not upward-sloping, so that an asset repossessed by a lender may only partially pay off the loan if it is sold quickly.

The second factor is the decreased demand for real estate. Since many loans are backed by real estate, a decrease in the demand for real estate will result in a decline in nominal real estate prices. This has occurred in New England, where real estate prices have declined sharply from their 1987 peak.³ A shift in demand would be represented in Figure 1 as a parallel shift downward of both the valuation lines.

A third factor in the increase in performing nonperforming loans has been decreased liquidity, which would be represented in Figure 1 as a decrease in the initial value of P_2 . A drop in liquidity indicates that while the long-run valuation of an asset would be unchanged, the value realized on a short-notice sale would decrease. In New England, liquidity may have decreased as a result of the sharp increases in

³ In New England, total sales of existing homes fell from 235.5 thousand to 174.7 thousand between the second quarter of 1988 and the third quarter of 1991, a drop of nearly 26 percent. In the same period, the median sale price for existing single-family homes in Hartford fell from \$169 thousand to \$149.4 thousand, a drop of 11 percent and in Boston fell from \$182.9 thousand to \$175.5 thousand, a drop of 4 percent. (Source: National Association of Realtors.) These changes in home sale prices are subject to the usual caveats: they understate the depth of the real estate slump because they do not reflect the value of home improvements made by the seller, and they exclude all the properties taken off the market by the sellers because the offers made were too low. (See, for example, Case and Shiller 1987.)

the numbers of personal and business bankruptcies,⁴ the large number of failed financial institutions whose assets had to be sold, and a tightening of credit conditions at banks that forced many businesses to sell assets.

A final factor is the appraisal process. Under normal economic conditions most assets will be sold at close to their long-run value. As a result, appraisals, which are based primarily on sales of comparable properties, will value assets at their long-run value. During periods of decreased demand and liquidity, however, many sales will be involuntary. These distress sales will often be at the spot price, so that substantial discounts from the long-run price become the reported sales prices. If so, appraisals based on comparable property increasingly will reflect the liquidation price rather than the long-run value of the assets. These appraisals based on liquidation prices are then incorporated into the valuation of bank assets during the examination process. Thus, even without a change in the long-run price of an asset, an increase in distress sales can cause a rise in performing nonperforming loans due to the appraisal process.

New England banks experienced all the factors conducive to a rapid increase in performing nonperforming loans during the early 1990s. The inflation rate was low and the major collateral for bank assets, real estate, experienced a decrease in demand. In addition, bank failures, tighter credit conditions induced by inadequate bank capital, and increased numbers of bankruptcies all contributed to a sharp reduction in real estate transactions, which caused a drop in liquidity. The appraisal process further exacerbated the problem by evaluating collateral based on comparable sales at current prices rather than long-run values.

II. FDIC Treatment of Performing Nonperforming Loans in Failed Bank Resolutions

When collateral is appraised at an amount below the value of a loan, the loan would commonly be classified as substandard by bank examiners and it would become a performing nonperforming loan. If a large number of loans are in this category, the bank would likely increase its provision for loan loss reserves, thus depressing its earnings. If the bank believes, however, that appraisals are artificially low because of a depressed market and that the borrower

will continue to make payments on the loan, the bank would have little incentive to incur the costs of foreclosure and a distress sale of the collateral. The same is not necessarily true if the performing nonperforming loan is in a bank acquired by the FDIC.

In the case of most bank failures, the FDIC agrees to repurchase the bad assets of the failed bank. This "bad bank" is then operated by an agent of the FDIC, which frequently is also the acquirer of the failed bank. While the details can vary somewhat, the following features are typical of these agreements:⁵

1. After a loan acquired from the failed bank is classified by the acquirer,⁶ the acquirer has up to 90 days to put the loan back to the government to be managed as part of the pool of bad assets.
2. If the loan is classified and put back in the first year, the acquirer is paid the full face value of the loan. In the second year, the acquirer is paid 98 percent of the face value, and in the third year, 96 percent. At the end of three years, no additional loans can be put back to the government.
3. If the acquiring bank materially alters a loan by restructuring the terms, it loses the put on the loan.
4. If the acquiring bank takes back a loan it had sent to the classified loan pool, the loan cannot be put back to the government a second time.
5. Under the terms of a servicing contract, the FDIC pays a collecting agent for the pool of classified loans for all costs incurred in collection on loans plus a monthly incentive fee based on collections up to that time.
6. The collecting agent is instructed to maximize the cash flow to the FDIC appropriately discounted for the time value of money.

⁴ In the past two years the number of bankruptcy filings in Massachusetts more than tripled, increasing from 4,229 in 1989 to 12,942 in 1991. (Source: Administrative Office of the U.S. Courts. Figures are for years ending June 30.)

⁵ The Purchase and Assumption Agreements with both Fleet Financial Group for the purchase of Bank of New England and Key Bank of Western New York for the purchase of Goldome had these features. The length of the put option may vary. In the agreement with Chase Bank of Connecticut for the purchase of Citytrust, for instance, the put is for two years, instead of three. The structure of the incentive fee, however, is the same.

⁶ Examiners classify problem loans into four categories listed in the order of credit risk to the bank: other assets especially mentioned (OAEM), substandard assets, doubtful assets, and loss assets. Only assets classified as substandard or below can be returned to the FDIC. These are all assets that examiners believe have a distinct possibility of sustaining some loss for the bank.

7. The collecting agent has limitations on its ability to restructure or alter the terms of the original loans.

The acquiring bank has a clear incentive to quickly identify problem loans and transfer them to the FDIC. Failed bank loans held by the acquirer that are classified after the first year receive less than the full face value. Once classified, if the loan is not put back to the FDIC in 90 days, the acquiring bank loses the put. After the loan has been transferred to the FDIC, the collecting agency for the classified asset

The bank acquiring a failed bank has a clear incentive to quickly identify problem loans and transfer them to the FDIC.

pool has incentives to collect the entire loan quickly. While the collection agency may even be a nonbank subsidiary of a bank holding company, it is not structured to maintain a lending relationship with customers, so it has no incentive to restructure the loan. Moreover, the servicing contract explicitly limits the amount of additional funds that can be expended to support a loan.

In many cases, the acquirer of the failed bank and the collecting agent are subsidiaries of the same bank holding company. While the servicing contract is a device to entice bidders to acquire the failed bank, it also creates serious incentive problems. The acquirer can maximize incentive fees by aggressively classifying as substandard the loans it is not anxious to keep. Since the fee schedule is based on cumulative collections, putting back to the FDIC loans that are only slightly impaired and then making a quick collection through the servicing agent provides a fee for eliminating marginally profitable loans while ensuring that more difficult collections are compensated at the higher fee schedule.

III. Contractual Incentives

The servicing agreement has two components. The first is the incentive the acquiring bank has to put the failed bank assets into the bad loan pool. The

second is the incentive the collecting agency has to foreclose once the loans are in the bad loan pool.

The Put

The acquiring bank has a limited time to put assets of the failed bank back to the government. Only loans that would be classified as problem loans by a bank examiner can be put back to the FDIC. If the bank retains a classified asset, it must reserve more capital for its possible default. If a loan is put back to the government, the acquiring bank receives cash for the face value of the loan, and can use this cash to make a new loan. Since a new loan will initially have a lower probability of default and will require less capital to be set aside for possible loan losses, the acquiring bank will prefer to place all classified assets in the bad loan pool.

The Collecting Agency

The servicing agreement with the collection agency is straightforward. The FDIC reimburses the agency for all collection expenses. In addition, the agency receives an incentive fee based on the amounts it collects. The fee is on a graduated scale based on net cumulative collections (collections minus double the collection expenses), and it ranges from 1.5 percent of the first 20 percent of such collections to 27.5 percent of collections over 50 percent. Furthermore, the incentive fee is capped at 5 percent of gross collections, that is, collections before expenses are subtracted.⁷

⁷ The incentive structure is as follows:

Collections as a Percentage of Gross Pool Value	Cumulative Net Incentive Fee as a Percentage of the Cumulative Net Collection Strata (from the first column)
less than or equal to 0%	0
over 0% to and including 20%	1.5
over 20% to and including 31%	4.0
over 31% to and including 39%	7.5
over 39% to and including 46%	11.0
over 46% to and including 50%	18.5
over 50%	27.5

The fee received by the collection agency is:

$$FEE = \min[\gamma \min(L, P_t); \lambda(\min(L, (P_t - 2F - 2M)))]$$

where P_t is the value of the collateral, L is the face value of the loan, γ is the maximum incentive fee, λ is the graduated incentive rate, F is the cost of foreclosure, and M is the cost of monitoring the loan. The complete mathematical derivations of the contract and the incentives of the acquiring bank, the collecting agency and the FDIC are available in the Appendix to this article.

Within this incentive structure, the collection agency must first decide whether to foreclose on a loan and sell the collateral or give the borrower time to pay off the loan. If the agency decides to foreclose, it must then choose the optimal time of foreclosure.

The agency will foreclose when the reinvested money from foreclosing on collateral exceeds the value of the loan. If the agency has reached the maximum incentive fee, the collecting agency bears no foreclosure cost on additional foreclosures. Therefore, the agency determines the benefits of foreclosure as the money received from the foreclosure, ignoring all costs associated with the foreclosure,

The collecting agency will foreclose when the reinvested money from foreclosing on collateral exceeds the value of the loan.

reinvested at the rate of return the collecting agency receives on its investments.

The FDIC would also choose to foreclose when the reinvested money from foreclosing on collateral exceeds the value of the loan. However, the FDIC's decision differs from that of the collecting agency in two ways. First, the FDIC must bear the costs of foreclosure, so the money available from foreclosure to reinvest is net of all costs of foreclosure. Second, the FDIC's rate of return is the government borrowing rate, which will be below the borrowing rate of a private company. Thus, the collecting agency is most likely to foreclose on a loan when the FDIC would not if the monitoring and foreclosure costs are large and the government's borrowing rate is substantially lower than the collecting agency's internal rate of return.

In addition, for those loans where both the collecting agency and the FDIC will find it optimal to foreclose at some point, the collecting agency will foreclose sooner. Both the FDIC and the collecting agency would choose to foreclose when the additional revenue gained from collateral appreciation is less than the revenue gained by foreclosing and reinvesting the funds. However, because the FDIC has a lower rate of return for reinvested funds, and because it must bear the costs of foreclosure, its

opportunity cost of waiting for further asset appreciation is lower than that of the collecting agency. The argument is strongest when the collecting agency has reached the maximum incentive fee of 5 percent of net cumulative collections and its marginal cost of an additional foreclosure is zero. But it still holds in the less extreme cases since, under the current contract, the collecting agency never bears the full costs of monitoring and foreclosure on collateral. Therefore, loans that would be fully paid off with additional time may be foreclosed on, since the servicer prefers to receive the incentive fee immediately rather than wait for a small additional appreciation in the asset. For example, the foreclosure cost might far exceed the discount of selling at the liquidation price, but the servicer would still prefer to foreclose as long as its share of the foreclosure cost was less than the appreciated value of the asset.

This servicing contract ignores all externalities from foreclosing prematurely on a viable business. A bank that restructures a loan can receive profits from the loan in the future. The collecting agency receives no benefits from maintaining a viable business, since it will not be extending credit to the business in the future. In addition, the costs to society of unemployed labor and capital are ignored in the servicing contract.

The incentives for the current contract are most perverse for performing nonperforming loans. Since they have only slight impairment of collateral value, the collecting agency gains little from waiting and gets close to the full potential incentive fee by collecting quickly. By collecting on many only slightly impaired loans, the collecting agent also ensures that it gets the maximum incentive fee of 5 percent. Thus, for the least impaired loans the servicer has an incentive to liquidate the collateral, even though the servicer might achieve lower costs if a longer horizon were chosen. The incentives are less perverse in cases where the loan is nonperforming and the collateral could never pay off the loan. For extremely troubled loans, taking possession of the collateral may be necessary in order to prevent further deterioration of the FDIC's position. In such cases, maximizing the value of the asset can be achieved only by removing the current owners through the foreclosure process. The transferable put would do little in cases where foreclosure is the optimal strategy, but would be a substantial improvement for those least impaired loans, where the incentives of the collecting agent diverge the most from the incentives that would exist if the loan had been issued by a well-capitalized bank.

IV. The Transferable Put

The transferable put alters the current FDIC agreements in two significant ways. First, it eliminates the current 90-day expiration of the put option once a loan is classified, and it allows the acquiring bank to take assets back again from the FDIC without extinguishing the put. This provides the acquiring bank more time to determine if a loan will return to performing status and leaves the loan in the banking system rather than with a collection agency. Second, it allows the put to be transferred. Therefore, the borrower could transfer the government guarantee on a loan from a failed bank to any financial institution willing to extend credit. If the lender acquires a loan with a full government guarantee the first year, its risk-based capital ratio would be unchanged. (Actual regulatory treatment is discussed below.) In subsequent years, only the portion of the loan not guaranteed by the government would be included in the calculation of the risk-based capital ratio.

This proposal could be less costly than the standard contract used by the FDIC.⁸ First, fewer performing nonperforming loans would be transferred to the asset pool serviced by the collection agency. Because the acquiring bank would no longer need to transfer loans within 90 days after being classified, it would keep a higher percentage of loans in the bank in the hope that they could be restored to fully performing status. For the loans that are transferred to the collecting agency, the borrowers have a strong

The proposed transferable put could be less costly than the standard contract used by the FDIC.

incentive to seek out lenders willing to work out the loan. If a substantial number of loans are retained by the private banking system instead of being transferred to the collecting agency, the FDIC would save the incentive fee and the expenses paid to collect and manage the asset pool.

A second advantage is that this proposal eliminates some of the conflicting incentives that occur when the acquiring bank and the collecting agency are part of the same holding company. In such cases,

the holding company has an incentive to classify marginal loans that have a high probability of making a complete payoff. After transfer of a loan to the collection agency, the monitoring and collecting costs are paid, the maximum servicing fee based on cumulative collection is more easily achieved, the incentive fee is paid, and the bank eliminates all default risk. With alternative bidders for these loans, acquiring banks may be more aggressive in ascertaining each borrower's prospects, since they may be losing a potential good customer to a competitor and will not receive any of the incentive fees. In addition, it is precisely those loans with the highest ratio of collateral value to the amount of the loan that will be most attractive to other banks. Such loans are most likely to be paid in full, because the collateral value would soon reach the face value of the loan. Thus, it is the strongest borrowers who would avoid foreclosure with transferable puts and would benefit the most from this proposal.

A third advantage is that loans that would have been worked out, had they been in a well-capitalized institution, can be transferred to such institutions with the help of the government guarantee. Currently borrowers in the collecting agency have no alternatives, since no other bank will be interested in extending credit to a borrower whose loan has been classified and whose assets could be encumbered at any time by a foreclosure filing. With a transferable put, those loans with good prospects for making full payment will not be prematurely foreclosed as a result of the incentives of the collection agency. The FDIC also acquires market information on the prospects of the individual loans that do not remain in the banking system. If no bank can be convinced to acquire the loan with the government guarantee, action based on the incentives of the collection agency may be the most appropriate way of disposing of the loan.

This analysis has assumed no uncertainty about the future price of the collateral. In reality banks are uncertain about whether low asset sales prices reflect a lack of liquidity, which leaves the long-run price unaffected, or a drop in the demand for the asset, which causes the long-run price to decrease. When uncertainty is great, transferable puts allow banks that believe that the long-run price will be unaffected to work out performing nonperforming loans that would otherwise be left to the collecting agency.

⁸ This is true assuming that the long-run asset value stays constant. If the FDIC expects a large drop in asset values, it may be optimal to foreclose and sell everything as soon as possible.

V. Conclusions and Recommendations

Borrowers whose collateral value has dropped and whose bank has failed have been the source of substantial credit complaints, particularly in New England where the numbers of failed banks and performing nonperforming loans have been high. Borrowers whose loan payments are current but whose collateral is impaired would normally be able to work with their bank. However, when the bank fails, these loans have been placed with collecting agencies that have a strong incentive to liquidate. These incentives may cause premature foreclosures that cost the FDIC money, result in a liquidation not in the borrower's interest, and create unemployment and unused capital. These problems could be reduced by allowing the government put on performing nonperforming loans to be transferable. Adoption of such a proposal could result in fewer liquidations,

which would be in the interests of both the FDIC and the borrower.

How extensively banks would lend to borrowers with transferable puts is uncertain. It would depend, at least in part, on the regulatory treatment of these loans under the risk-based capital standards. If the puts were treated as government securities they would receive a risk weighting of zero; however, if they were treated as agency securities they would receive a risk weighting of 20 percent. Given the shortage of capital at many New England institutions, a risk weighting of 20 percent could discourage some lenders. In addition, many institutions are shrinking and may not want to acquire loans that require substantial monitoring. Nonetheless, for borrowers with transferable puts able to find a willing lender, their risk of liquidation may be significantly reduced.

Appendix

This appendix provides a more formal mathematical treatment of the argument outlined in this paper. Equation (1) is an example of the valuation of an illiquid asset.

$$(1) \quad P_t = P^{LR} - \alpha_1 t^{-1}$$

The price received for an illiquid asset is a function of time. If the asset must be sold immediately, the price is the long-run price, P^{LR} , minus α_1 . For illiquid assets with little or no value except to a few potential buyers, α_1 will be large relative to the long-run value. For a perfectly liquid asset, such as a Treasury security, α_1 would be 0 and the price at all times would equal the long-run value. The explicit functional form is used in Equation (1) for ease of exposition, although any functional form that resulted in the collateral selling at a discounted price initially, with the price eventually converging to the long-run value of the asset, would be equally suitable.

To understand the sudden emergence of performing nonperforming loans, simple alterations to Equation (1) are required.

$$(2) \quad P_t = P^{LR} * \pi_t - \alpha_1 t^{-1} + \alpha_2$$

The first addition is π , the change in prices through time t due to inflation. The second addition is α_2 , which represents a shift in the demand for the asset used as collateral, for reasons outlined in the paper.

The fee the collection agency receives from the FDIC is summarized in Equation (3):

(3)

$$FEE = \min [\gamma \min (L, P_t); \lambda (\min (L, (P_t - 2F - 2M)))]$$

where P_t is the value of the collateral, L is the face value of the loan, γ is the maximum incentive fee (in this case 5 percent), λ is the graduated incentive rate, F is the cost of foreclosure and M is the cost of monitoring the loan.

Equation (4) summarizes the decision whether or not to foreclose at all, from the collecting agency's perspective. For simplicity, we assume here that the agency has reached the maximum incentive fee, γ , and bears no foreclosure costs on the margin:

$$(4) \quad P_t e^{(\theta - t)r_1} > P_\theta = L$$

The left-hand side of Equation (4) represents the value of the foreclosed collateral reinvested at the agency's internal rate of return r_1 for a time period $\theta - t$, where θ is the point in time when the asset value reaches the value of the loan, L . The agency will choose foreclosure as long as reinvested money from foreclosed collateral exceeds the value of the loan.

In contrast, the FDIC's decision on foreclosure is represented by Equation (5).

$$(5) \quad (P_t - F - M)e^{(\theta - t)r_2} > P_\theta = L$$

where F and M are foreclosure and monitoring costs, respectively, and r_2 is the government borrowing rate. Equation (6) provides the condition under which the col-

lecting agency would foreclose on a loan and the FDIC would not.

$$(6) \quad P_t e^{(\theta - 1)r_1} > L > (P_t - F - M) e^{(\theta - 1)r_2}$$

Equation (7) represents the first-order condition for the optimal timing of foreclosure for the collecting agency:⁹

$$(7) \quad \gamma \frac{dP_t}{dt} = \gamma r_1 P_t$$

The left-hand side of Equation (7) is the additional revenue gained from the collateral appreciation, and the right-hand side is the opportunity cost of waiting given the internal rate of return r_1 . If we substitute the explicit valuation function from Equation (1) into Equation (7), we get the equilibrium for determining when to foreclose, again assuming the maximum incentive fee has been reached:

$$(8) \quad \frac{\alpha_1}{t^2} = r_1 \left(P^{LR} - \frac{\alpha_1}{t} \right)$$

Equation (8) illustrates why so many borrowers whose loans have been classified as performing nonperforming complain of almost immediate threats of foreclosure. Whenever the right-hand side of Equation (8) is greater than the left, foreclosure is optimal for the collection agency.

Equation (9) shows the first-order condition for foreclosure from the point of view of the FDIC:

$$(9) \quad \frac{\alpha_1}{t^2} = r_2 \left(\left(P^{LR} - \frac{\alpha_1}{t} \right) - F - M \right)$$

It differs from Equation (8) by the presence of the monitoring and foreclosure costs paid by the FDIC and the different interest rate. A similar result holds but with somewhat less

disparity when, on the margin, the collecting agency bears some cost of foreclosure. Suppose that on a particular property, the collection agency pays a portion of the foreclosure cost, aF , with the FDIC paying $(1 - a)F$. Then, from Equation (7), the collecting agency's decision rule is:

$$(10) \quad \frac{dP_t}{dt} = r_1 (P_t - 2aF)$$

while the FDIC's decision rule is:

$$(11) \quad \frac{dP_t}{dt} = r_2 (P_t - (1 - a)F)$$

It would be in the interest of the collecting agency, but not of the FDIC, to foreclose whenever

$$(12) \quad r_1 (P_t - 2aF) > r_2 (P_t - (1 - a)F)$$

One exception to this rule would occur if the FDIC and the collecting agency had the same discount rate, that is, $r_1 = r_2$, and the marginal incentive rate of 27.5% were in effect. Assuming that the monitoring cost is zero, if $r_1 = r_2$, then the above inequality would not hold whenever a , the proportion of the foreclosure cost borne by the collection agency, was greater than one-third. This is precisely the case when the incentive rate is 27.5%, making the proportion of the foreclosure cost borne by the agency equal to $27\% * 2 = 55\%$. Note that this does not occur at any of the lower marginal incentive rates.

⁹ The left-hand side of Equation (7) would have an additional term if the collecting agency fell short of the maximum incentive rate for the marginal loan, because each collection brings it closer to the maximum rate. This complicates the model without altering the general conclusions.

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Current Taxation of Qualified Pension Plans: Has the Time Come?

The U.S. Treasury estimates that personal income tax receipts in fiscal year 1992 would have been \$51 billion higher without the special provisions accorded employer-sponsored pension plans. It is at best unclear that taxpayers are getting their money's worth from this large tax expenditure. Despite a myriad of legislative changes, all of which combine to increase the likelihood that persons covered by pension plans will actually receive benefits, the U.S. pension system is still a very erratic and unpredictable way to provide retirement income and it benefits a relatively privileged subset of the population. In view of other pressing demands on the federal budget, the time may have come to eliminate some or all of the tax preferences accorded compensation provided through qualified pension plans and introduce some form of current taxation.

The purpose of this paper is to reiterate the case for reassessing the current favorable treatment accorded qualified plans and to explore some possible approaches for introducing current taxation. Part I addresses the issue of revenue loss, considering the impact not only on the personal income tax but also on the payroll tax. Concluding that the revenues forgone are large no matter how they are measured, Part II explores what taxpayers are buying for their money. Qualified plans provide retirement income to a steadily declining and decidedly non-poor proportion of the population, and they do not appear to have increased national saving. In short, the favorable tax treatment of compensation received in the form of accrued pension benefits does not appear to be achieving high-priority social goals.

Given the large federal deficits and overwhelming demands on the federal budget, Part III explores mechanisms for taxing qualified plans in order to recoup some or all of the subsidy currently accorded pensions, and looks at the experience of other countries that have made changes in this area.

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I. The Current Tax Treatment of Qualified Plans

In the United States, a person's income has generally been viewed as the best measure of his ability to contribute to the cost of government. Tax experts have argued for a broad definition of income and indeed such a broad definition has been incorporated in the Internal Revenue Code. Treasury regulations specify that income includes compensation paid in forms other than money and the U.S. Supreme Court has confirmed that the Code definition "is broad enough to include in taxable income any economic or financial benefit conferred on the employee as compensation, whatever the form or mode by which it is effected."¹ In actual practice, the economic benefit test has not been rigidly followed; certain forms of compensation have been accorded special treatment.

Qualified Plans and the Personal Income Tax

Under the personal income tax, employees are not taxed currently on the value of their accrued pension benefits; rather, they are allowed to defer taxes until benefits are received in retirement. This treatment is equivalent to an interest-free loan from the Treasury and significantly reduces the lifetime taxes of those employees who receive part of their compensation in wages and part in pensions as opposed to those who receive all their compensation in cash wages.

This favorable treatment costs the Treasury money; the estimated revenue loss for fiscal 1992 is \$51 billion. This number is the net of two figures: 1) the revenue that would be gained from the current taxation of annual pension contributions and pension fund earnings, and 2) the amount that would be lost from not taxing benefits in retirement, as is done currently. The \$51 billion includes the tax expenditure for private pensions, state and local plans, and the federal civilian retirement plans (Table 1); no estimate appears to be made for the military plan. Nevertheless, the exclusion of employer-sponsored pension plan contributions and earnings is the single largest tax expenditure, topping even the revenue loss arising from the deduction of mortgage interest on owner-occupied homes (Table 2).

Two lines of argument are sometimes employed to diminish the importance of these estimated revenue losses. The first, which contends that the treatment of pensions is consistent with that of saving

Table 1
Estimated Revenue Loss under the Personal Income Tax from Exclusion of Pension Contributions and Plan Earnings, Fiscal Years 1990 to 1992

Billions			
Plan	1990	1991	1992
Total	\$45.4	\$48.0	\$51.2
Private Plans	23.9	25.5	27.1
State and Local Plans	14.1	14.7	15.7
Federal Civilian Retirement Plans	7.4	7.8	8.4
Addendum:			
Revenue Loss as a Percent of			
Income Tax Receipts	9.7	9.8	9.7

Source: Author's estimate based on unpublished data from the U.S. Department of the Treasury, Office of Tax Analysis; U.S. Office of Management and Budget (1991, Section X, "Receipts, User Fees, and Other Collections," Part Three, p. 6 and Section XI, "Tax Expenditures," Part Three, p. 36).

under a consumption tax, is accurate but of little relevance. True, the United States has something of a hybrid system, but its commitment to the income tax was reaffirmed in the Tax Reform Act of 1986, and the Treasury itself, with the apparent concurrence of Congress, classifies the treatment of pensions as a deviation from both the "normal" tax structure and the so-called "reference law" baseline.

The second line of argument actually represents some confusion on the part of critics. The notion is that the current calculation does not properly account for the fact that the large pension accruals not taxed today will be taxed in the future. A generous interpretation of this concern is that the cash-flow calculation may not be the best measure of the revenue loss.

Indeed, the cash-flow approach, which is meaningful for permanent deductions and exclusions, does not properly account for tax concessions in those cases where tax payments are deferred. Its limitations for qualified pension plans can be seen clearly by considering a situation in which (1) annual contributions to private plans and pension fund earnings exactly equal benefit payments during the year, and (2) workers face the same marginal tax rate in retirement as they do during their working years. Under these assumptions the revenue loss would equal zero, according to the Treasury calculations of

¹ Commissioner vs. Smith, 324 U.S. 177, 181 (1945).

tax expenditures. Yet individuals covered by private plans would continue to enjoy the advantage of deferring taxes on employer contributions and investment income until after retirement.

A better estimate of the annual revenue loss resulting from the current deferral would be the difference between (1) the present discounted value of the revenue from current taxation of pensions as they accrue over the employee's working life, and (2) the present discounted value of the taxes collected when benefits are received by the employee after retirement. Such a calculation, which is reported in Table 3, suggests that the current treatment of pensions reduces tax revenues between \$40 billion and \$69 billion in present value terms. For instance, if the typical worker covered by a pension plan were 35, and if the earnings on accumulated contributions were 7 percent and the discount rate 7 percent, then the tax expenditure calculated for fiscal 1992 contributions on the present-value basis would be \$51.4 billion. This compares to the Treasury tax expenditure estimate calculated on a cash basis of \$51.2 billion for fiscal 1992.

It could be argued that the tax benefit for pension plan participants should be limited to the value of deferral, and the rate effect that results from the progressive tax structure ignored. Focusing solely on the revenue loss from deferral, the present-value

Table 2
Top Ten Tax Expenditures in the Income Tax, Ranked By Revenue Loss, Fiscal Year 1992

Item	Billions
Net exclusion of pension contributions and plan earnings	\$51.2
Deductibility of mortgage interest on owner-occupied homes	40.5
Exclusion of employer contributions for medical insurance premiums and medical care	33.5
Step-up basis of capital gains at death	26.8
Accelerated depreciation	26.1
Deductibility of nonbusiness state and local taxes other than on owner-occupied homes	20.4
Exclusion of OASI benefits for retired workers	18.0
Deductibility of charitable contributions	16.8
Exclusion of interest on public purpose state and local debt	14.0
Deferral of capital gains on home sales	13.9

Source: U.S. Office of Management and Budget (1991, Section XI, "Tax Expenditures," Part Three, p. 40).

Table 3
Alternative Estimates of Cost to Treasury of Favorable Tax Provisions for Employer Pension Plans,^a Fiscal Year 1992

Rate of Return on Plan Assets (percent)	Average Age of Covered Worker			
	30	35	40	45
	Estimate A ^b			
7	\$56.5	\$51.4	\$45.9	\$40.0
8	62.4	56.1	49.4	42.4
9	68.9	61.1	53.2	45.0
	Estimate B ^c			
7	52.3	47.2	41.8	35.9
8	56.9	50.8	44.4	37.6
9	61.6	54.5	47.1	39.5

^aIncludes private pension plans, federal civilian retirement plans, and state and local retirement systems.

^bTax rate is 23 percent in working years and 17.5 percent during retirement.

^cTax rate is 23 percent during working years and retirement.

Source: Author's estimates.

estimate of the tax expenditure becomes \$47.2 billion for the 35-year-old individual and an assumed interest rate of 7 percent. Thus, the revenue loss associated with the favorable treatment of pension contributions and earnings under the personal income tax is substantial regardless of how it is measured.

Qualified Plans and the Payroll Tax

Like the income tax, Social Security payroll taxes are theoretically applicable to a broad definition of wages that includes noncash as well as cash payments. However, employer contributions to qualified pension plans are also excluded by statute from the payroll tax base.

These exclusions have never been considered "tax expenditures," because the Treasury and the Congressional Budget Office assume that, with Social Security payments tied to the level of contributions, the reduction in contributions will eventually be reflected in lower retirement and disability benefits. Future benefits are reduced less than proportionately, however (Chen 1981). This occurs because the weighted benefit formula replaces a smaller percentage of wages at higher earnings levels than at lower ones. Since a substantial portion of the decline in the payroll tax base, caused by the growth in pensions, occurs at higher earnings levels, benefit payments are

Table 4
*Immediate Revenue Loss under the
 Payroll Tax from Exclusion of Pension
 Contributions and Plan Earnings,
 Fiscal Year 1992*
 Billions

Plan	Revenue Loss
Total	\$38.6
Private Plans	20.5
State and Local Plans	11.9
Federal Civilian Retirement Plans	6.3
Addendum:	
Revenue Loss as a Percent of Payroll Tax Receipts	12.2

Note: Items may not sum to total because of rounding.

Source: Author's estimate based on unpublished data from U.S. Department of the Treasury, Office of Tax Analysis; Social Security Administration (1989, Table 4.B1); Social Security Administration (1991, Tables 1 and 22).

not reduced significantly. Thus, the exclusion of pension accruals from the tax base not only causes the short-run loss of revenues, but also raises the long-run costs of the program.

The short-run revenue effect is substantial. Table 4 summarizes the immediate revenue loss from reducing the payroll tax base, without considering the effect on future benefit commitments. This calculation differs from that performed for the income tax in two respects. First, employer contributions to pension plans escape tax completely, since no payroll tax is levied on pension benefits in retirement. Second, revenue loss occurs on both the employee's and the employer's side of the transaction, since neither party is required to pay taxes on exempt employer contributions.² For 1992, the estimated revenue loss from excluding pension fund accruals from the payroll tax base amounts to nearly \$39 billion.

Eventually benefit reductions occur as a result of the exclusions from the tax base, so the long-run cost to the system is less than that implied by the short-run revenue loss. Nevertheless, the long-run costs are substantial. If all pension accruals, that is, contributions plus fund earnings, were included in the tax base, the system could be financed over the next 75 years with an annual payroll tax of 11.8 percent instead of 12.4 percent, as scheduled under current law.³ This rate reduction would particularly benefit low-income individuals who generally are not covered by pensions and therefore would experience no

change in their tax base. Thus, it is apparent that the exclusion of pension accruals has a large impact on both personal income tax and payroll tax revenues.

Equity Considerations

In addition to requiring higher income and payroll tax rates, exclusion of pension contributions and earnings from the tax base creates problems of horizontal equity. Deferring taxes on a major component of compensation means that two people who are equally well off in an economic sense pay different amounts of tax over their lifetimes. The favorable tax provisions also have an adverse effect on the distribution of income. As will be discussed later, less than

*Pension coverage tends to
 be concentrated among the
 higher-paid.*

one-half of the private work force is covered by a pension plan, and pension coverage tends to be concentrated among the higher-paid. Moreover, the value of exclusion or deferral increases with taxpayers' marginal rates. Hence the higher-income groups profit from the favorable tax provisions, yet all taxpayers must pay higher rates to compensate.

This discrepancy could be overlooked if the incentives substantially improved the lot of those who would not have saved on their own, or increased aggregate saving. As this study considers the evidence, the favorable tax provisions achieve neither of these objectives; the following section lays out the arguments.

² The ability to avoid payroll tax payments provides an incentive for the employer to offer a dollar of benefits rather than a dollar of wages. This factor, which becomes increasingly important as the payroll tax rate rises, is generally overlooked in discussions of the reasons for the growth of employee benefits.

³ Although the statutory rate is 12.4 percent, under the current economic and actuarial assumptions the long-run cost projections show the trust fund running a deficit of 1.08 percent of payroll over the 75-year period. Thus, the savings from expanding the payroll tax base to include pension contributions and earnings would probably be used to reduce the projected deficit rather than reduce the tax rate.

II. What Do Tax Expenditures for Qualified Plans Buy Us?

Advocates of government support for qualified plans claim that these plans provide a secure retirement for individuals who otherwise would not have saved on their own and that pensions increase national saving.

The Coverage Issue

The goal of federal tax policy since 1942 has been to encourage, through favorable tax provisions, the use of tax-qualified pension and profit-sharing plans to ensure greater retirement security for all employees, not just highly paid executives. In other words, the strategy is to secure retirement benefits for the rank and file by providing tax incentives that will induce higher-paid employees to support the establishment of plans providing broad coverage.

Contrary to the popular belief that Social Security fully replaces the income of the low-paid worker, almost everyone needs supplementary benefits in order to avoid a decline in living standards after retirement. The misconception about Social Security arises from calculating replacement rates using the analytical construct of a hypothetical person retiring at age 65 with a history of low earnings and a nonemployed spouse; this exercise shows Social Security replacing nearly 100 percent of preretirement earnings. In contrast, data from the New Beneficiary Survey indicate that the actual replacement rate for couples in the lowest quartile was 58 percent.⁴

Despite the near universal need for supplementary pension income, the most recent data on pension coverage (March 1989 Current Population Survey) showed that only 39 percent of full-time private wage and salary workers were covered by either a defined benefit or defined contribution plan (Woods 1989). Another 7 percent were covered by employer-sponsored pre-tax plans, such as 401(k)s or 403(b)s. These kinds of plans are not necessarily employer-financed, however, nor do they necessarily provide retirement income since they frequently allow lump-sum payments. Nevertheless, the sum of those covered by pre-tax plans and traditional plans equals only 46 percent of private full-time workers. The inclusion of government workers increases this ratio to 52 percent, since they have a much greater chance of being covered by a traditional employer-sponsored plan than their counterparts in the private sector.

Pension coverage and pension benefit payments

also tend to be concentrated among higher-paid employees. The incidence of pension coverage increases markedly as earnings levels rise. For example, in 1988 only 30 percent of nonagricultural wage and salary workers earning under \$20,000 were covered by a plan, compared with 73 percent of those with earnings over \$50,000 (EBRI 1989). On the benefit side, pensions are a much more important source of income for the wealthiest elderly than for the rest of the population aged 65 and older. In 1988, pensions accounted for only 3 percent of total income and retirement benefits for the poorest quintile compared to 19 percent of income and 49 percent of retirement benefits for the wealthiest (Table 5). Some of this pattern can be explained by the relatively greater importance of Social Security benefits in the lower quintiles; the program is designed specifically to replace a higher proportion of the wages of lower-income individuals. Nevertheless, lower-income people still need supplementary income, in addition to their Social Security benefits, in order to maintain their pre-retirement standard of living, and they received almost no help from the private pension system.

Additionally, the percentage of covered full-time workers has been declining during the 1980s, after decades of expansion. Table 6 shows that, for private workers, this percentage fell from 50 percent in 1979 to 46 percent in 1988. Moreover, the decline in coverage under traditional plans has probably shown a more dramatic decrease given the rapid expansion of 401(k) plans over this period.⁵ Coverage for all workers has exhibited approximately the same decline, since the coverage and relative size of the government work force remained stable over this period.

⁴ Replacement rates are designed to compare retirement earnings with preretirement earnings. Fox (1982) reported a replacement rate for married couples of 56 percent using the highest three out of the previous ten years of earnings as the denominator. This figure represented a recent standard of living not unduly influenced by career-high or career-low earnings years. Grad (1990b) reports two different replacement rates, one using the average of the five years of highest earnings over the career as the denominator, and the other using the average of the five years of earnings just prior to retirement as the denominator. These rates, 39 and 77 percent, respectively, represent the spectrum of possible rates, since the highest five years of earnings could have occurred 20 years before retirement, while earnings just prior to retirement are often lower than average. Thus, to obtain a figure closer to the ideal, these two rates were averaged.

⁵ Between May 1983 and May 1988, the availability of 401(k) arrangements increased threefold; the proportion of nonagricultural wage and salary workers offered 401(k) plans increased from 8 to 27 percent (EBRI 1989).

Table 5
Pensions as a Percentage of Total Income and Retirement Benefits for Households Aged 65 or Older by Income Quintile, 1988

Income Quintile	Pensions ^a as a Percent of	
	Total Income	Retirement Benefits ^b
Lowest	2.5	3.0
Second	6.2	7.4
Middle	13.7	18.3
Fourth	20.0	31.3
Highest	19.0	49.1
Total	16.6	30.0

^aIncome from pensions includes payments from government employee pensions and private pensions.

^bRetirement benefits include Social Security and Railroad Retirement payments as well as private and government pensions.

Source: Social Security Administration, Office of Research and Statistics, unpublished tabulation from the March 1989 Current Population Survey.

When the decline in coverage first appeared in the early 1980s, it was attributed to the poor economic conditions and high unemployment associated with the 1982 recession, and largely dismissed. Observers thought that coverage losses were due solely to temporary layoffs and that coverage would rebound with economic growth. During the 1980s, however, the proportion of employees working for firms that are large and unionized, which are key determinants of pension coverage, suffered a permanent decline. These declines have not been offset by increases in coverage in the service industries. The inevitable conclusion is that because of the influence of industry structure on pension coverage, the percentage of the work force covered by supplementary plans in the United States will not increase noticeably in the foreseeable future.

In short, less than one-half of the population is covered by a supplementary employer-sponsored plan, coverage tends to be concentrated among the higher-paid, and the percentage of even the full-time work force covered by a traditional pension plan is declining. Thus, the tax incentives do not appear to be meeting the goal of providing supplementary retirement income to those who would not save on their own, and are unlikely to do so in the future.

The Saving Issue

Though it appears that widespread provision of retirement income through private pension plans has not been achieved, the favorable treatment of compensation provided through qualified plans might still be justified if it promoted national capital formation. In other words, do those people who are covered by pension plans end up with substantially more saving than they would have had in the absence of favorable tax provisions?

Many people have cited the rapid increase in pension fund assets as evidence of the positive impact of pensions on national saving. Indeed, pension reserves have experienced extraordinary growth; from the end of 1945 to the end of 1990, private pension assets increased from \$5 billion to almost \$2 trillion, while government pension reserves grew from \$5 billion to \$1 trillion. Proponents of pension plans imply that this buildup of reserves represents a net increase in national saving. The life-cycle model, however, predicts that in an ideal world exhibiting perfect labor and capital markets, no taxes, and no uncertainty, people would simply substitute the increase in their expected pension benefits for their own saving.

On the other hand, the favorable tax provisions associated with qualified plans would be expected to increase saving. This conclusion, however, depends

Table 6
Percentage of Full-Time Workers Aged 16 or Older Covered by an Employer-Financed Pension Plan, 1972, 1979, 1983, and 1988

Plan	Percent Covered			
	1972	1979	1983	1988
Total	n.a.	56	n.a.	52
Private	48	50	48	46
Public	n.a.	84	n.a.	83
Addendum:				
Coverage Status Under Private Plans				
Basic pension only				33
Both pension and pretax plans				6
Pretax savings plan only				7

n.a. = not available.

Source: Woods (1989, p. 17); Beller (1981, p. 3); Social Security Administration, unpublished tabulation of public employee coverage from March 1989 Current Population Survey.

crucially on the extent to which the tax preferences influence saving decisions at the margin and the sensitivity of individuals to changes in the rate of return caused by the tax preferences. In the United States, pension contributions and benefits tend to be relatively small. According to the Social Security Administration, the median annual private pension benefit for married couples age 65 and older was only \$4,374 (Grad 1990a, p. 73). Hence, it is highly likely that desired saving exceeds pension saving for most middle-income and high-income people, and thus they experience no change in their rate of return at the margin.

Even for those individuals for whom pension saving is marginal, the effect of the higher after-tax return may be relatively small. Although economists agree on the direction of response to higher returns, they have not reached a consensus on the magnitude of this response. An average of extreme estimates (Boskin 1978; Howrey and Hymans 1978) would indicate that a 10 percent increase in returns (say from 7 to 7.7 percent) would increase the private saving rate by 2 percent (say from 9.8 to 10.0 percent). At today's levels, even if pension saving exceeded desired saving for all people covered by qualified plans, the effect of the tax preferences on the after-tax return to saving through pensions would be expected to increase national saving by roughly \$12 billion.

Some other nontax factors, however, might lead one to think that saving through pension plans might produce more capital accumulation than a procedure whereby each person saved directly. The illiquidity of pension rights makes them less than perfect substitutes for private saving, with the result that people might reduce their other saving by less than one dollar for each dollar of pension accumulation. Similarly, retirement provisions accompanying qualified plans may stimulate saving by encouraging workers to retire early and therefore to save more during their working years than they would have otherwise. Moreover, uncertainty about whether they will ultimately receive a pension benefit might cause people to be cautious about cutting back on their own saving. Conversely, because an inflationary environment hinders an accurate assessment of unindexed pension benefits, workers could just as easily overestimate future real benefits and reduce their own saving by more than their pension asset accumulation. Similarly, because pension benefits are paid as annuities that pool risk, total saving might be less than if workers had saved individually for their own retirement and had to plan for extreme contingencies.

Since it is impossible to determine a priori whether the growth in private pension plans has fostered a net increase in saving or merely a shift in the composition of assets, a final assessment must rest on empirical evidence. If plans are fully funded, which is a relatively safe assumption these days, the

Once the shift in personal saving and the revenue losses have been taken into account, the favorable tax provisions do not appear to have stimulated national saving to any great degree.

key determinant of saving is the extent to which individuals reduce their own saving in response to promised pension benefits. The bulk of the evidence supports the prediction of the life-cycle model that individuals reduce their own saving in anticipation of future pension benefits (Munnell and Yohn 1992). The majority of the studies, however, did not use a very reliable measure of expected benefits and most of the studies focused on older men for whom retirement was the primary saving motive; little progress has been made in assessing the impact of pensions on the saving of the entire population. All that can be reasonably said is that some offsetting behavior occurs, and it is less than dollar for dollar.

For purposes of illustration, however, assume that the offset is in the range of 65 to 70 cents, an estimate consistent with the results of most of the accepted studies. Given this offset, if annual pension saving were \$150 billion,⁶ individuals would reduce their own saving by roughly \$100 billion, implying a net increase of \$50 billion to private saving. With a revenue loss estimate from the preferential treatment of qualified pensions of approximately \$50 billion, the most reasonable conclusion is that the increase in private saving may well have been completely offset

⁶ The contribution figure underlying the Treasury's tax expenditure estimate for 1992 is \$144 billion.

by a comparable increase in the federal deficit, leaving national saving unchanged.⁷

Thus, neither of the basic justifications for the preferential tax treatment of private pensions is supported by current evidence. Broad provision of private retirement income across income classes has not been achieved, given the pattern of pension coverage and distribution of benefits. Furthermore, once the shift in personal saving and the revenue losses have been taken into account, the favorable tax provisions do not appear to have stimulated national saving to any great degree. Thus, eliminating or reducing the tax concessions merits serious consideration.

III. Taxing Qualified Plans

It is important to clarify one point before beginning the discussion of possible options for taxing compensation in the form of deferred pension benefits. An income tax unquestionably favors consumption over saving relative to a consumption tax. An income tax reduces the rate at which individuals can trade off present consumption C_p for future consumption C_f , because the interest earnings on savings are reduced by the tax and less is gained by postponing consumption.⁸ It is also true that the current treatment of saving through qualified plans is

⁷ A slightly different issue is what would happen to saving if the preferential treatment of pensions was eliminated. Under one extreme scenario, pensions are relatively unaffected by the changes in the tax provisions, so pension and other personal saving remains more or less unchanged. The Treasury, however, receives \$50 billion and uses this money to reduce the federal deficit, so national saving is increased by \$50 billion. At the other extreme, pensions exist only because of the tax preferences and therefore would disappear once the preferences were removed. In this event, pension saving would decline by \$150 billion and other personal saving would increase by \$100 billion, implying a net reduction in personal saving of \$50 billion. If the decision were made to return the \$50 billion earned from the elimination of the tax preference to taxpayers by lowering rates, then the deficit would remain unchanged and the net impact would be a \$50 billion reduction in national saving.

⁸ Without any tax, consumers can consume their entire income $C_p = Y$, or they can save it, earn interest equal to iY , and enjoy future consumption C_f of $Y(1 + i)$. Thus, the rate at which they can trade off present for future consumption (C_p/C_f), in the absence of taxation, is $Y/[Y(1 + i)]$ or $1/(1 + i)$. With a consumption tax, present consumption becomes $(1 - t)C$ and future consumption becomes $(1 - t)(1 + i)C$, but the ratio of the two remains unchanged at $1/(1 + i)$. With an income tax, present consumption equals $(1 - t)Y$, but maximum possible future consumption becomes $(1 - t)Y + (1 - t)i(1 - t)Y$, so that the trade-off becomes $1/[1 + i(1 - t)]$.

consistent with the treatment accorded saving under a consumption tax.⁹

The conclusion does not automatically follow, however, that the present treatment should remain unchanged. While, in the writer's view, a well-designed consumption tax, with a nice progressive rate structure and bequests included in the tax base, would be a perfectly acceptable alternative to the present personal income tax, little is gained from the piecemeal exclusion from the income tax base of saving through qualified plans. This treatment costs a lot in forgone revenues, creates horizontal inequities, and does not increase saving.

The alternative is to move more towards a comprehensive income tax—thereby continuing the trend established by the Tax Reform Act of 1986—and devise a mechanism for including in a person's tax base the change in the present discounted value of future retirement benefits. This somewhat elusive concept can be fairly well approximated by the sum of contributions to pension funds and earnings on pension fund assets. The major strategic question is whether the tax should be levied on the individual's share of these financial flows or imposed at the fund level.

The practical difficulties associated with allocating contributions and pension fund earnings to employees are substantial. First, these amounts would fluctuate widely from one year to the next depending on the performance of the stock market, introducing substantial volatility into the individual employee's annual tax payments. Second, unless contributions and earnings were attributed only to those whose pensions were vested, some individuals might be taxed on benefits that they might never collect. Third, some individuals would have difficulty finding the funds to pay tax on income they have not received.

Despite these difficulties with allocating individual accruals, the Treasury Department, during the Ford Administration, outlined an approach that involved allocating annual pension fund earnings to those individuals with vested pension rights (U.S. Department of the Treasury 1977). Essentially, the plan retained the deductibility of employer contributions and the taxation of benefits after retirement,

⁹ An individual can either receive compensation (P) in cash, pay income on that amount and enjoy current consumption of $(1 - t)P$, or save P through a qualified plan, earn interest of iP and enjoy future consumption of $(1 - t)(1 + i)P$. Thus, the trade-off through qualified pension plans between current and future consumption is $1/(1 + i)$, the same ratio that individuals face under a consumption tax.

and introduced the taxation of pension fund earnings on a current basis.¹⁰ Otherwise the earnings would be included in the income of the employer. Given some simplifying assumptions, this plan can be shown to be equivalent to taxing employees currently on pension contributions and plan earnings.¹¹ To date, however, no movement has been made in the United States toward implementing current taxation of pension accruals. Efforts to limit the revenue loss associated with qualified plans have been directed at contribution and benefits limits on both defined contribution and defined benefit plans.

Foreign Experience

In contrast to the U.S. experience, three countries—Sweden, Australia, and New Zealand—have recently instituted major reforms in the taxation of pensions. Although the rationale for reform and the specifics of the new taxation differ among the three nations, the common development is that in each situation the decision has been made to levy the tax at the fund rather than the individual level.

Sweden. Until 1991, Sweden taxed pensions as the United States currently does. That is, contributions and earnings were tax exempt and benefits were taxed when received in retirement. The tax reform of 1991 was designed to redistribute the tax burden without changing the total burden, and move the entire system to a consumption-tax system through expanded use of value-added and indirect taxes. On the income tax side, however, movement was towards an even purer income tax through base-broadening measures. The reforms included a major provision to tax annual earnings on pension funds, in order to capture some of the revenue that was lost because of deferral and to improve equity in the treatment of different forms of saving.

Under the new system contributions remain tax exempt and fund income is taxed, but at a lower rate than other capital income (10 or 15 percent, depending on the type of plan, versus 30 percent under the federal personal and corporate income taxes) to provide some incentive in favor of pension saving. Benefits continue to be taxed as ordinary income when received. Thus, Sweden has adopted an approach to taxing pensions analogous to the plan laid out by the U.S. Treasury in the late 1970s.

Most people, however, do not pay any national income tax on benefits. Throughout the 1980s personal income taxes have been constantly changing toward fewer brackets and lower marginal rates.

Currently, due to the high standard deduction, roughly 85 percent of the population pays no national income tax, while the other 15 percent is subject to a marginal rate of 20 percent on labor income.¹² As a result, taxation of benefits has been significantly reduced over the last decade.

Australia. Prior to reform, Australia's system paralleled that in the United States. Contributions and fund earnings were untaxed and benefits were taxed when paid out. The government played little role in encouraging private provision of retirement income until 1983 when the political wing of organized labor was elected into government and developed a Retirement Income Policy. This policy was designed to maintain tax concessions in order to encourage private pension provision, to expand coverage to traditionally excluded groups, and to promote annuities over lump-sum distributions. Until 1988 the tax treatment of pensions remained largely unchanged;¹³ reforms were aimed at meeting other goals. The reforms of 1988 included important provisions related to pensions: the tax on benefits was shifted to the time when contributions occur, thus aligning the treatment of pensions more closely with other forms of saving and recouping some of the revenue loss of deferral.

Under the new system, contributions are taxed at 15 percent, levied on the fund. Fund income and realized capital gains are taxable at a flat rate of 15 percent, after expenses and after adjusting capital gains for inflation. As an offset to this tax, the funds can claim credit for dividends received from Australia.

¹⁰ The plan also extended the deductibility to employee contributions, which are not deductible under current law.

¹¹ Assume that contributions, earnings, and benefits were all taxed at the same rate. Then current taxation of contributions and pension fund earnings would mean that the amount available for future consumption would be $(1 - t)P + (1 - t)i(1 - t)P$ or $(1 - t)P[1 + (1 - t)i]$. Similarly, allowing a deduction for contributions but taxing earnings currently and benefits after retirement would mean that $[P + iP(1 - t)](1 - t)$, or $(1 - t)P[1 + (1 - t)i]$, would be available for future consumption. Thus, in both cases, the trade-off of present for future consumption would be at the rate $1/[1 + (1 - t)i]$.

¹² Most taxpayers are subject to municipal income taxes which average 31 percent, however, and special rules apply to retired people with low pensions so that a minimum pension is tax exempt (Swedish Ministry of Finance 1991).

¹³ See Commonwealth of Australia (1988) and Larum (1990) for a more complete discussion of the reforms. The discussion has been simplified here and concerns only plans similar to private plans in the United States. Lump-sum pension plans are also prevalent in Australia and are subject to slightly different regulations. Some changes were made in the tax treatment of lump-sum distributions between 1983 and 1988, but the most significant pension tax changes occurred in the reforms of 1988.

lian companies. Taxes on benefits have been reduced by 15 points as an offset to the contribution tax. As a transitional measure, the government allowed reductions in gross benefits to yield the same after-tax benefit. Few companies with defined benefit plans

Countries already undertaking reforms provide some examples and guidelines for the United States.

actually reduced their benefits; instead they accepted the additional costs. Australia has moved towards an income-tax approach to pensions, but has retained some subsidy for private plans.

New Zealand. New Zealand, at the end of 1987, made the boldest reforms to pension taxation of any country. Historically, contributions and fund income of pension schemes were untaxed and benefits were taxed on receipt. Beginning in 1984, with the election of the Labor Party, many tax reforms have been implemented. It was not until 1987 that pensions were tackled, at which time the government decided that the revenue costs of preferential treatment for pensions had become too large and that the benefits of these concessions were not fairly distributed. The 1987 changes were also designed to achieve tax neutrality between all forms of saving and among all types of capital income.¹⁴

Contributions are now subject to a 33 percent tax, which originally was to be paid by the employer. After much public discussion, however, the government decided to levy the tax on the fund. Fund income is taxed at 33 percent, and benefits go untaxed. To ease the transition between the old and new tax regimes, pension plans were allowed to negotiate benefit reductions and essentially provide the same after-tax benefit to retirees. Thus, New Zealand has adopted a pure income-tax approach to pensions and eliminated all tax subsidies for these plans.

¹⁴ New Zealand Ministry of Finance (1988) and Lucas and Bransford (1990) provide more detail on these changes. These reforms also included provisions affecting the taxation of life insurance, which is discussed more fully in New Zealand Ministry of Finance (1988).

It is apparent that a great deal of action has been taken in recent years to change the tax treatment of pensions. Countries undertaking reforms have done so to improve equity in the treatment of various forms of saving and to recoup some revenue loss. They have also chosen to impose the taxes principally at the fund level. Although some uncertainty exists over whether the changes will remain in force, and some complaints are heard from the pension industries, these countries provide some examples and guidelines for the United States.

A Proposal for the United States

In order to crystallize the debate, it is probably useful to put forth a specific proposal for the taxation of pension accruals in the United States. One obvious option is an annual tax on pension contributions and pension fund earnings, which for administrative and other reasons would be paid at the fund level. That is, the employer would make a deductible contribution to pension plans just as under current law, but then the trustees of the plan would transfer to the U.S. Treasury the stated percent of annual contributions and plan earnings. Although a variety of rates are possible, some argument exists for using one of the marginal rates in the current personal income tax structure—probably 15 percent. Benefits could then be withdrawn tax free. The assumption, of course, is that benefits would probably end up 15 percent lower than they would have been without the current taxation.

To ensure equity, the Internal Revenue Service would need to make adjustments at the beneficiary level in the form of a rebate for individuals below the taxable threshold or a larger levy for high-rate taxpayers, so that these groups are not unduly disfavored or favored relative to current law. Even then, this plan is still less than perfect; it continues to provide some advantage to high-income taxpayers, whose pension fund earnings are taxed at only 15 percent, less than their marginal rate on wage income.

Even this skeleton of a plan raises some serious issues. The first is that, of the approximately 45 million people participating in employer-sponsored plans, roughly 2.5 million are covered by federal plans and nearly 10 million by state and local plans. Constitutional and practical problems arise in an attempt to tax the contributions and earnings of state and local plans.

As the debate regarding the mandatory extension of coverage of Social Security to state and local

employees revealed, the federal government is constrained by the Tenth Amendment from intruding into basic state government functions or infringing on the powers reserved for the states. States would certainly resist the federal government coming in and scooping up 15 percent of state and local pension contributions and pension fund earnings. Mechanisms would have to be devised to work around constitutional constraints. One possibility would be to enact an alternative tax whereby contributions and earnings would be attributed to individual employees and taxed at a rate greater than 15 percent if the tax were not paid at the fund level.

A serious practical problem also grows out of the constitutional arrangements between the states and the federal government. Unlike private plans whose funding behavior is controlled by the Employee Retirement Income Security Act of 1974 (ERISA), state and local plans are not subject to federal funding standards. Thus, the states and localities would be free to respond to the strong incentive to reduce contributions and pension fund earnings by cutting back on their funding efforts.¹⁵ Such an outcome would clearly be undesirable. Thus, an effort to tax pension accruals for state and local employees would have to be accompanied by federal legislation to regulate funding of government plans. Enacting such legislation would not be easy, however, as demonstrated by state and local opposition to efforts in the early 1980s to extend federal reporting, disclosure, and funding standards to public plans.

Presumably similar difficulties should not arise in the case of the federal pension plans. Although the federal retirement plans are not covered by ERISA, Congress should have no problem extending the proposed tax provisions to the plans sponsored by the federal government. The only reason to raise the issue is that Congress, in recent years, has failed to adopt for federal plans some constraints that it has placed on plans sponsored by private employers. Specifically, the modified section 415 funding limits in the Tax Reform Act of 1986 do not apply to employees of tax-exempt organizations or government employees, including members of Congress (Schieber 1990).¹⁶ Thus, care would have to be taken to ensure that federal plans were treated in the same manner as private plans if the taxation of pensions were shifted to a current basis.

Another major issue is the question of transition from the current to the proposed tax scheme. The problem is that the existing assets in the pension funds represent pension accruals for which no tax has

been paid, so that immediately discontinuing the tax on pension benefits would mean that some beneficiaries would escape taxation under the income tax entirely. On the other hand, retaining income taxation for those benefits where contributions and earnings have not been subject to tax and exempting from tax those benefits for which accruals had been taxed currently would unnecessarily complicate the tax law.

An ingenious solution has been suggested by David Callund, a British economist (Callund 1989; MacLeod and Callund 1989). He suggests a one-time assessment on all existing pension assets equal to the tax applied to current accruals, which in this case is 15 percent. To compensate for the reduction in assets, the government would also reduce pension liabilities by announcing that all pensions in force would henceforth be paid net of this 15 percent tax. As mentioned previously, rebates or surcharges would be applied to benefit payments so that retirees would receive the same after-tax benefits as they would have under the current system.

Such a one-time assessment would not only ease the transition by allowing the new tax rules to apply immediately to all benefits, it would also eliminate a peculiarity of the current system whereby the government is essentially prefunding its future tax receipts. That is, current pension plans really consist of two separate funds: one fund that accumulates assets to pay future net-of-tax pension benefits, and another fund that accumulates assets to pay future federal income taxes. The government, like the private sector, implicitly employs the services of plan sponsors and investment advisors to manage and invest the assets in its portion of the pension fund. The government has no need to prefund its tax receipts, and

¹⁵ In reality, state and local contributions cannot drop to zero. If they do, the deferred compensation of state and local employees becomes subject to taxation under section 457 of the Internal Revenue Code.

¹⁶ ERISA for the first time set dollar restrictions for contributions to both defined benefit and defined contribution plans. The original 1974 funding limits were \$75,000 for a defined benefit plan and \$25,000 for a defined contribution plan, both amounts to be adjusted annually in line with changes in the consumer price index. By 1982, these limits had risen to \$136,425 and \$45,475, respectively. In response to perceived excesses of the pension deferral provisions and the need for revenue, the Tax Equity and Fiscal Responsibility Act of 1982 reduced the limits to \$90,000 and \$30,000, and froze further indexing until 1986. Legislation in 1984 extended the freeze until 1988, thereby significantly lowering the real dollar funding limits on employer pensions. The Tax Reform Act of 1986 introduced significant cuts to the maximum fundable benefits for workers retiring before age 65, and to the contribution limits for defined benefit plans (Schieber 1990, pp. 52-55).

would lose nothing by discontinuing this practice.

The one-time assessment would produce a large pile of one-time revenues for the Treasury—15 percent of \$3 trillion is \$450 billion—and the implications are intriguing in terms of their impact on federal government finances. Of course, the Treasury would gain the money only in a cash-flow sense and would be no better off in present value terms, since it would not receive the tax payments on future benefits as it would have under existing law. Nevertheless, these accelerated payments could be used to reduce the \$3 trillion of outstanding federal debt, lowering annual federal interest payments by roughly \$35 billion. On the other hand, if the assessment were used for current consumption, the transaction would have a detrimental effect on national saving and capital accumulation.

The case for current taxation of qualified plans does not depend, however, on the acceptability of the proposed transition scheme. Taxing pension accruals is consistent with a comprehensive income tax and deviating from this approach can be justified only if it produces substantial benefits. Thus, the proposal to tax pension contributions and pension fund earnings at the base income tax rate—that is, 15 percent—is not a radical proposal. The revenues from such a tax would vary with the performance of the stock market, but the levy would have produced roughly \$55 billion in revenue in 1990, the last year for which data are available (Table 7). If these funds were used either to reduce the federal government deficit or to invest in infrastructure or education, they would increase the resources available for future generations.

IV. Conclusions

This article has attempted to argue that the time has come for the current taxation of compensation received in the form of deferred pension benefits. Such treatment is consistent with the broad definition of income envisioned under a comprehensive personal income tax and incorporated in the language of the Internal Revenue Code. Taxing pensions on a deferred basis can be justified only if pension plans provide rank and file employees with retirement benefits that they would not have accumulated on their own, or, failing that test, if they increase the saving of those who are covered so that national saving and capital accumulation are greater than they would have been otherwise.

The evidence does not support either of these

Table 7
Estimated Revenue from Current Taxation of Pension Contributions and Plan Earnings, 1980 to 1990

Year	Pension Fund Assets	Benefits	Contributions and Earnings	Tax Revenue
1980	\$916.1	\$74.6	\$223.6	\$33.5
1981	996.9	87.8	168.6	25.3
1982	1179.2	99.9	282.2	42.3
1983	1392.1	112.5	325.3	48.8
1984	1532.0	124.2	264.1	39.6
1985	1801.8	145.7	415.5	62.3
1986	2031.8	172.5	402.4	60.4
1987	2201.9	194.6	364.6	54.7
1988	2482.4	221.2	501.8	75.3
1989	2848.0	244.4	610.0	91.5
1990	2945.1	267.2	364.3	54.6

Note: Pension fund asset figures represent end-of-year reserves. Given that $assets_t = assets_{t-1} + contributions_t + earnings_t - benefits_t$, contributions plus earnings are calculated using the following formula: $contributions_t + earnings_t = assets_t - assets_{t-1} + benefits_t$.

Source: Author's estimates based on Board of Governors of the Federal Reserve System (1991, pp. 19–24); U.S. Bureau of Economic Analysis (1986, Tables 2.1 and 6.13) and (1986 to 1990, Tables 2.1 and 6.13).

justifications. Pension benefits are a trivial source of income for retirees in the bottom two-fifths of the income distribution, and increase dramatically in importance as one moves up the income scale. The pattern is unlikely to change in the future, since coverage is also concentrated among higher-paid workers. Coverage rates are also declining and, given their dependence on industry structure, they will probably continue to decline in the future. In short, pensions benefit a relatively privileged minority of the population, while all taxpayers face higher rates to cover the preferences accorded qualified plans.

Advocates of tax preferences for pensions frequently raise the saving issue as a rationale for favorable tax treatment. The assets of pension plans, however, do not represent a net increment to national capital accumulation, but rather a shift in the composition of saving and capital accumulation. Empirical studies confirm that individuals reduce their own saving in response to contributions to employer-sponsored pension plans. Although the offset is less than dollar for dollar, the net increment from the less than complete offset must be compared to the revenue loss associated with the large tax expenditure accorded qualified plans.

Given that the revenue loss associated with qualified plans does not appear to be achieving major social goals, the taxation of benefit accruals should be shifted to a current basis. The specific proposal is to levy a tax of 15 percent on annual contributions and pension earnings at the *fund* level. The transition to the proposed system could be eased by a one-time assessment of 15 percent of existing pension fund assets, accompanied by an announcement that outstanding liabilities were also reduced by 15 percent. That is, plan sponsors would be allowed to pay out 85 percent of their promised benefits, and adjustments could be made on the personal income tax form for any tax rebate or additional surcharge required for beneficiaries at different income levels.

A host of issues remain to be explored and resolved should policymakers become seriously interested in introducing such a reform. Problems exist in extending such a tax to pension plans sponsored by

state and local governments, but excluding such plans would be inequitable. Questions also arise about whether to eliminate the preferences associated with other tax-deferred savings plans such as Individual Retirement Accounts (IRAs) and section 401(k) and 403(b) plans.

While the problems are serious, they could all be addressed and resolved. The experiences of Australia, New Zealand, and Sweden should be very useful in anticipating and circumventing administrative and other practical difficulties. In short, the United States has the ability to tax pensions on a current basis and the time has come to do it. The *quid pro quo*, however, is that once the government has reduced or eliminated the subsidy to qualified plans, it should reduce the mountain of regulation facing sponsors of these plans. For after all, the tax advantages are the major justification for regulation.

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Profits and Stock Prices: The Importance of Being Earnest

In recent months, popular indices of the prices of common stocks have surged to new peaks. At the same time, the profitability of nonfinancial corporations has foundered, and many question whether the rising tide of economic recovery can lift earnings to meet the value of equity.

Since 1982 stock prices have more than tripled, while the operating income of corporations has risen by less than one-half. In the last three years alone, prices have increased by more than one-half, while earnings have fallen. During January of this year, the price of equity for Standard & Poor's composite of 500 stocks exceeded 23 times earnings, a comparatively high multiple by historical standards. To some analysts, stocks are priced as aggressively as they were during the prosperity of the 1960s, but the performance of corporations appears to be languishing nearly as much as it did during the 1970s. Once the gap between the value of equity and the prospects of corporations became evident during the 1970s, the price of stocks fell from 17 times earnings in the late 1960s to less than 10 times earnings in the late 1970s. The rise and subsequent collapse of stock prices has been more abrupt during the last decade: the value of equity rose 30 percent from January to late August in 1987, then fell 30 percent from late August to late October.

While the prospect for equity values naturally concerns traders and investors, it also is a concern for public policy. Because investors' wealth depends on the value of corporate equity, the demand for consumption goods can vary with the price of stocks. Furthermore, the valuation of corporations' productive assets on stock exchanges influences businesses' willingness and ability to undertake new investments.¹ If the falling price of stocks should retard the pace of capital formation in the future, it also would retard the potential growth of output and living standards.

This article examines the relationship between the earnings of nonfinancial corporations and the value of their equity. It concludes that

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the price of stocks corresponds more closely to the earnings that companies disclose in their financial reports than it does to the earnings for nonfinancial corporations reported in the national income accounts. This unsurprising result is not necessarily reassuring. If corporations' financial reports overstate both the magnitude and the rate of growth of their earnings because of the biases arising from their reliance on historical book values, then the lower returns reported in the national accounts may represent the performance of these corporations more accurately.

This analysis also suggests that the value of equity does not necessarily reflect corporations' incentives for undertaking investments. Therefore, a revival of domestic capital formation does not necessarily require the Dow Jones industrial average to remain near its recent record high values. Since the late 1970s, for example, corporations' rate of return on surplus increased in part because their average tax burdens declined with the various tax reforms enacted in the 1980s. Stock prices rose with earnings. Because the tax reforms adopted in 1986 tended to maintain, for a time, a lower tax burden on existing corporate assets, while raising the burden on many new investments, rising stock prices during the late 1980s did not herald a commensurate improvement in incentives for investment. Conversely, should the rate of return on existing assets and surplus for domestic corporations fall with increasing foreign competition, the prices of stocks also may fall. But, if the opportunities for profitable growth, both here and abroad, remain sufficiently attractive, lower prices of stocks would not foretell a commensurate drop in corporations' capital budgets.

I. The Value of Equity

Most descriptions of stock prices share a common pedigree: the value of common stocks essentially rests on the prospective earnings of the assets backing these shares. Some augment this fundamental description of stock prices by allowing for bubbles or fads, wherein prices can rise well above values supported by corporate earnings for an indefinite time.

Although stocks appear to be valued for both their dividend payments and their resale values, from the fundamental point of view the resale value of stocks must reflect the prospective value of subsequent dividends. To shareholders who anticipate owning stocks for one year, for example, the value of

this investment depends on dividend receipts during the year plus the proceeds from selling the stocks after a year has elapsed. In order to forecast this resale value, shareholders must anticipate the price that others would be willing to pay one year hence. If subsequent investors also hold the stocks for one year, then the current value of stocks depends on prospective dividends over the next two years and the proceeds from selling the stocks two years from now. Extending this chain of logic shows that

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the value of stocks ultimately depends on forecasts of dividends extending into the indefinite future, well beyond current shareholders' intended holding periods.

According to this view, the fundamental value of stocks depends on their stream of dividends, which, in turn, depends on prospective earnings. Share prices tend to rise when dividends increase or when prospective earnings promise a greater capacity for paying dividends in the future. The importance of rising earnings appears to be substantial. From 1982 to 1989, for example, the ratio of current dividends to stock prices generally varied around 4 percent, while the yields on corporate bonds averaged 11 percent.² If shareholders during the late 1980s had expected no growth in corporate earnings, stock prices would have to have fallen by two-thirds for the yields on equities to appear attractive to investors.

Not only do dividends depend on earnings, but earnings also depend on corporations' policies for paying dividends. Earnings per share of stock may grow either because the rate of return on the corporation's surplus increases or because the amount of

¹ See Tobin (1969); von Furstenberg (1977); Ciccolo and Fromm (1979); Abel (1979); Yoshikawa (1980); and Hayashi (1982).

² This is the dividend-price ratio reported by Standard & Poor's for their index of 500 stocks. The bond yield is that reported by Salomon Brothers for new securities issued by industrial corporations bearing an A bond rating.

surplus backing each share increases. Other things equal, a corporation reduces its retained earnings when it increases its payment of dividends to shareholders. Conversely, lower dividend payments this year increase the surplus backing each share of stock next year, thereby raising earnings per share in the future.

When deciding the proportion of earnings to be distributed to shareholders as dividends, corporations must weigh the benefits of paying greater dividends this year against the benefits of paying greater dividends in the future. Some financial theories, resting on assumptions of perfect competition, constant returns to scale, or uniformity of information and beliefs among investors, conclude that dividends are either arbitrary or dictated by institutional details, such as the incidence of income taxes, bankruptcy costs, agency costs, or the need to signal investors.³ Other approaches stress that the proportion of earnings to be distributed as dividends and, consequently, the rate of growth of earnings and dividends depend on the growth of profitable investment opportunities available to corporations.⁴

Retaining earnings, instead of paying dividends, ultimately benefits corporations and their shareholders only if the return on marginal investments is no less than the opportunity cost of capital. Should corporations earn a greater rate of return on their retained earnings than shareholders can earn on alternative investments, shareholders benefit when corporations retain their earnings. Conversely, should shareholders earn greater returns on alternative investments, they would benefit most when corporations pay greater current dividends.⁵ If corporations distribute too little of their earnings to shareholders, they will expand too rapidly, thereby earning an inadequate return on their marginal investments, and their share prices may be depressed enough to invite a "takeover." If they distribute too much of their earnings, they risk either being displaced by competitors or relying too much on debt financing.

The Price-Earnings Ratio

Stocks frequently are appraised as a multiple of their recent earnings, the price-earnings ratio. At the very least, this multiple depends on the shareholders' required rate of return, the prospective rate of growth of earnings, and the proportion of earnings that is distributed to shareholders as dividends. Other things equal, the lower the required rate of return,

the greater the growth of earnings, or the greater the ratio of dividends to earnings, the greater is the price shareholders are willing to pay per dollar of earnings for a corporation's stock.

If the rate of return on a corporation's surplus—the difference between the value of its assets and the value of its liabilities—is constant (r) and the rate of growth of profitable investment opportunities is constant (g), then the share of earnings distributed as dividends is

$$(1) \quad s = 1 - g/r.$$

The greater is the warranted rate of growth of surplus relative to the rate of return on surplus, the lower are dividends.

In a steady state, according to the fundamental view of stock pricing, the dividend-price ratio would be constant: in the long run, the dividend yield neither rises without limit nor falls toward zero. Consequently, the rate of appreciation of the stock equals the rate of growth of earnings and dividends (g). The shareholders' rate of return equals the dividend yield (the ratio of dividends to the price of the stock) plus the rate of appreciation of the stock. If the shareholders' required rate of return on equity is ρ , then

$$(2) \quad \rho = \frac{D}{P} + g, \quad \text{implying} \quad \frac{D}{P} = \rho - g.$$

Therefore, the steady state ratio of earnings to the price of the stock is

$$(3) \quad \frac{E}{P} = \frac{D/s}{P} = \frac{\rho - g}{s}.$$

The price of stocks can be a fallible indicator of corporations' incentives for undertaking new invest-

³ See, for example, Taggart (1985); Modigliani and Miller (1958); Miller and Modigliani (1961); Jensen and Meckling (1976); Miller and Scholes (1978); Bhattacharya (1979); and the articles listed in Kopcke and Rosengren (1989).

⁴ If corporations are oligopolistic competitors whose return on assets varies with their scale of operations, capital markets are not perfect, or investors are not homogeneous, then dividends also depend on the relative appeal of corporations' investment opportunities.

⁵ This strategy is not equivalent to maximizing the price of stock. A corporation that maximizes the wealth of its shareholders essentially expands until the rate of return on its last investment project eventually falls low enough to equal its marginal cost of capital. Because this strategy does not maximize the average return on assets or on surplus, it entails corporations' expanding beyond the scale that maximizes share prices.

Table 1
Earnings, Dividends and Stock Prices for Ford Motor Company
 Millions of Dollars

Year	Earnings	Dividends	Total Value of Stock	Return on Surplus (Percent)	Ratio of Dividends to Earnings	Price-Earnings Ratio	Price-Dividend Ratio
1977	1,672.8	359.3	5,418.2	19.8	.21	3.2	15.1
1978	1,588.9	416.6	5,035.5	16.4	.26	3.2	12.1
1979	1,169.3	467.6	3,856.9	11.2	.40	3.3	8.2
1980	-1,543.3	312.7	2,411.5	n.a.	n.a.	n.a.	7.7
1981	-1,060.1	144.4	2,019.6	n.a.	n.a.	n.a.	14.0
1982	-657.8	0	4,687.9	n.a.	n.a.	n.a.	n.a.
1983	1,866.9	90.9	7,754.6	24.7	.05	4.2	85.3
1984	2,906.8	369.1	8,490.8	29.5	.13	2.9	23.0
1985	2,515.4	442.7	10,793.8	20.5	.18	4.3	24.4
1986	3,285.1	591.2	15,097.5	22.1	.18	4.6	25.5
1987	4,625.2	805.0	19,126.4	25.0	.17	4.1	23.8
1988	5,300.2	1,113.5	24,785.4	24.6	.21	4.7	22.3
1989	3,835.0	1,403.5	20,625.9	16.9	.37	5.4	14.7
1990	860.1	1,388.6	12,596.3	3.7	1.61	14.6	9.1

n.a. = not applicable.
 Source: Compustat Data Base.

ments. Although the value of stocks tends to rise or fall with the prospective rate of growth of earnings, offsetting changes in the rate of return on surplus may break this relationship. The price-earnings ratio, for example, tends to rise when the rate of return on surplus rises relative to the rate of growth of profitable investment opportunities. Under these circumstances, the share of earnings distributed as dividends rises, (1), which tends to reduce the reciprocal of the price-earnings ratio, (3). Even if the warranted rate of growth should fall, the price-earnings ratio may, nonetheless, rise in the steady state if the return on surplus rises, thereby increasing dividends sufficiently. Both the price-earnings ratio and the level of stock prices can rise, if the return on surplus increases sufficiently when warranted growth declines.⁶

Changes in the Return on Surplus

The foregoing steady-state analysis, by itself, is not a complete description of stock prices in the short run. At the very least, the return on surplus and the potential for profitable investment opportunities vary from year to year.⁷ Temporary changes in earnings and investment opportunities will affect the value of equities less than enduring changes. If, for example, a decline in earnings were regarded as fleeting,

perhaps likely to be offset by extraordinary earnings in the future, stock prices could fall less than earnings, and the ratio of prices to current earnings would rise as shareholders look forward to better years. If, however, the lower earnings were to persist, as assumed by the steady-state analysis, then stock prices would fall more than earnings.

In practice, shareholders seem not to regard fluctuations in business conditions as entirely fleeting. Consequently, year-to-year changes in performance can influence equity values greatly. Assessments of a corporation's long-run return on surplus and long-run growth may vary with current returns and investment opportunities. Moreover, temporary changes in a corporation's fortunes often are not reversed very quickly. When the shareholders' rate of discount (ρ) is sufficiently great, these changes may

⁶ In other words, the demand for capital does not necessarily correspond well with changes in Tobin's q (Hayashi 1982). The demand for capital also may not correspond closely with changes in marginal q (Pindyck 1991; Kopcke 1992).

⁷ This long-run analysis breaks down when a corporation's warranted rate of growth exceeds shareholders' discount rates or when corporations pay no dividends. During business cycle recoveries, for example, investors may anticipate that the rates of growth of some businesses will exceed their discount rate (ρ) for a time. Also, younger corporations may pay no dividends and promise extraordinary rates of growth for many years before they mature.

carry a weight approximating that of more lasting changes in performance.

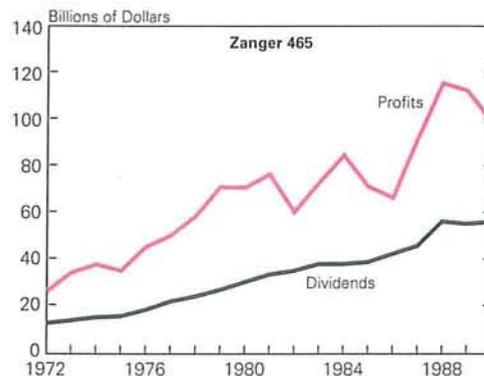
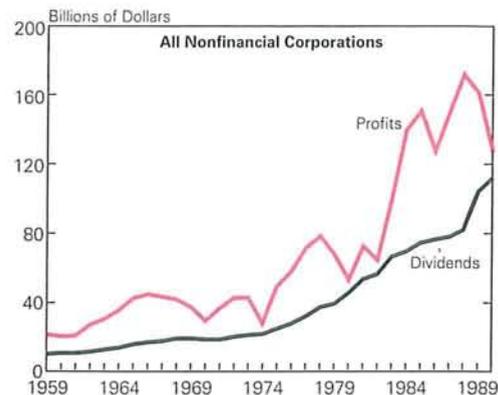
Ford Motor Company, for example, has been a prominent manufacturing corporation for most of this century. Because the demand for its principal products, motor vehicles, varies substantially with economic conditions, Ford's earnings, like the earnings of other manufacturers of durable goods, also vary over the business cycle. When Ford Motor Company's rate of profit fell from 20 percent on surplus in 1977 to 11 percent in 1979, its price-earnings ratio remained near 3 (Table 1). The attendant decline in the market value of Ford's equity agreed more with the consequences of a lasting deterioration in performance than with the consequences of a temporary slump. From 1983 to 1988, Ford's return on surplus averaged nearly 25 percent, and its price-earnings ratio averaged approximately 4. As its return on surplus fell to 4 percent by 1990, its price-earnings ratio rose to nearly 15. The higher price-earnings ratio implies that shareholders expected much of the 84 percent decline in earnings since 1988 to be temporary. Nevertheless, that the price-earnings ratio did not rise more, that the market value of Ford's equity fell by one-half, suggest that shareholders regarded much of the deterioration in performance as lasting rather than temporary.⁸

Annual changes in profits tend to be greater than the changes in dividends⁹ (Figure 1). Dividends, unlike earnings, cannot fall below zero. Moreover, corporations prize a history of rising dividends; consequently, most adopt conservative strategies for paying dividends. As earnings rise, dividends often rise with a lag, protecting management from the need to cut dividends should earnings subsequently decline. When earnings fall, managers seem to gain little by reducing dividends immediately, unless they are convinced their earnings will be depressed indefinitely or they need to retain the cash to avoid financial duress. Managers may even issue debt in order to maintain dividends and meet their capital commitments when earnings fall. By reducing dividends, managers may fear tarnishing the appeal of their securities, thereby raising their cost of capital, or they may fear prematurely signaling substantial distress to "outsiders."

Whereas potential shareholders, as outsiders, may be inclined to bid cautiously for the stock of a corporation reporting new problems, managers, as insiders, have an incentive to avoid overreacting. Because stock prices can react more to annual changes in earnings than do dividends, prices may

Figure 1

Profits and Dividends



Source: See the Appendix for definitions and sources.

appear to be too volatile compared to the behavior of dividends, perhaps suggesting that stock prices are not grounded firmly in fundamentals. However, when earnings fall more than dividends, the rate of growth of corporations' surplus also falls, thereby reducing the growth of future earnings and dividends.¹⁰ When earnings rise more than dividends,

⁸ This observation assumes that the shareholders' required rate of return for Ford is constant and that they do not expect the share of earnings distributed as dividends to change. If Ford now appears to be a more risky investment, the required rate of return may have increased. If so, the limited increase in the price-earnings ratio may be consistent with shareholders' regarding much of the decline in Ford's earnings as temporary rather than lasting.

⁹ See Peter L. Bernstein, Inc. (1992).

¹⁰ If corporations tend to maintain both their capital budgets and their distribution of dividends by borrowing, they may increase their marginal cost of debt financing, which also reduces their capacity for paying future dividends, other things equal.

corporations' surplus and capacity for paying dividends in the future tend to increase. The longer shareholders expect the change in earnings to endure, the greater is the initial change in the price-dividend ratio.

Much of the volatility of the price-dividend ratio, especially for specific stocks, might be attributed to the delayed adjustment of dividends to earnings. For example, Ford's dividends increased from 1977 to 1979 when its earnings and stock prices were falling (Table 1). Although the price-earnings ratio remained near 3 during these years, the price-dividend ratio fell from 15 to 8. Ford reduced its dividends after 1979 and did not increase them until earnings recovered in 1983. In 1983 Ford's price-dividend ratio was 85, and its price-earnings ratio was 4, as earnings increased more than dividends; in 1984, these ratios were 23 and 3, respectively, as dividends overtook earnings. Ford's dividend in 1990 exceeded its dividend of 1988, and its price-dividend ratio fell from 22 to 9 as its earnings fell significantly between these years. Dividends represented one-fifth of earnings in 1988, but in 1990 dividends exceeded earnings by three-fifths. By 1990 investors, forecasting lower earnings for Ford, regarded prevailing dividend payments as unsustainable.

Bubbles

The fundamental description of steady-state equity values given above essentially assumes that the price of stocks increases at the same rate as corporate earnings. Other descriptions allow for bubbles, wherein shareholders expect stock prices to appreciate at a rate that exceeds the rate of growth of earnings or dividends.¹¹ Therefore, the price of a stock ruled by a bubble grows without limit relative to its price given by the fundamental model. From the bubble point of view, there may be no unique solution for either the current prices of stocks or the future course of these prices, because the prices of stocks are not bound to reflect the value of their future dividends.

For the bubble, like the fundamental model, the shareholders' rate of return equals the dividend yield plus the rate of appreciation of the stock. When the rate of appreciation exceeds the growth of dividends, the dividend yield approaches zero with the passing of time. In this case, the rate of appreciation must rise to compensate shareholders for the falling dividend yield. High and rising stock prices today are justified by the common expectation that they will be higher

and rise more rapidly next year, not by prospective dividend returns. Eventually, the rate of appreciation of stocks must approach shareholders' required rate of return (ρ) as dividend yields become negligible. The rate of appreciation of stocks may even increase without limit in a bubble, if shareholders should perceive an increasing risk that the bubble might burst and their required rate of return increases with the size of the bubble. The expected rate of appreciation also may be very great when an extraordinary

No theory seems to predict either the inception or the demise of bubbles, and even the existence of bubbles is debatable.

increase in the price of stocks (due to the prospect of greater earnings, perhaps) spawns expectations of exceptional rates of appreciation for the future, especially if investors, attracted by these potential capital gains, bid up the price of stocks sufficiently to sustain, for a time, these expectations of exceptional returns.

As bubbles inflate, price-earnings ratios will rise above those predicted by fundamental analysis. When they burst, price-earnings ratios may fall to those corresponding to fundamental analysis, but they need not do so. No theory seems to predict either the inception or the demise of bubbles.

The existence of bubbles is debatable. Should some investors believe that Ford Motor Company's return on surplus will recover to 30 percent and the corporation's share of the world automobile market will expand greatly over the next decade, the price-dividend ratio of its stock may rise as the rate of appreciation of its shares exceeds the rate of growth of its earnings during the next few years. Ford's shares may even appreciate more rapidly once the

¹¹ For discussions of bubbles and the efficiency of prices in securities markets, see, for example, Shiller (1981); LeRoy and Porter (1981); Campbell and Shiller (1988); Fortune (1991); DeJong and Whiteman (1991); Fama (1991); Froot and Obstfeld (1991); Hsieh (1991); van Norden and Schaller (1991); and the articles listed in Dwyer and Hafer (1990). See also Kindleberger (1989) for descriptions of historical "bubbles."

nation's unemployment rate begins declining. Other investors who are less optimistic about Ford's prospects may believe that Ford's stock prices are ruled by a bubble.

The difficulty with finding bubbles may arise because investors are not certain about future business prospects and because investors' opinions can differ substantially. One investor's bubble or fad may be another investor's unsuccessful, but not necessarily unreasonable forecast. Should Ford prosper, history would report, in retrospect, no strong evidence of a bubble. Should Ford eventually achieve only a modest recovery of its fortunes, its stock prices during the 1990s may seem to have been ruled by a bubble, a conclusion not necessarily shared by those investors who held the unfulfilled forecast. Finally, should Ford's performance begin to recover only to collapse later and should more investors be attracted to Ford's shares during its recovery, then its shareholders may appear to have been absorbed by a fad or attracted to a bandwagon.

The surge in equity values in 1987, which subsided abruptly in the late summer and early fall of that year, and the recent record prices of stocks, coinciding with weak corporate profits and an uncertain recovery, suggest to some analysts that the prices of equities can stray from their fundamental values. The remainder of this article compares equity values with various concepts of corporations' earnings to assess the strength of the relationship between stock prices and corporate earnings.

II. Earnings and Equity Values

The fundamental value of equity ultimately rests on corporations' prospective capacity for paying dividends which, in principle, depends on their earnings. From the shareholders' point of view, however, a corporation that reports greater earnings on the "bottom line" of its annual report may not necessarily possess a greater capacity for paying dividends. For instance, earnings may increase because of extraordinary, one-time transactions, or they may increase because accounting techniques understate the costs of doing business when prices are rising.

This section examines the correspondence between the ratios for nonfinancial corporations and the rates of growth of two separate measures of their earnings. The analysis describes this correspondence both for aggregates of company data and for a specific group of corporations.

Measuring Earnings

The two concepts of earnings are different measures of operating profits. The first, "basic earnings," most closely reflects the profits reported by nonfinancial corporations. The second removes from basic earnings some of the biases that may arise because of the accounting for the value of goods in inventory, capital consumption expenses, or debt service expense. This second concept, recognizing that interest rates on corporations' outstanding debt may not correspond to prevailing rates of interest, also "marks" their interest expenses "to market." To the degree possible, these concepts of earnings are applied to the aggregation of domestic nonfinancial corporations reported in the national income and product accounts as well as to 465 nonfinancial corporations selected from the Compustat records, the "Zanger 465." (See the Appendix for a description of how the 465 corporations were selected.)

The national income and product accounts report profits after taxes (basic earnings) for nonfinancial corporations of \$136 billion in 1990. Because this concept of earnings is a first step toward measuring the value added to the assets of these companies, it does not represent the profit as reported by these corporations. National income accounting omits capital gains or losses and other elements of profit not arising from the current production of goods and services. It also omits income from foreign sources and removes from corporate income dividends re-

The fundamental value of equity ultimately rests on corporations' prospective capacity for paying dividends; this, in principle, depends on their earnings.

ceived from another domestic corporation. For the corporations selected from the Compustat records (Zanger 465), the concept of basic earnings is income before extraordinary items (as adjusted for common stock equivalents), the measure used by Standard & Poor's to calculate familiar price-earnings ratios. For the Zanger 465, earnings were \$99 billion in 1990.

These concepts of basic earnings tend to omit

nonrecurring revenues and costs so as to measure corporations' sustainable returns from operations, but the accounting techniques behind basic earnings may require further adjustments in order to better measure the fundamental returns from operations. National income accounting recognizes that profits do not reflect properly the cost of doing business; consequently, corporate income in these accounts includes inventory valuation and capital consumption adjustments. The Compustat data do not report corporations' inventories, stock of capital goods, or investment flows in sufficient detail to permit reasonably accurate estimates of inventory and capital consumption adjustments for the Zanger 465.

The first-in-first-out inventory accounting commonly used in business tends to understate costs when prices are rising.¹² Goods removed from inventory are valued at production costs that prevailed in the past, rather than current costs. The national accounts' inventory valuation adjustment deducted \$14.2 billion from the profit of nonfinancial corporations in 1990.

The rules governing the reporting of capital consumption expenses do not necessarily represent the actual decay of capital goods that are used in production. In the late 1970s, when the rules deferred the claiming of capital consumption allowances and the rate of inflation was substantial, the value of the decay of capital goods was understated in business accounts. After 1981, when allowances became more generous and the rate of inflation fell, the value of the decay of capital goods was overstated. As a result, in 1985 and 1986 the national accounts' capital consumption adjustment indicates that profits were understated by nearly \$50 billion. After the rules for reporting capital consumption allowances became less generous in 1986, the capital consumption adjustment fell to \$5.9 billion by 1990. For these reasons, the national accounts' adjusted measure of corporate profits better represents the fundamental returns from operations than the unadjusted measure.

Although the national accounts do not include capital gains and losses in order to measure more accurately the income from current production, this strategy introduces a bias that understates the income of borrowers when prices are rising. During periods of inflation, businesses that finance themselves with debt receive purchasing-power gains, as the real value of their debt obligations falls over the life of their loans. Creditors, who anticipate a matching real loss, may protect themselves by including an inflation premium in the rate of interest they require on

the loans that they write. Consequently, measures of income that ignore the purchasing-power gains accruing to businesses that rely on debt financing may understate corporate profits; this is especially important when the yields on debt fully compensate creditors for their losses. Earnings for the aggregate of nonfinancial corporations and for the Zanger 465 may be adjusted for estimates of these purchasing-power gains. In 1990, for example, these gains for nonfinancial corporations exceeded \$50 billion, because their net financial liabilities were approximately \$1 trillion, and the inflation rate exceeded 5 percent.

Because not all the debt of corporations bears the prevailing rate of interest, their earnings may be unusually low or unusually great for a time. A final adjustment to earnings replaces corporations' actual interest expense with the product of the prevailing rate of interest and the amount of their interest-bearing liabilities.

Price-Earnings Ratios and the Growth of Earnings

The first section of this article stresses the importance of the rate of growth of earnings in determining fundamental equity values. Foreseeing a greater growth of earnings in the short run, shareholders expect, at least, corporations' current dividend payments to be more secure. A greater return on surplus in the short run also may increase the odds of corporations' earning a greater return on surplus in the future, and shareholders may anticipate greater dividends, if not a higher rate of growth of surplus, earnings, and dividends, in the long run. In any case, because shareholders' required real rates of return may be as great as 10 percent, forecasts of earnings for the next few years can carry much of the weight of a long-run forecast.¹³

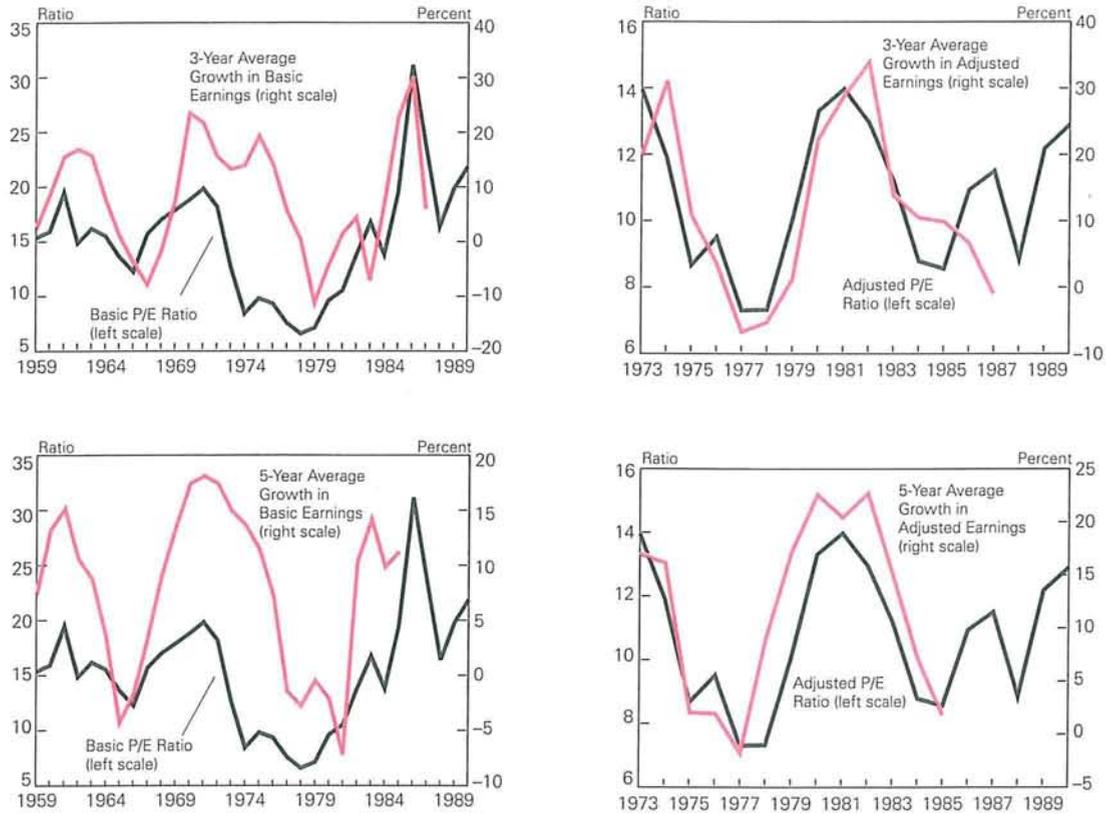
Analysts' recommendations on stocks can promote this tie between price-earnings ratios and the rate of growth of earnings. These reports commonly provide specific forecasts of companies' earnings for the coming year or two as well as general observations regarding the subsequent growth of earnings. These reports often project future prices of stocks by

¹² The U. S. Bureau of Economic Analysis estimates that only 45 percent of business inventories are covered by last-in-first-out (LIFO) accounting, rather than first-in-first-out accounting. In any case, LIFO accounting postpones rather than eliminates the misrepresentation of the cost of goods sold. Corporations using LIFO ultimately report "inventory profits" once their inventories of specific goods shrink.

¹³ See Abel (1991); Peek and Rosengren (1988); Campbell and Shiller (1988).

Figure 2

Equity Value and Growth in Earnings for All Nonfinancial Corporations



Source: See the Appendix for definitions and sources.

multiplying their forecasts of earnings by “customary” price-earnings ratios for the corporations in question. The analysis also may suggest that these projections understate or overstate future prices if the longer-run prospect for earnings warrants a multiple higher or lower than customary. When these reports foresee rising earnings, justifying higher prices of stocks in the future, they promote higher prices of stocks and higher price-earnings ratios today.

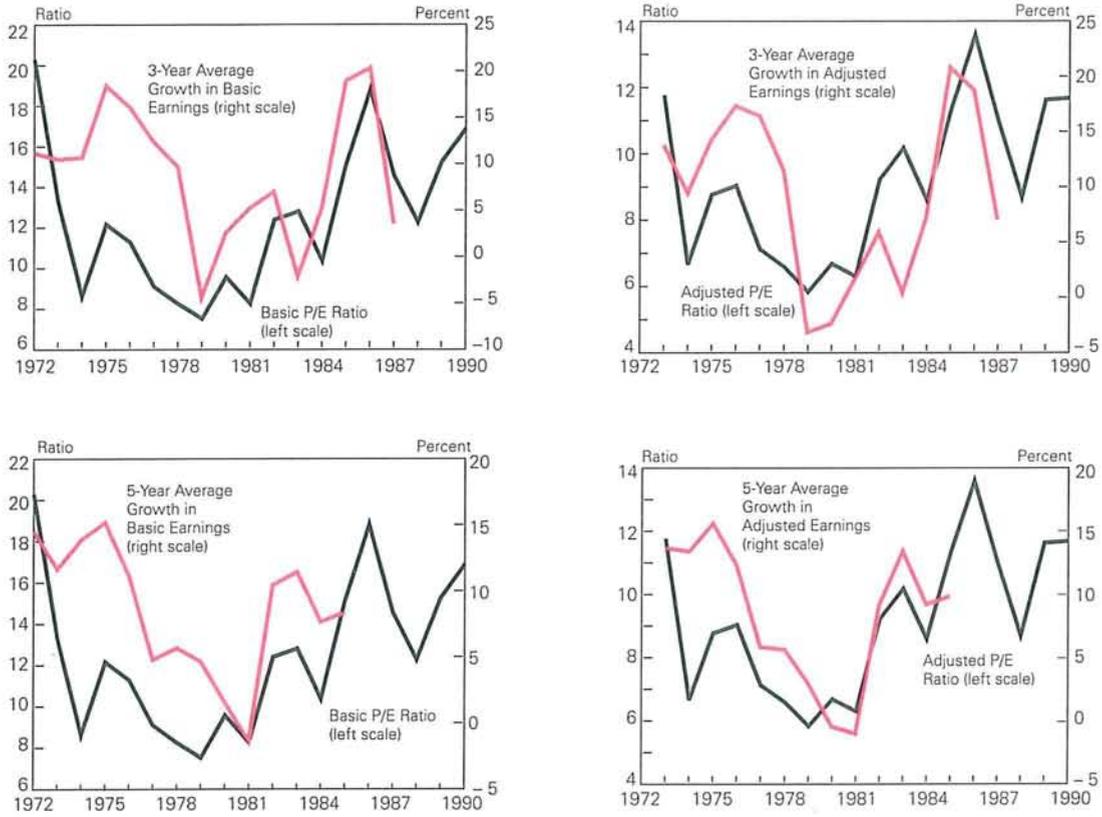
Figures 2 and 3 show the correspondence between equity values and short-term rates of growth of earnings. Figure 2, which shows the data for aggregated nonfinancial corporations, uses earnings data from the national income accounts and market values of equity from the flow of funds accounts. The

subsequent figure, which describes the data for the aggregate of the Zanger 465, uses data from the Compustat records. Appendix Tables 1 and 2 present the correlations between the price-earnings ratios and the growth of earnings shown in these charts.

In Figure 2, the price-earnings ratio for all nonfinancial corporations appears to anticipate changes in the short-run growth of earnings. The four panels show the value of equity relative to basic earnings and to adjusted earnings in each year, compared to the average annual rate of growth of those earnings over the subsequent three and five years. Between 1961 and 1966, equity multiples generally fell, while the future growth of earnings generally fell between 1962 and 1967. The subsequent rise in equity multi-

Figure 3

*Equity Value and Growth in Earnings
for the Zanger 465*



Source: See the Appendix for definitions and sources.

ples between 1967 and 1971 corresponds to a period when the future growth of earnings increased. Between the early 1970s and the late 1970s, equity multiples fell while the growth of earnings slumped. Between the late 1970s and 1983, equity multiples rose, virtually recovering their values of the early 1970s; at roughly the same time, the future growth of earnings increased significantly.

During the 1980s, the two different concepts of earnings shown in Figure 2 tell different stories. Because adjusted earnings tend to exceed basic earnings, the price-earnings ratios for adjusted earnings tend to be lower. Furthermore, adjusted earnings tended to grow more rapidly than basic earnings during the 1980s; consequently, the equity multiples for ad-

justed earnings do not rise as much as those for basic earnings during the decade. Equity multiples tend to follow changes in the future rate of growth of basic earnings during the early 1980s, and the ratio of stock prices to basic earnings attained a peak in 1986 that was roughly one-half again as high as its values in the early 1970s and early 1980s. Using adjusted earnings, however, equity multiples appear to anticipate the growth of earnings more consistently during the early 1980s, but less consistently around 1987, and the peak price-earnings ratio in 1987 was approximately four-fifths of its values in the early 1970s and early 1980s.

The four panels of Figure 3 show that the pattern of the price-earnings ratios for the Zanger 465 also

frequently anticipates changes in the future growth of earnings. Here, as in Figure 2, the correlation is greatest between equity multiples and the five-year average growth of earnings. Unlike the case for all nonfinancial corporations, however, the price-earnings multiples for the Zanger 465 during the early 1980s did not rise greatly above their depressed level of the 1970s; only in 1986 and 1990 did the values of price-earnings ratios resemble their value in 1972. In Figure 3, price-earnings ratios for adjusted earnings are much lower than those for conventional earnings, because the inflation gains on net debt and the restatement of interest expense increased earnings.

Price-Earnings Ratios and the Return on Surplus

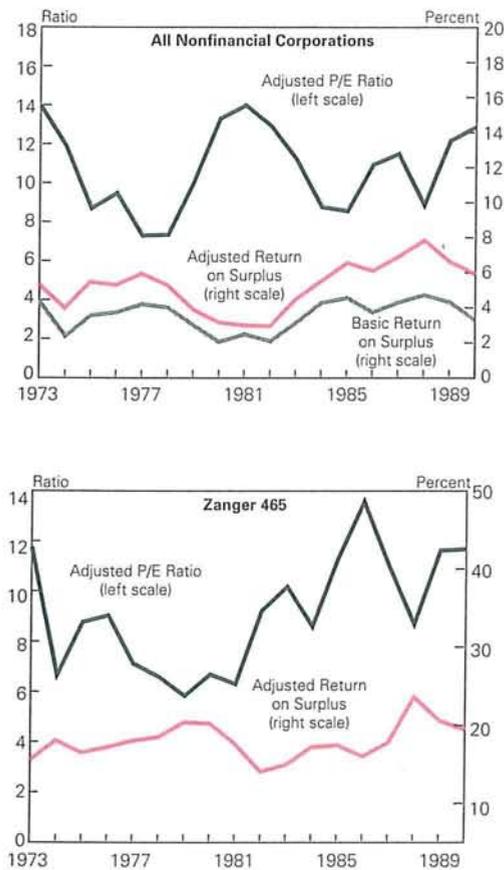
The correspondence between price-earnings ratios and the future growth of earnings, though not overwhelming, is remarkable nonetheless, because this relationship could break down for at least four reasons. First, even in the simple, steady-state model, equity values depend on shareholders' required rates of return and the ratio of the growth of the corporation to return on equity, as well as the growth of earnings. Variations in these other elements of equity valuation ought to disturb any simple correlation between price-earnings ratios and the growth of earnings. Second, to the degree that shareholders do not expect these determinants of equity prices always to vary according to the same pattern, the correlation between equity values and the growth of earnings over any fixed interval of time would suffer. Third, the value of equity can change when shareholders' income tax rates or capital gains tax rates change.¹⁴ Finally, stock prices reflect forecasts of earnings, not actual earnings. Errant forecasts would diminish the correlation between equity values and the actual growth rates of earnings.

Figure 4 describes the correspondence between earnings and the value of equity from a different viewpoint. The price-earnings ratio tends to be correlated negatively with corporations' return on surplus. According to this view, when rates of return fall toward a local trough, the price multiple tends to rise as shareholders anticipate better times; prices fall less rapidly than earnings. When returns rise toward a local peak, multiples tend to fall as shareholders anticipate the ensuing decline in returns; prices rise less rapidly than earnings.¹⁵

The viewpoint of Figure 4 does not contradict the descriptions appearing in the previous two figures. The graph of the return on surplus vacillates between local peaks and troughs reasonably frequently, with-

Figure 4

Equity Value and Return on Surplus



Source: See the Appendix for definitions and sources.

out remaining at these peaks or troughs for very long. Consequently, the high price-earnings ratios around troughs tend to precede years when the growth of earnings is especially high. Low price-earnings ratios tend to precede years when the growth of earnings is especially low.

¹⁴ See, for example, Kopcke (1989).

¹⁵ The apparent anticipation of rising or falling rates of return may be grounded in shareholders' constructive forecasts of future business conditions, or it may reflect a more passive reaction: the rate of return on surplus may be regarded as a simple statistical process. The current rate of return may be regarded as a function of past rates of return plus a random variable. The function may allow for (changing) deterministic trends; it may be a simple linear combination of past rates of return.

Are Stocks Overpriced?

Recognizing that the previous analysis is not designed to find bubbles, especially those that might last less than a year, the data as presented appear to show no compelling need to consider the presence of bubbles between the early 1960s and the late 1980s. Nonetheless, recent record stock prices, in conjunction with the prospect of only a modest recovery of economic activity, suggest to some analysts that stocks now may be overpriced.

The previous figures demonstrate that high price-earnings ratios, anticipating improving business conditions, frequently accompany low earnings. Reasoning from the precedents shown in Figure 2, earnings of nonfinancial corporations reported in the national accounts should double by the end of 1993 if prices of stocks are to remain near their recent peaks. This finding generally is in accord with the fact that the price-earnings ratio for the Standard & Poor's composite of 500 stocks is now approximately 75 percent higher than its average value over the past four decades. Should earnings double, rates of return on surplus would approach their comparatively high values of 1988 as price-earnings ratios fall by almost half, a coincidence that would agree with historical patterns.

III. Decomposing the Growth of Earnings

The price of stocks varies with the future rate of growth of earnings, which, in turn, varies with economic activity. That the simple relationship between stock prices and shorter-run changes in earnings has prevailed so well is one reason that the stock market appears to predict business cycles.¹⁶

Equity values currently appear to anticipate rapidly rising earnings over the next several years. Some analysts, questioning the pace of the business cycle recovery, also question this prospective surge in earnings. This section examines trends in the return on assets for nonfinancial corporations to evaluate the outlook for earnings.

The Total Return on Assets

Figure 5 shows the total return on the tangible assets of nonfinancial corporations, comprising the returns distributed to creditors as well as those accruing to shareholders.

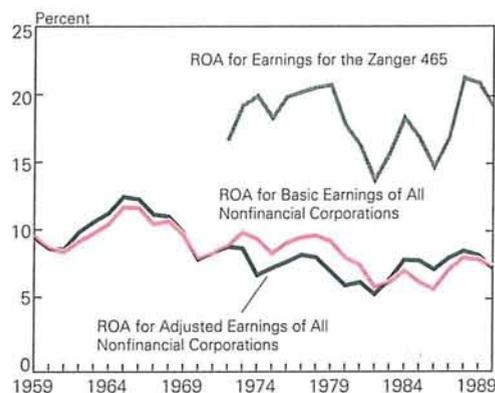
According to the national income accounts, this

return on assets peaked in the mid 1960s, then tended to decline until the early 1980s. During the 1980s the return on assets tended to increase somewhat. These trends are more pronounced when returns include the inventory valuation and capital consumption adjustments; without these adjustments, the cost of goods sold tended to be understated and profits tended to be overstated during the 1970s due to rising inflation. The return on assets also varies with business conditions, falling in years of recession, rising in years of recovery.

The pattern of the return on assets for the Zanger 465 is uniformly higher than that for the national aggregate, especially in the late 1980s. This difference

Figure 5

Return on Assets of Nonfinancial Corporations



Source: See the Appendix for definitions and sources.

in rates of return is due partly to differences in the valuation of total assets and partly to the accounting for profits. Businesses report assets at book values, which are most often depreciated acquisition costs. With rising prices of capital goods and business products, these book values tend to understate the current value of tangible capital goods and corporate surplus, thereby overstating the return on assets and surplus. On the other hand, the replacement value of the stock of tangible capital published by the U. S. Bureau of Economic Analysis is itself an estimate that may be prone to systematic measurement biases. Furthermore, the national accounts' omission of for-

¹⁶ See, for example, Peek and Rosengren (1988).

eign income also introduces a potential bias: 281 corporations in the Zanger 465 reported foreign income amounting to two-thirds of their domestic income in 1988.

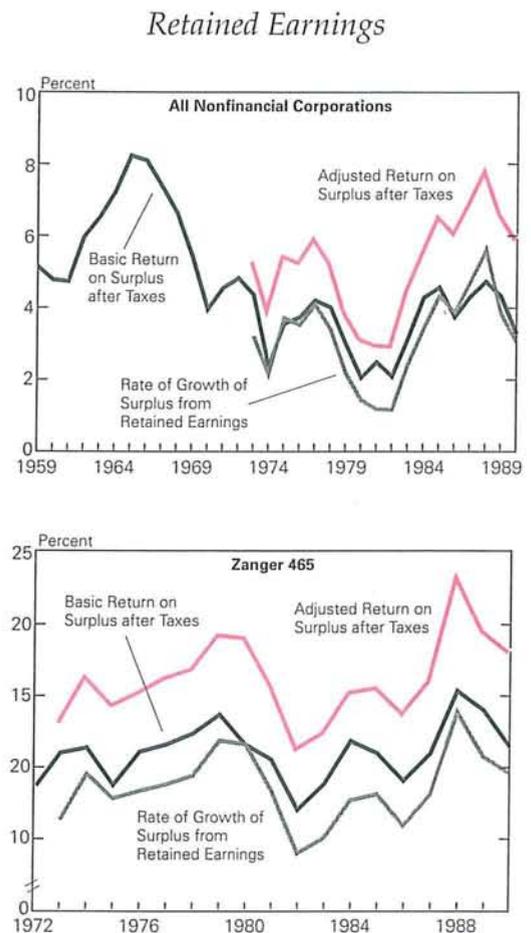
About one-half of the variation of the return on assets for both the national aggregate of nonfinancial corporations and for the Zanger 465 appears to be related to the business cycle (Appendix Table 3). According to this relationship, restoring the return on assets to its 1988 value would require that economic activity expand sufficiently quickly to regain a capacity utilization rate of 84 percent in 1993, which would require an average rate of growth of real gross domestic product exceeding 4.5 percent this year and next.¹⁷

The Return on Surplus

Pretax earnings essentially equal total returns less net interest expense, and the rate of return on surplus, before taxes, is the ratio of these earnings to the value of tangible assets less net financial obligations. Consequently, variations in the total return on assets tend to be reflected in the return on surplus, albeit leverage magnifies these reflections and the image can change with a change in interest rates or leverage.

For the national aggregate of nonfinancial corporations, the course of the return on surplus shown in Figures 6 and 7 conforms closely to that of the return on assets. For these data, the consequences of lever-

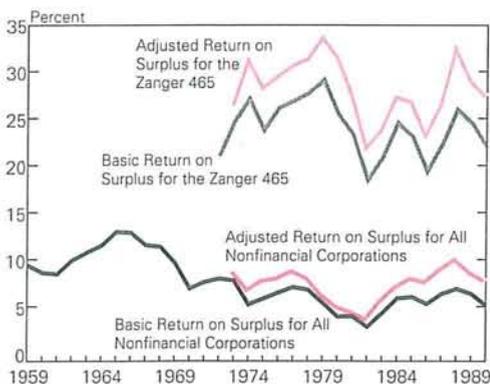
Figure 7



Source: See the Appendix for definitions and sources.

Figure 6

Return on Surplus before Taxes



Source: See the Appendix for definitions and sources.

age are relatively small. Although debt obligations increased relative to assets during the 1980s, declining interest rates insulated earnings from the burden of this leverage. Accordingly, the return on surplus increased relative to the return on assets, especially for the measure of surplus adjusted for the inflation gains on net liabilities and prevailing rates of interest. The return on surplus also tended to increase after 1980 because the average rate of income tax paid by nonfinancial corporations during the 1980s was significantly lower than that of the 1970s.

The return on surplus for the Zanger 465 is both higher and more variable than that for the national aggregate. The greater return on surplus arises partly because the return on assets for the Zanger 465 is

higher and partly because their reported leverage is higher. For the same reason that using the book value of assets overstates the return on assets for the Zanger 465, using these book values also overstates both leverage and the return on surplus. Furthermore, as a result of this higher leverage, variations in the return on assets are magnified to a greater degree when they are translated into a return on surplus.

The return on surplus for the Zanger 465, like that of the national aggregate, increased relative to their return on assets during the late 1980s. Even in 1990, a year of recession, the return on surplus remained comparatively high compared to its values of the previous 17 years.

The high rate of return on surplus for the Zanger 465 is due principally to a high rate of return on assets and a declining average tax burden on their profits. Between the late 1970s and the late 1980s, the average tax rate on corporations' profits fell by approximately one-quarter.¹⁸ This reduction in tax rates increased the rates of return on surplus, shown in Figure 7, by approximately 3 percentage points after 1987. Without this additional yield, the rates of return on surplus after taxes from 1988 to 1990 fell considerably compared to their values in 1979 and 1984, more closely resembling the pattern of the return on surplus before taxes, shown in Figure 6.

The Value of Equity

The description of the performance of nonfinancial corporations presented in the national accounts differs substantially from that presented in companies' financial reports. The current value of equity and the current consensus forecast of a modest recovery in economic activity, taken together, are more easily reconciled with companies' financial reports than with the national accounts.

The simple description of equity pricing presented in the first section of this article stressed the contributions of the rate of return on surplus and the rate of growth of surplus to the value of stocks. As discussed at the end of the previous section, current equity values appear to anticipate that earnings for the national aggregate of nonfinancial corporations will double by the end of 1993. The return on surplus (for unadjusted earnings) should increase from less than 3 percent to nearly 5 percent in order to meet this target. Barring any tax cuts or any further reductions in interest rates, this increase in earnings requires that the rate of return on assets rise by nearly 1.5 percentage points. As noted above, this improve-

ment in performance might accompany a rate of growth of real output exceeding 4.5 percent over the next two years. In these circumstances, both earnings and the opportunities for profitable investment generally would improve sufficiently to ratify the prevailing price of stock.

According to the financial reports for the Zanger 465, business conditions need not improve so greatly to be reconciled with prevailing equity values. As shown in Figure 7, the rate of return on surplus has

The current value of equity and the current consensus forecast of a modest recovery in economic activity are more easily reconciled with companies' financial reports than with the national accounts.

been comparatively high during the last three years: using book values for assets, annual returns exceeded 15 percent, and the rate of growth of surplus exceeded 12 percent as a result of the retention of earnings. Because of this comparatively rapid growth of surplus, earnings for the Zanger 465 would increase by approximately one-quarter in two years even if their return on surplus remained unchanged. This recent performance, if it endures, not only produces greater earnings in the short run, it also would warrant greater price-earnings multiples. Even after considering the bias arising from using book values for assets, the rate of growth of surplus for the Zanger 465 may be nearly twice that reported for nonfinancial corporations in the national accounts and, therefore, may be much closer to typical estimates of shareholders' required rates of return (see footnote 13). This comparatively rapid growth of surplus would justify relatively high price-earnings ratios (see equation (3) in Section I). In turn, a modest economic recovery would sustain both the return on surplus and the growth of surplus needed to support the prevailing value of equity.

¹⁷ See McNees (1991) for a discussion of the economy's potential rate of growth, and Okun's Law.

¹⁸ In 1979, the average tax rate for basic earnings was 46 percent; for adjusted earnings it was 40 percent. By 1989 these rates were 35 percent and 30 percent, respectively.

IV. Conclusion

Many indices of the prices of common stocks recently have attained record high values, even though the profits of corporations have languished. Early this year, the price-earnings ratio for Standard & Poor's composite of 500 stocks exceeded 20, attaining values not commonly seen since the prosperity of the 1960s.

It is not surprising that high price-earnings ratios, anticipating improving business conditions, frequently coincide with periods of comparatively low earnings for nonfinancial corporations. Nevertheless, by historical standards, the prevailing value of equity appears to anticipate a doubling of corporations' earnings by the end of 1993.

According to the description of nonfinancial corporations reported in the national accounts, the economy may need to regain full employment during 1993 to achieve this doubling of earnings. The rate of return on assets, other things equal, would return to its comparatively high value of 1988 and real gross domestic product may need to grow more than 4.5 percent annually this year and next to fulfill the expectations embedded in the prevailing value of equity.

Current prices of stocks do not rest on such great expectations, according to corporations' financial reports. The current rate of return on surplus, which is considerably greater in companies' financial reports than in the national statistics, provides sufficient retained earnings to increase both surplus and earnings significantly by 1993. More importantly, even allowing for some decline in the rate of return on surplus, the promise of maintaining a relatively high rate of growth of surplus and earnings beyond next year may justify a comparatively high price-earnings ratio for equities.

That the prices of stocks correspond better to corporations' financial reports than to data reported in the national accounts is not surprising; analysts study the financial reports of Ford Motor Company much more closely than the national accounts when appraising Ford's stock. This finding is also not entirely comforting: if, because of their reliance on historical book values, biases in financial reports misrepresent corporations' performance, then the value of equity may be prone to a "correction."

This article stresses the relationship between the prices of stocks and corporations' earnings. But a resurgence of corporations' rate of return on surplus, by itself, cannot guarantee that the growth of surplus and earnings in the future will be sufficiently great to justify the current value of equity.¹⁹ If opportunities to undertake profitable investments are wanting, corporations eventually will divert an increasing share of their earnings to the payment of dividends, thereby reducing retained earnings and the prospective rates of growth of surplus and earnings. In these circumstances, price-earnings ratios would decline; greater current dividends alone cannot compensate shareholders for the loss of opportunities for growth.

¹⁹ Greater earnings in the short run may not even be a necessary condition. Should corporations profitably finance a greater share of their new investments with debt rather than retained earnings for a time, then the growth of earnings may be supported first by rising leverage, then by the rising return on surplus that accompanies greater leverage (when debt can be issued on attractive terms). However, unless their return on surplus first increases substantially, corporations are not likely to be able to increase their leverage very much on acceptable terms. Growth financed through new issues of equity does not promise the requisite growth of earnings for existing shareholders, unless corporations' return on surplus increases.

Appendix: Data Sources and Definitions

Selection of the Zanger 465

The companies constituting the Zanger 465 were selected from the Compustat database, which maintains 20 years of annual data on 7,000 publicly traded companies. Those companies involved primarily in the financial, investment, or real estate industries, and utilities, were excluded. Of the remaining companies, all those ranked in the Fortune Industrial 500 or the Fortune Service 500 in either 1989 or 1990 that had reported total assets and stock prices continuously from 1972 to 1990 were selected, a total of 465 companies.

Data for the National Economy

From the Board of Governors of the Federal Reserve System, Flow of Funds Accounts, Nonfinancial Business Sector:

Profits (Prof)
 Taxes (Tax)
 Inventory Valuation Adjustment (IVA)
 Capital Consumption Adjustment (CCAdj)
 Dividends (Div)
 Market Value of Equity (MVE)
 Total Assets (TotA)
 Tangible Assets (TanA)
 Total Financial Assets (TFA)
 Total Liabilities (TotL)
 Credit Market Instruments (CMI)
 Net Debt (NetD) = TotL - TFA

From the National Income and Product Accounts, U. S. Bureau of Economic Analysis:

Net Interest of Nonfinancial Corporate Business (NetInt)

From the U. S. Bureau of Labor Statistics:

Consumer Price Index (CPI)

From Salomon Brothers Inc, *Analytical Record of Yields and Yield Spreads*, Part IV, Table 1:

Annual Average Yield on 6-Month Commercial Paper (6Mo)

Compustat Data for the Zanger 465

Operating Income After Depreciation (OIADP) - Profits after depreciation, but before net interest expense or taxes are deducted.
 Income Before Extraordinary Items Adjusted for Common Stock Equivalents (IBADJ) - Profits after depreciation, from which net interest expense and taxes have been subtracted.
 Nonoperating Income (NOPI)
 Interest Expense (XINT)
 Cash Dividends (DV)
 Total Taxes (TXT)
 Total Assets (AT)
 Inventories (INVT)

Property, Plant, and Equipment (Net) - Total (PPENT)
 Total Debt (DT)
 Total Liabilities (LT)
 Market Value of Equity - Fiscal Year End (MKVALF)
 Net Debt (ND) = LT - (AT - (PPENT + INVT))

Figure 1

The upper panel of Figure 1 shows profits after taxes and dividends (Div) for all nonfinancial corporations, where:

$$\text{Profits} = \text{Prof} - \text{Tax} + \text{IVA} + \text{CCAdj}.$$

The lower panel shows profits for the Zanger 465 (IBADJ) and dividends (DV).

Figure 2

The left side of Figure 2, upper and lower panels, shows the basic price-earnings ratio for all nonfinancial corporations and the subsequent 3- and 5-year average rates of growth of earnings where:

$$\text{Basic earnings} = \text{Prof} - \text{Tax}.$$

The price-earnings ratio is the market value of equity (MVE) divided by basic earnings.

The right side of Figure 2 shows the adjusted price-earnings ratio and the average rate of growth of adjusted earnings where:

$$\text{Adjusted earnings} = \text{Prof} - \text{Tax} + \text{IVA} + \text{CCAdj} + \text{inflation adjustment} + \text{interest rate adjustment}.$$

$$\text{Inflation adjustment} = ((\text{CPI}/\text{CPI}_{-1}) - 1) * \text{NetD}$$

$$\text{Interest rate adjustment} = ((\text{RZ465} - 6\text{Mo}) * \text{CMI})$$

$$\text{RZ465} = \text{XINT}/((\text{DT} + \text{DT}_{-1})/2)$$

Figure 3

Basic price-earnings ratios (left-hand panels) for the Zanger 465 = MKVALF/IBADJ. The growth rates represent average growth in IBADJ over the subsequent periods. Adjusted earnings, on the right side of Figure 3, equal:

$$\text{IBADJ} + \text{inflation adjustment} + \text{interest rate adjustment}$$

$$\text{Inflation adjustment} = ((\text{CPI}/\text{CPI}_{-1}) - 1) * \text{ND}$$

$$\text{Interest rate adjustment} = (\text{RZ465} - 6\text{Mo}) * \text{DT}$$

Figure 4

The price-earnings ratios are the same as those appearing in Figures 2 and 3. The returns on surplus are defined as follows:

For all nonfinancial corporations:

$$\text{Basic return on surplus} = (\text{Prof} - \text{Tax} + \text{IVA} + \text{CCAdj})/(\text{TanA} - \text{NetD})$$

$$\text{Adjusted return on surplus} = (\text{Prof} - \text{Tax} + \text{IVA} + \text{CCAdj} + \text{inflation adj} + \text{interest rate adj})/(\text{TanA} - \text{NetD})$$

For the Zanger 465:

$$\text{Basic return on surplus} = (\text{OIADP} - \text{TXT} - \text{Net Interest}) / ((\text{PPENT} + \text{INVT}) - \text{ND})$$

$$\text{Adjusted return on surplus} = (\text{OIADP} - \text{TXT} - \text{Net Interest} + \text{inflation adj} + \text{interest rate adj}) / ((\text{PPENT} + \text{INVT}) - \text{ND})$$

$$\text{Net interest} = \text{XINT} - \text{NOPI}$$

Figure 5

Figure 5 shows the return on assets for the Zanger 465 as well as the basic and adjusted return on assets for all nonfinancial corporations. For all nonfinancial corporations:

$$\text{Basic return on assets} = (\text{Prof} + \text{NetInt}) / \text{TanA}$$

$$\text{Adjusted return on assets} = (\text{Prof} + \text{NetInt} + \text{IVA} + \text{CCAdj}) / \text{TanA}$$

For the Zanger 465:

$$\text{Return on assets} = \text{OIADP} / (\text{PPENT} + \text{INVT})$$

Figure 6

For all nonfinancial corporations:

$$\text{Basic return on surplus} = (\text{Prof} + \text{IVA} + \text{CCAdj}) / (\text{TanA} - \text{NetD})$$

$$\text{Adjusted return on surplus} = (\text{Prof} + \text{IVA} + \text{CCAdj} + \text{inflation adj} + \text{interest rate adj}) / (\text{TanA} - \text{NetD})$$

For the Zanger 465:

$$\text{Basic return on surplus} = (\text{OIADP} - \text{Net Interest}) / ((\text{PPENT} + \text{INVT}) - \text{ND})$$

$$\text{Adjusted return on surplus} = (\text{OIADP} - \text{Net Interest} + \text{inflation adj} + \text{interest rate adj}) / ((\text{PPENT} + \text{INVT}) - \text{ND})$$

$$\text{Net interest} = \text{XINT} - \text{NOPI}$$

Figure 7

The returns on surplus are the returns (as defined for Figure 6) less taxes, divided by surplus. The rates of retention shown are the adjusted returns, less taxes and dividends, divided by surplus.

Appendix Table 1

Correlation between Earnings-Price Ratios and Rates of Growth of Earnings

The following regressions summarize the correlation between the earnings-price ratios and the rates of growth of earnings shown in Figures 2 and 3.

Dependent Variable	All Nonfinancial Corporations				Zanger 465			
	Basic Earnings-Price		Adjusted Earnings-Price		Basic Earnings-Price		Adjusted Earnings-Price	
	Annual 1959-1987	Annual 1959-1985	Annual 1973-1987	Annual 1973-1985	Annual 1972-1987	Annual 1972-1985	Annual 1973-1987	Annual 1973-1985
Constant	8.648 (.676)	9.780 (.681)	11.364 (.538)	12.633 (.625)	10.460 (.950)	12.093 (1.054)	14.067 (1.105)	15.759 (1.103)
3-Year Average Growth of Earnings	-.116 (.051)		-.129 (.031)		-.159 (.083)		-.218 (.093)	
5-Year Average Growth of Earnings		-.230 (.063)		-.229 (.043)		-.310 (.108)		-.370 (.111)
R ²	.161	.345	.571	.716	.208	.409	.297	.503

Standard errors in parentheses.
Source: Compustat Database

Appendix Table 2

Distribution of Slope Coefficients and Coefficients of Determination

Percent of All Firms

The following two panels describe the distribution of slope coefficients and coefficients of determination for regressions of the earnings-price ratios on the five-year average rates of growth of earnings for 425 of the Zanger 465. The results for similar regressions on two- and three-year average rates of growth of earnings tend to show both a more uniform distribution of slope coefficients and a distribution of R^2 weighted more toward zero.

Basic Earnings-Price Ratios Regressed on Five-Year Average Rate of Growth of Earnings, Annual Data, 1972 to 1985

R^2	Slope								Total
	<-.15	-.15 to -.1	-.1 to -.05	-.05 to 0	0 to .05	.05 to .1	.1 to .15	>.15	
0 to .05	.7	.7	1.6	11.1	14.4	3.1	.7	.5	32.7
.05 to .10	.5	.7	2.4	4.0	3.1	1.2	1.2	1.2	14.1
.10 to .15	1.6	1.9	1.2	.9	1.2	.7	.7	1.4	9.6
.15 to .20	.7	.5	.2	1.6	.7	.5	.7	1.9	6.8
.20 to .25	1.2	.5	1.6	.7	1.2	.5	.5	.5	6.6
.25 to .30	3.3	.9	1.6	.7	.2	.9	.2	.9	8.9
.30 to .35	2.8	.5	0	.2	0	0	.5	.7	4.7
>.35	7.3	1.2	1.4	1.2	1.4	.7	0	3.3	16.5
Total	18.1	6.8	10.1	20.5	22.1	7.5	4.5	10.4	100.0

Adjusted Earnings-Price Ratios Regressed on Five-Year Average Rate of Growth of Earnings, Annual Data, 1973 to 1985

R^2	Slope								Total
	<-.15	-.15 to -.1	-.1 to -.05	-.05 to 0	0 to .05	.05 to .1	.1 to .15	>.15	
0 to .05	1.4	1.6	3.3	10.1	12.0	2.4	.9	.9	32.7
.05 to .10	2.4	.9	.7	2.6	1.6	1.6	.5	1.6	12.0
.10 to .15	3.5	.7	.7	1.2	.7	.7	0	2.6	10.1
.15 to .20	2.4	.9	.5	.2	.7	.2	.2	1.4	6.6
.20 to .25	1.4	.5	1.2	.5	.9	.5	.2	2.4	7.5
.25 to .30	1.9	.2	.9	.5	0	.5	.2	.9	5.2
.30 to .35	2.1	.5	0	0	.2	.2	.5	1.2	4.7
>.35	13.4	1.6	.7	.5	1.2	.2	.2	3.3	21.2
Total	28.5	7.1	8.0	15.5	17.4	6.4	2.8	14.4	100.0

Note: Figures may not sum to totals because of rounding.

Source: Compustat Database.

Appendix Table 3

Correlation between Return on Assets and Capacity Utilization

The following table describes the regression of the rates of return on assets shown in Figure 5 on capacity utilization.

Dependent Variable	All Nonfinancial Corporations		Zanger 465
	Basic Earnings	Adjusted Earnings	Basic Earnings
Frequency	Annual	Annual	Annual
Period of Observation	1959-1990	1959-1990	1972-1990
Constant	-.133 (.033)	-.151 (.042)	-.103 (.077)
Capacity Utilization Rate	.271 (.040)	.290 (.051)	.353 (.095)
R^2	.601	.522	.447

Standard errors in parentheses.

Source: Compustat Database.

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Mutual-to-Stock Conversions by New England Savings Banks: Where Has All the Money Gone?

In the aftermath of the real estate slump and the attendant financial troubles of the New England banks, it is natural to look for causes and contributing factors. One phenomenon that has received its share of the blame is the rush of conversions by thrifts in the mid 1980s from mutual to stock form of ownership.

Conversions were hailed initially as a way to fortify the eroded capital of thrifts and increase their safety and soundness. At the same time, conversions coincided with deregulation and the granting of new lending powers to thrifts. Foremost among these was the authority to make commercial and industrial loans, commercial real estate loans, and construction loans. A number of converted thrifts hastily invested their capital in real estate projects, many of them ill-conceived.

This article compares the behavior of converted thrifts with that of the mutuals. It finds that converted institutions took greater risks, suffered bigger losses, and failed at a higher rate than the mutuals despite being very highly capitalized after conversion. Three conclusions are reached. First, converted thrifts accounted for a substantial share of the increase in real estate financing during the boom of the mid 1980s. Second, ability to take greater risk, rather than efficiency, appears to have been a dominant motive for thrift conversions in New England. And third, even very high capital ratios may not prove sufficient if an institution takes big risks in its loan portfolio.

Part I of this article provides an overview of the mutual to stock conversion process. Part II describes the sample of thrifts under analysis and presents the empirical results. Part III analyzes management incentives. Part IV concludes with the implications for regulatory reforms.

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I. The Conversion Process

Mutual thrifts are owned by their depositors. A conversion involves an issuance of stock to the public, which changes ownership from depositors to equity holders. (See Dunham (1985) for a historical overview and a step-by-step description of the conversion process.) Theoretically, depositors own the accumulated retained earnings of the mutual thrifts. To protect their ownership rights during conversion, the depositors are given nontransferable rights of first refusal to buy shares during the stock offering. They can buy stock in proportion to the size of their deposits (as of 90 days before the conversion plan is adopted by the thrift), as long as each depositor's share does not exceed 5 percent of the total offering. Management and directors who have deposits at the thrift can buy stock along with other depositors, subject to somewhat more stringent limits on their aggregate purchases. If any stock is left unsubscribed it is offered to managers and employees and marketed to the local community. Large stock offerings are sold by underwriters to the general public. The conversion process is completed only when all the shares are sold.

Reason for Conversion

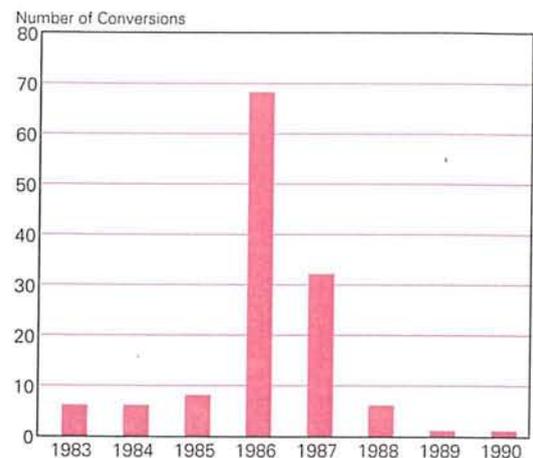
Economic efficiency is often suggested as a reason for conversion (Masulis 1987; Mester 1991). Since the separation of ownership from control is greater in the mutual than in the stock form of organization, managers of mutual thrifts are more likely to pursue their own goals at the expense of depositors. Masulis suggests that managers of mutual thrifts will choose less profitable but lower-risk investment projects over more profitable but riskier investments. If mutual thrifts are subject to greater organizational inefficiency than stock thrifts, then conversion to stock form will improve efficiency, by aligning managerial incentives more closely with those of the stockholders. This will lead converted thrifts to invest in more profitable but riskier projects.

II. Performance of Converted Thrifts in New England

In New England, the majority of thrift conversions from the mutual to the stock form occurred since 1983. Of the 468 New England savings institutions included in the Federal Reserve Bank of Boston

Figure 1

Conversions from Mutual to Stock Ownership among Thrift Institutions in the First Federal District



Source: Federal Reserve Bank of Boston Financial Institutions Tracking System; Board of Governors of the Federal Reserve System.

Financial Institutions Tracking System (FITS) in January 1983, only 12 had already converted. In contrast, 128 institutions have converted since that date. The pace of conversions accelerated in 1986 when low interest rates increased the thrifts' net interest margins, improving their profitability. This, together with the signing of the New England regional interstate banking pact, made the stock market very bullish on New England thrifts, which were considered prime takeover candidates for commercial banks. As can be seen from Figure 1, 68 thrifts converted in 1986 and 32 in 1987. However, the stock market crash of October 1987 effectively put an end to the conversion boom. As a result, only eight conversions occurred in the three following years.

The substantial infusion of new equity capital that results from conversion could be expected to reduce the probability of insolvency by providing a cushion against failure. This did not happen in New England, where converted thrifts quickly loaned out the capital they raised and then proceeded to fail at an even higher rate than the mutuals. Of the 468 thrifts in existence in 1983, a total of 28 have since failed. (Failures include government-assisted acquisi-

tions.) Of these, 13 were mutuals (4 percent of the total number of mutuals), while 15 were stock (11 percent of the stock thrifts). While the loans made by converted thrifts were indeed riskier than those made by mutuals, they were not more profitable. When the New England economy suffered a downturn, especially in real estate, converted thrifts sustained significantly higher losses.

The Sample and Data

The sample for this study consisted of New England savings banks that were in existence in 1983 and for which call report data were available. Savings and loan institutions (S&Ls) were not included, be-

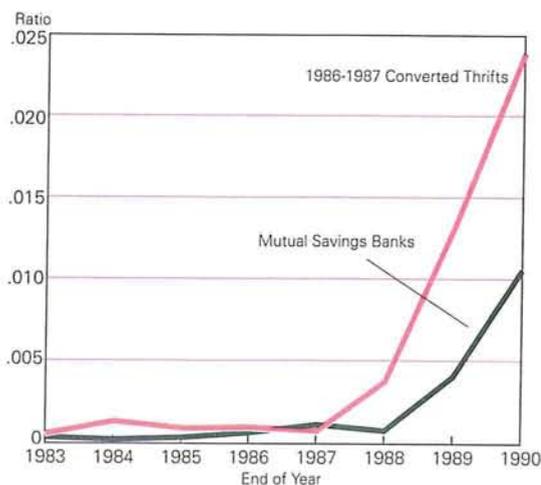
savings bank conversions in the sample (55). Since thrifts that convert tend to be bigger than mutuals, the comparison excludes all savings banks with less than \$100 million in assets. However, including smaller banks does not change the results.

While the New England economy was booming in the mid 1980s, loan losses were negligible for both mutual and converted institutions. During the subsequent downturn of the regional economy, all institutions suffered increased loan losses, but the converted thrifts incurred them earlier and at significantly higher rates. The figure shows they had higher losses in 1988, while the mutuals did not incur them until 1989. By 1990, the gap widened further. The average loss for the mutuals in 1990 was 0.8 percent of loans, while for the converted thrifts, it was 2.1 percent of loans. Testing for the equality of means, this difference in means was significant at greater than the 1 percent confidence level (Appendix Table A-1).

The high rate of loan losses evidently was not offset by high returns elsewhere. As a result of these losses, both mutuals and converted thrifts suffered declines in profitability. Figure 3 compares the return

Figure 2

Ratio of Net Charge-Offs to Total Loans, in First District Mutual Savings Banks and Converted Thrifts^a

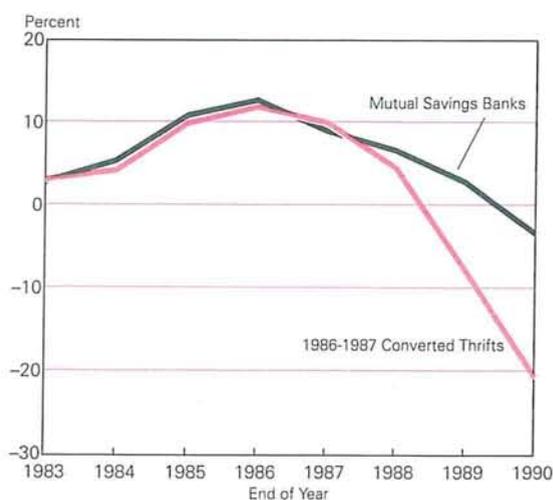


^a 1986-1987 converted thrifts and mutuals with more than \$100 million in total assets. Source: Board of Governors of the Federal Reserve System, Call Report Data.

cause they report on a different form and their balance sheet data are not directly comparable to those of the savings banks. Figure 2 compares the converted thrifts and the mutual savings banks in terms of their rate of loan losses from 1983 to 1990. The figure shows the end-of-year ratio of net charge-offs to total loans for those thrifts that converted in 1986 and 1987 and for the mutuals. These two years were chosen because they have the largest number of

Figure 3

Return on Assets for First District Mutual Savings Banks and Converted Thrifts^a



^a 1986-1987 converted thrifts and mutuals with more than \$100 million in total assets. Source: Board of Governors of the the Federal Reserve System, Call Report Data.

on assets (ROA) from 1983 to 1990 for the same set of institutions as in Figure 2. ROA follows the same pattern as loan losses—converted savings banks suffer losses earlier and at a significantly steeper rate than the mutuals (Appendix Table A-1). ROA turned negative for the converted banks in 1989, and while it also became negative for the mutuals in 1990, the average loss in that year was much larger for the converted banks in the sample.

Before they incurred their losses, converted institutions grew at unusually high rates, driven by the need to earn an adequate rate of return for their new stockholders. As Figure 4 shows, their rate of growth of assets was much higher than that of mutuals, reaching 30 percent at its peak in 1986. To achieve this high rate of growth, converted institutions assumed higher risk in both their assets and their liabilities.

Converted thrifts relied on federal funds (funds borrowed overnight from other depository institutions) and brokered deposits to fund their asset growth. Figure 5 shows the ratio of such volatile liabilities to total assets at mutual and converted institutions. Here, the difference is striking. Mutual

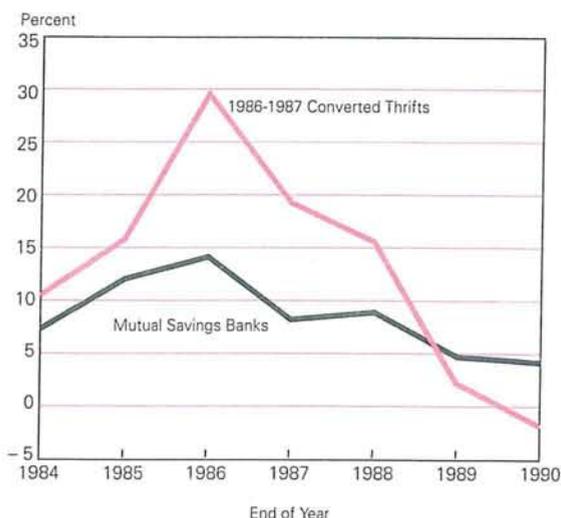
savings banks kept their volatile liabilities below 1 percent of assets throughout the period under study. For converted thrifts, however, volatile liabilities increased sharply following conversion, reaching a peak of 6.2 percent in 1988. Even though the converted thrifts had reduced their volatile liabilities by half by 1990 in response to financial problems, their ratios are still far higher than those of the mutuals.

Asset Composition

Converted thrifts grew by investing in riskier loans. Traditionally, the staple of the thrifts' loan portfolios has been home mortgages, the safest category of lending. In 1983, however, New England

Figure 4

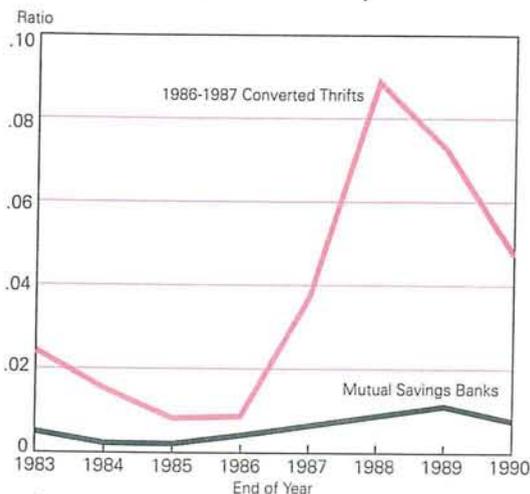
Rate of Growth of Total Assets for First District Mutual Savings Banks and Converted Thrifts^a



^a1986-1987 converted thrifts and mutuals with more than \$100 million in total assets.
Source: Board of Governors of the Federal Reserve System, Call Report Data.

Figure 5

Ratio of Volatile Liabilities to Total Assets in Portfolios of First District Mutual Savings Banks and Converted Thrifts^a



^a1986-1987 converted thrifts and mutuals with more than \$100 million in total assets.
Source: Board of Governors of the Federal Reserve System, Call Report Data.

savings banks received the same investment powers as commercial banks. As a result, they began to expand into riskier types of lending such as business and commercial real estate.

Table 1 compares the 1985 and the 1988 asset composition of mutuals, converted thrifts, and commercial banks of similar size (more than \$100 million but less than \$2.5 billion in assets). It is clear that, while differences in asset composition occur over

Table 1
Selected Assets as a Share of Total Assets, for First District Commercial Banks, Mutual Savings Banks, and Stock Savings Banks That Converted in 1986 and 1987
 Percent

Asset	1985			1988		
	Commercial ^a	Mutuals ^b	Converted ^b	Commercial ^a	Mutuals ^b	Converted ^b
Total Loans	66.5	65.2	68.2	75.7	74.8	77.7
C&I Loans	19.0	3.7	4.8	18.2	5.1	7.4
Consumer Loans	15.5	6.8	6.5	14.2	5.3	4.0
Mortgage Loans						
1-4 Family	12.2	43.3	40.4	19.3	47.8	41.5
Multifamily	.9	3.0	2.8	.8	3.3	4.5
Nonfarm, Nonresidential	9.6	6.0	9.7	13.4	9.1	12.8
Construction	3.5	1.9	2.9	6.0	4.5	7.3
Equity/Assets	5.9	7.9	7.5	6.3	8.7	10.6
Loan Loss Reserves/Assets	.7	.2	.2	.8	.3	.5

^aCommercial banks with more than \$100 million but less than \$2.5 billion in total assets.

^bMutual and stock thrifts with more than \$100 million in total assets.

Source: Board of Governors of the Federal Reserve System, Call Reports.

time, converted thrifts still resemble mutual thrifts much more than they resemble commercial banks. Real estate lending remains the mainstay of all thrifts, and their percentages of commercial and industrial (C&I) loans and consumer loans are much lower than those of commercial banks. Within their real estate portfolios, converted thrifts concentrated on riskier categories of lending, increasing construction lending and multifamily mortgages. In 1988 they had a larger proportion of their assets in these categories than either mutual thrifts or commercial banks.

Figure 6 depicts the change through time in the proportion of commercial and industrial loans, construction loans, and nonfarm and nonresidential loans, respectively, in the savings banks' loan portfolios. All three categories showed a similar pattern—the converted thrifts had higher concentrations than the mutuals. An interesting point is that the converted thrifts' investment in risky categories was also higher than the mutuals' in years 1983 through 1985, that is, even *before* they converted. The difference became greater after the conversion, however. Evidently the managements of thrifts that converted showed a greater affinity for risk-taking, and this tendency was reinforced by the conversion.

Converted thrifts also have a higher preference for liquidity risk than the mutuals. Figure 7 depicts the ratio of liquid assets (cash and marketable securities) to total assets at the mutual and converted

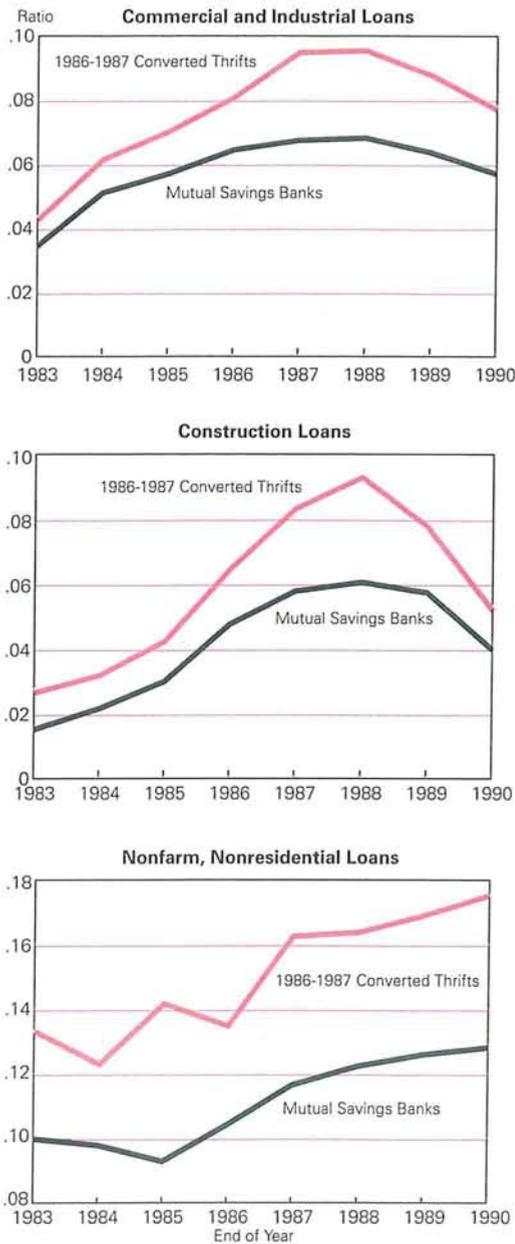
savings banks. Since 1984, mutuals have held proportionately more liquid assets than converted banks. The proportion of liquid assets fluctuated at both sets of institutions, increasing from 1983 through 1985, then declining until 1989. In 1990, it increased again, representing a return to more conservative practices in reaction to the region's economic distress and financial difficulties.

Effect on the Real Estate Market

The rapid growth and aggressive lending practices of converted thrifts ensured that they accounted for a substantial share of bank assets and real estate lending in New England during the years of the real estate boom. In 1988, converted thrifts accounted for 17 percent of total assets of the FDIC-insured financial institutions in New England. They also accounted for 20 percent of all construction loans, 24 percent of nonresidential mortgages, and 41 percent of multifamily mortgages. These numbers somewhat overstate the importance of converted thrifts to the real estate market, since the totals reported here do not include the funds provided by non-New England banks and by life insurance companies, mortgage companies, pension funds, federal and state credit agencies, and other possible investors. Nevertheless, the contribution of converted thrifts is significant, especially in view of their share of the rapid growth of

Figure 6

Ratio of Selected Assets to Total Assets in Portfolios of First District Mutual Savings Banks and Converted Thrifts^a



^a1986-1987 converted thrifts and mutuals with more than \$100 million in total assets. Source: Board of Governors of the Federal Reserve System, Call Report Data.

the real estate market in New England during the peak years of the boom.

Table 2 shows the increase in total assets, construction lending, and nonresidential and multifamily mortgages by all FDIC-insured financial institutions in New England, from 1986 to 1988. The table shows that converted thrifts accounted for 30 percent of the growth in total assets, 28 percent in construction loans, 32 percent in nonresidential mortgages, and 53 percent of the growth in multifamily mortgages.

As these numbers make clear, converted savings banks had a larger share of the flow than of the stock of real estate financing in New England. While the converted thrifts accounted for less than one-sixth of the total assets of the region's FDIC-insured institutions, they accounted for one-third to one-half of the flow of real-estate lending between 1986 and 1988.

III. Management Incentives

The above results demonstrate that converted thrifts took greater risks than mutuals and that their gambles resulted in greater losses as New England's economy deteriorated after 1989. It is clear in retrospect that these institutions did not employ their newly raised capital wisely and well. The benefit of hindsight is not necessary, however, to have foreseen the likely outcome of the sudden rush of conversions. The dangers were discussed in the press at the time and, presumably, were familiar to the managements and boards of directors of these thrifts. As early as 1986, for example, an article by Robert Eisenberg in *Banker & Tradesman* recounted the now-familiar litany of perils of commercial real estate lending, such as the susceptibility of the appraisal process to abuse, the difficulty of maintaining underwriting standards when loans are abundant, and the lack of experience among thrift managements in coping with the pitfalls of commercial real estate. The article even invoked the specter of empty Houston office buildings as a warning for New England, a comparison that was heard with increasing frequency later, as the New England real estate market collapsed.

Why did the thrift managements go through the conversions, given the evident dangers in the crowded marketplace? The answer lies at least in part in the personal fortunes that the managements hoped to make by acquiring stock as part of the conversion. On average, less than 5 percent of mutual thrift depositors exercise their rights to purchase stock

Table 2
Growth of Assets and Selected Loan Categories between 1986 and 1988 at FDIC-Insured Institutions, First Federal Reserve District

Institution	Total Assets	Construction Loans	Nonresidential Mortgages	Multifamily Mortgages
All Institutions	\$63.4	\$7.8	\$10.9	\$1.9
Converted Thrifts	\$19.0	\$2.2	\$3.5	\$1.0
Share of Growth by Converted Thrifts	30%	28%	32%	53%

Note: Converted thrifts include those that converted between January 1, 1983 and December 31, 1988.

Source: Board of Governors of the Federal Reserve System, Call Reports.

during a conversion, while management and directors purchased 20 percent of all conversion shares (Dunham 1985, p. 37). The price is determined by an independent appraiser who arrives at a "fair value" through study of comparable transactions and balance sheet analysis. The stock is then offered at a price within a range of 15 percent above and below the appraised value. The conversion price tends to be below market value, giving the management an immediate incentive to convert.

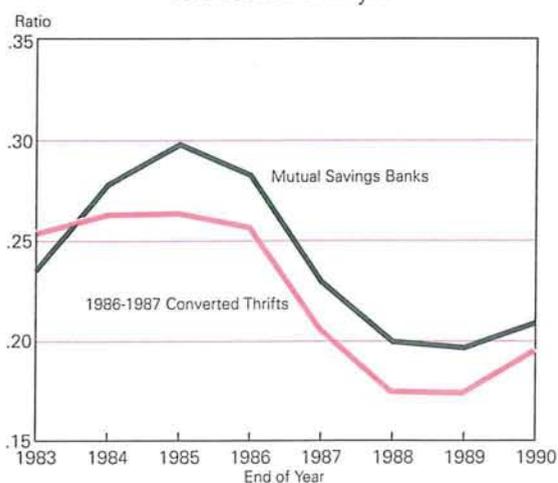
The shares of converted thrifts are usually offered at a discount from their post-conversion book values. This occurs because pre-conversion net worth is distributed to the initial shareholders on a pro rata basis, since no founding shareholders exist to claim it. For example, suppose the stock is issued at \$10 per share and pre-conversion net worth amounts to \$5 per share. Then post-conversion book value is \$15 per share, and the stock is said to be offered at 67 percent (\$10/\$15) of pro forma (post-conversion) book value. Accordingly, the share price can be expected to rise immediately in the secondary market, tempered only by the costs of conversion and the possible losses on the thrift's assets. This discount from the market value is in contrast to the typical takeover premiums for financial institutions. In a sample of 44 bank mergers completed in 1986, Adkisson and Fraser (1991) found merger premiums as measured by price/book ratio ranging from 1.00 to 2.60, with a median of 1.60.

Despite some unique regulatory requirements, the issuing of stock during thrift conversion is essentially equivalent to any initial public offering (IPO), and underpricing of IPOs is a well-known phenomenon extensively documented in the finance literature. (See, for example, Ibbotson, Sindelar, and Ritter 1988 for recent figures.) Various explanations for the underpricing have been advanced in the literature, from monopsony power of underwriters and insurance against legal liability to asymmetric information and incomplete markets (Loderer, Sheehan, and Kadlec 1991).

Evidence has shown that thrift stock prices do indeed exhibit large positive returns in secondary market trading following conversion. Masulis (1987) found a mean return of 5.6 percent on the first day and 11.4 percent in the first 20 days of secondary market trading in a sample of 78 conversions nation-

Figure 7

Ratio of Liquid Assets to Total Assets in Portfolios of First District Mutual Savings Banks and Converted Thrifts^a



^a 1986-1987 converted thrifts and mutuals with more than \$100 million in total assets.
 Source: Board of Governors of the Federal Reserve System, Call Report Data.

wide between 1976 and 1983. These numbers are all the more striking when one remembers that these are actual period returns and not annualized returns.

In New England, the thrifts that converted in 1986 saw impressive price gains in the stock market. Of 55 institutions tracked by Keefe, Bruyette & Woods Inc. that converted in 1986 and were still publicly traded in 1987, not one traded at a price lower than the conversion price on March 16, 1987, the date for which the Keefe, Bruyette & Woods data were published (McGurrin 1987). The gain in price from conversion to this date ranged from 14 to 130 percent, with an average gain of 62 percent. Although these gains demonstrate a clear means of personal enrichment for the thrifts' managements, conversion prices do not seem excessively low in view of the longer-term performance. For the 50 thrifts from the above 55 that were still traded on March 3, 1988 (again, the date for which prices were published), the average price gain had dwindled to 7 percent, and one-half of the banks were traded at a price lower than the conversion price (McGurrin 1988).

In addition, no evidence suggests that thrift managements anticipated the collapse in stock prices, took their profits, and bailed out. On the contrary, examination of insiders' share ownership as disclosed on proxy statements indicates that management and directors were more likely to increase than to decrease ownership of their institution's stock during 1987, regardless of the price change. As Table 3 shows, when the stock price fell after conversion, insiders sold stock in five institutions and bought it in 14. Chief executives alone, as opposed to all insiders, sold stock in one institution and bought stock in 14. From this indirect evidence, it appears that managements of converted thrifts suffered from excessive optimism and overconfidence, as did other New

England thrift investors, and were not guilty of deliberate deception.

IV. Conclusion

Academic literature suggests improved efficiency as a result of reduced agency costs as the motive for conversion. This seems to be confirmed by the initial stock price increases of the converted thrifts. In retrospect, however, the desire to undertake riskier investments seems to have been the dominant motive for conversions. All managements of mutual thrifts had faced similar incentives before conversion, but it was those managements with an inclination for risk-taking that decided to convert.

The preference for risk among New England thrifts took the form of large investments in construction and multifamily mortgages. These institutions accounted for a substantial share of the increase in bank financing in these areas. As a result, they played an important part in the New England real estate boom.

The consequences of thrift conversions in New England sound a cautionary note for bank reform proposals that advocate increased capital requirements, especially in combination with reduced supervision of well-capitalized banks. Although this article presents no evidence on the effect of increased capital requirements on the portfolio risk of financial institutions, the fact that high capital ratios attained by thrifts upon conversion did not restrain their risk-taking is still significant. High capital ratios put pressure on managements to find investment projects with high payoffs, in order to provide adequate return to the new stockholders. Thus, increased capital levels alone should not be relied upon as a substitute for regulatory supervision.

Table 3
Changes in Insider Stock Ownership^a of Converted Thrifts, Relative to Change in Stock Price^b

Change	All Converted Thrifts ^c		Converted Thrifts with a Stock Price Decrease		Converted Thrifts with a Stock Price Increase	
	CEO	All Insiders	CEO	All Insiders	CEO	All Insiders
Increased Ownership	22	29	14	14	8	15
Decreased Ownership	4	8	1	5	3	3

^aOwnership changes reported are for a yearly interval, usually from the end of 1986 or beginning of 1987 to the end of 1987 or beginning of 1988. The exact dates vary for each bank depending on the date of the proxy statement.

^bStock price changes are from the date of conversion to 12/31/87.

^cNew England thrifts that converted in 1986 or 1987 and for which proxy statements were available.

Source: Proxy statements.

Appendix Table A-1
T-tests of the Equality of Means: Mutuals and 1986–1987 Converted Thrifts in First Federal Reserve District

	Mean		Standard Deviation		T-stat	D.F.	Prob >T
	Converted	Mutuals	Converted	Mutuals			
	Net Charge-offs/Total Loans						
1988	.003303	.000604	.008130	.001143	2.4	56.1	.02
1989	.014060	.003740	.028553	.008047	2.6	58.1	.01
1990	.020738	.007892	.018130	.012111	4.7	73.8	.001
Return on Assets							
1988	.004731	.007005	.012383	.004247	1.3	61.7	.19
1989	-.010736	.003196	.034827	.009416	2.9	57.8	.005
1990	-.019638	-.001024	.024940	.011481	5.2	62.2	.0001

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