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ABSTRACT

This issue examines inflation protection for pensions in the 1990s and beyond. It describes how providers of retirement services can offer participants opportunities to improve inflation protection through product design, services, and educational programs. It explains the use of inflation-indexed (real bonds), noting the potential role for such bonds in the U.S. economy and experience with indexed bonds issued by a number of foreign governments, especially the United Kingdom. The article emphasizes that the Teachers Insurance and Annuity Association College Retirement Equities Fund (TIAA-CREF), with its special responsibility for people in the education and research communities, has long recognized the potentially debilitating effects of inflation on retirement savings as well as its participants' fears of such an outcome. The issue includes charts showing inflation volatility since 1947, CREF stock values versus inflation since 1952, expected nominal returns versus inflation since 1978, comparison of yield volatility of real and ordinary bonds in the United Kingdom, and comparison of real annuity payments and a hypothetical inflation-protected annuity. The issue concludes that real bonds offer potential advantages to annuitants and to people saving for retirement in defined-contribution plans, even those where inflation-protection policies have long been a feature of the plan. (Contains 15 references.) (CK)

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In this issue:

This issue of Research Dialogues *describes how retirement services providers can offer participants opportunities to improve inflation protection through (1) product design, services, and educational programs, and (2) the use of inflation-indexed* (real) *bonds, based on a potential role for such bonds in the U.S. economy and on experience with indexed bonds issued by a number of foreign governments. Such instruments could be of value to both defined-contribution and defined-benefit retirement systems.*

The Holy Grail of Inflation Protection

Inflation poses a powerful threat to savings. Inflation makes it less likely that investors of all types will achieve their basic objective: choosing assets whose growth in value preserves or enhances future purchasing power.

If there is a holy grail for pensions, it is protection against inflation. Inflation troubles all long-term savers, but especially people who are near or in retirement. Such people want to protect their purchasing power, but are less able to offset the gradual erosion of purchasing power due to steady inflation. At the long-term historical U.S. inflation rate of 4.11 percent (since the 1920s), an asset or income whose *nominal* or ordinary value remains steady will lose half of its *real* value in eighteen years. The Social Security system provides protection through benefit increases based on a measure of inflation — the U.S. Consumer Price Index (CPI) — but few private pension plans guarantee such increases.

The gradual erosion of purchasing power is only part of the problem. Inflation can move up or down yearly or even monthly. If inflation over a given period of time is worse than people expect (e.g., worse than the historical average), they will experience a sudden commensurate drop in real income and wealth that is hard to anticipate or ameliorate. Chart 1 (see page 2) illustrates this by showing monthly changes in the U.S. CPI since 1947.

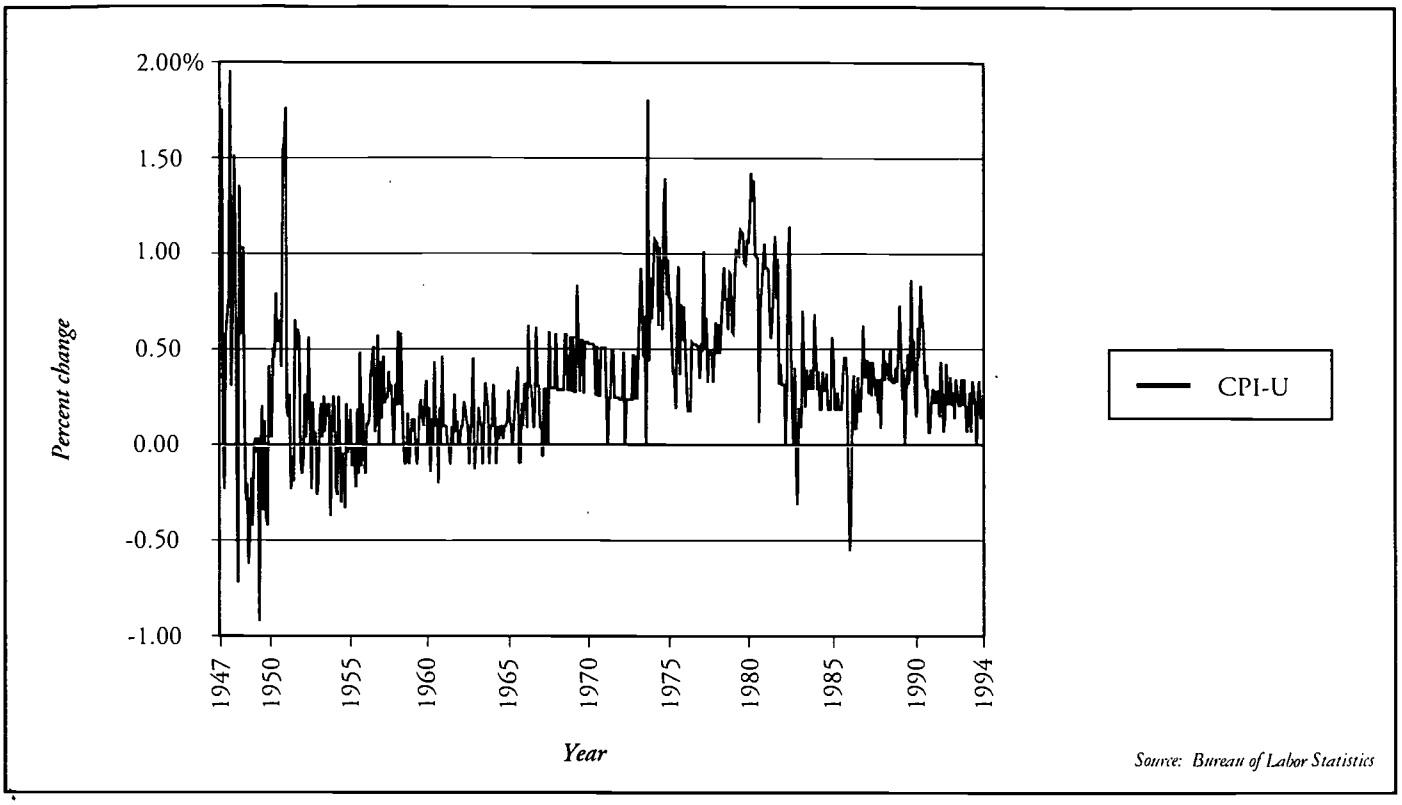
Retired annuitants have special problems in recovering from the stiff shock of an occasional inflationary spike, such as those that hit Americans in the middle 1970s and early 1980s. Although U.S. life expectancies continue to increase, retirees still have fewer years left to live than most working people; therefore, they have less time to recover financially from a rapid rise in inflation.

TIAA-CREF, with its special responsibility for people in the education and research communities, has long recognized the potentially debilitating effects of inflation on retirement savings as well as its participants' fears of such an outcome.

Although inflation threatens retirement security, the demand for inflation-resistant pension products and services will vary based on several factors:

• *Inflation expectations.* Those saving for retirement can purchase annuities based on assets such as stocks and ordinary bonds in order to protect themselves, as long as they know that inflation is sure to be steadily high or low. However, inflation is rarely steady, so stocks and ordinary bonds are vulnerable to uncertainty concerning the future inflation rate. People who are sensitive to that uncertainty will want an asset that can offset such volatility.

Chart 1
Inflation Volatility in the United States, 1947-1994
Monthly Changes in the Consumer Price Index
(CPI-U — All Urban Consumers)



• *Who bears the inflation volatility risk.* In both defined-benefit and defined-contribution plans, the retiree bears most or all of the risk of inflation. Employees are also subject to the risk of inflation. The call for inflation protection should be significant for those individuals or institutions bearing the risks of inflation.

• *Attitudes toward inflation risk.* Retirement savers' and retired annuitants' attitudes about inflation protection will vary depending on their time horizon, the size and types of assets they prefer, their tolerance of risk, and other personal factors.

This paper examines the issue of inflation protection for pensions in the 1990s and beyond by addressing two major questions:

• How can pension providers assist those saving for retirement and retired annuitants in responding to the inflation threat? The experience of TIAA-CREF shows how inflation-focused policies, products, and services have evolved since the 1950s in fighting inflation in the retirement services industry.

• Would the introduction of a new form of financial asset in the United States — *real* bonds — be a critical next step in the search for the holy grail of protection from inflation for retirement savings and income? Real bonds are bonds whose coupon payments and principal amount are indexed to the CPI.

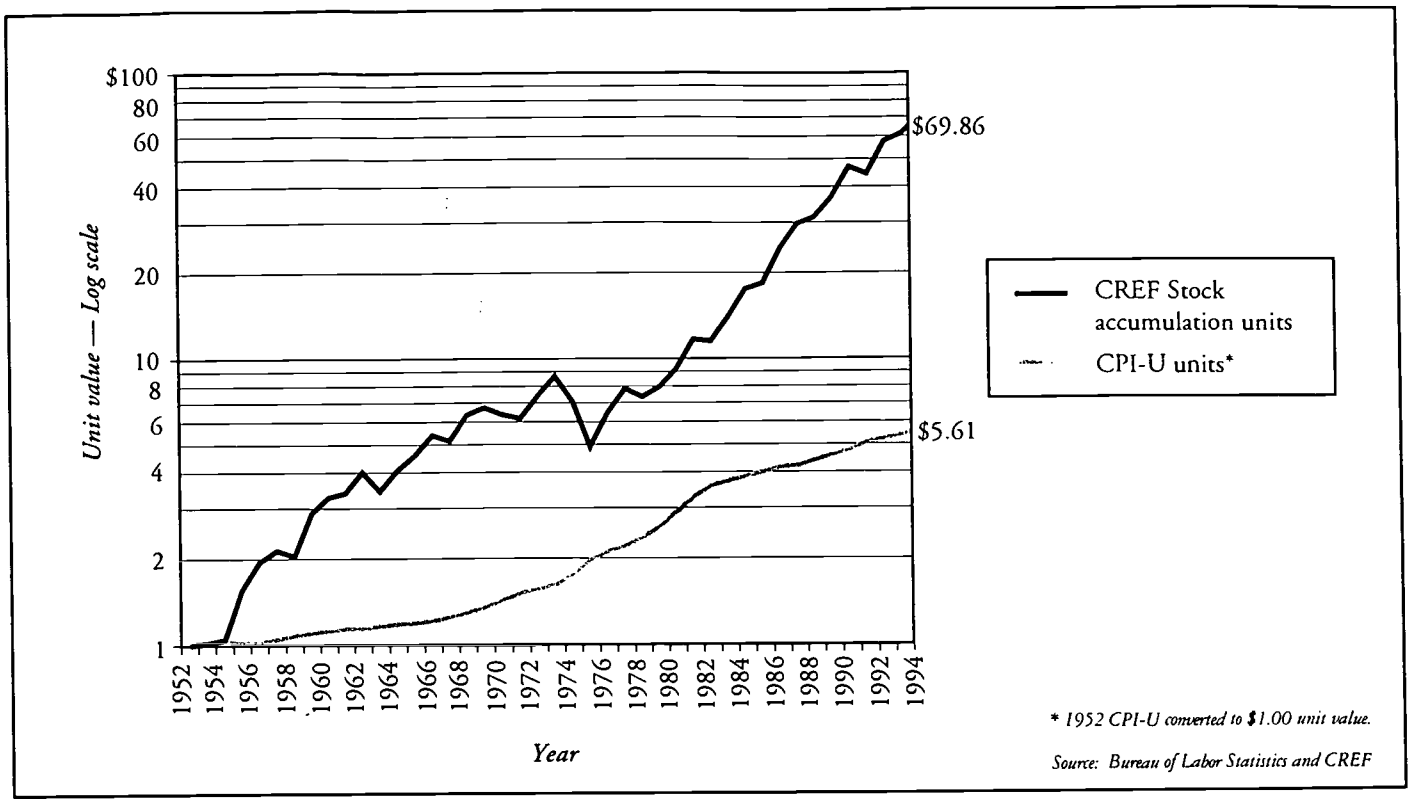
Over the past fifty years, the introduction by retirement services companies of new types of annuities and investment products has offered people considerable additional protection against inflation. Real bonds can, when properly designed and used for retirement, further improve people's income stability in retirement. Of course, for the following discussion, past financial performance is no guarantee of future results.

Combating Inflation: The Example of TIAA-CREF

TIAA-CREF, with its special responsibility for people in the education and research communities, has long recognized the potentially debilitating effects of inflation on retirement savings as well as its participants' fears of such an outcome. Although founded in 1918, the company became actively concerned about inflation following the end of World War II. The aftermath of the war — and subsequent later wars, hot and cold — transformed inflation into a serious permanent problem. In the late 1940s, inflation increased and coincided with a steep rise in salaries and the first big wave of retirements of faculty who by that time had spent their careers covered by TIAA.

This group found that fixed retirement annuity benefits couldn't keep up with rapidly rising inflation. Even benefits based on many years of service were low: Fixed-annuity interest rates had remained relatively high during the Depression but had declined after the war, and contributions of newly retired faculty had, of course, been based on many years of low pre-inflation salaries.

Chart 2
CREF Stock Accumulation Unit Values vs. Inflation, 1952-1994
1952=$1.00



As a result, retirement benefits as a proportion of preretirement salary substantially dropped for most faculty in the immediate postwar period. Many colleges and universities felt obliged to supplement fixed-income annuity benefits with additional payments.

By the early 1950s, the difficulties posed by simultaneous high inflation, low interest rates, and low benefits prompted TIAA to reexamine the role of traditional annuities in defined-contribution plans. Other pension providers were faced with similar circumstances, but in the case of defined-benefit plans, employers rather than employees faced the challenge of meeting the promises they'd made with eroding real assets and revenues.

Fighting Inflation with CREF. Under William C. Greenough, then TIAA vice president, TIAA launched studies to discover how a defined-contribution plan could respond more effectively to a variety of investment and inflation conditions. By tracing the performance of common stocks over the previous seventy years, a TIAA study team found the key to what they were looking for, a completely new instrument — christened a variable annuity — with a 100 percent equity investment base. The resulting legal, actuarial, and investment entity was given the name College Retirement Equities Fund — CREF.

Variable annuities are so common today that it is hard to realize that they were a new invention in 1952.

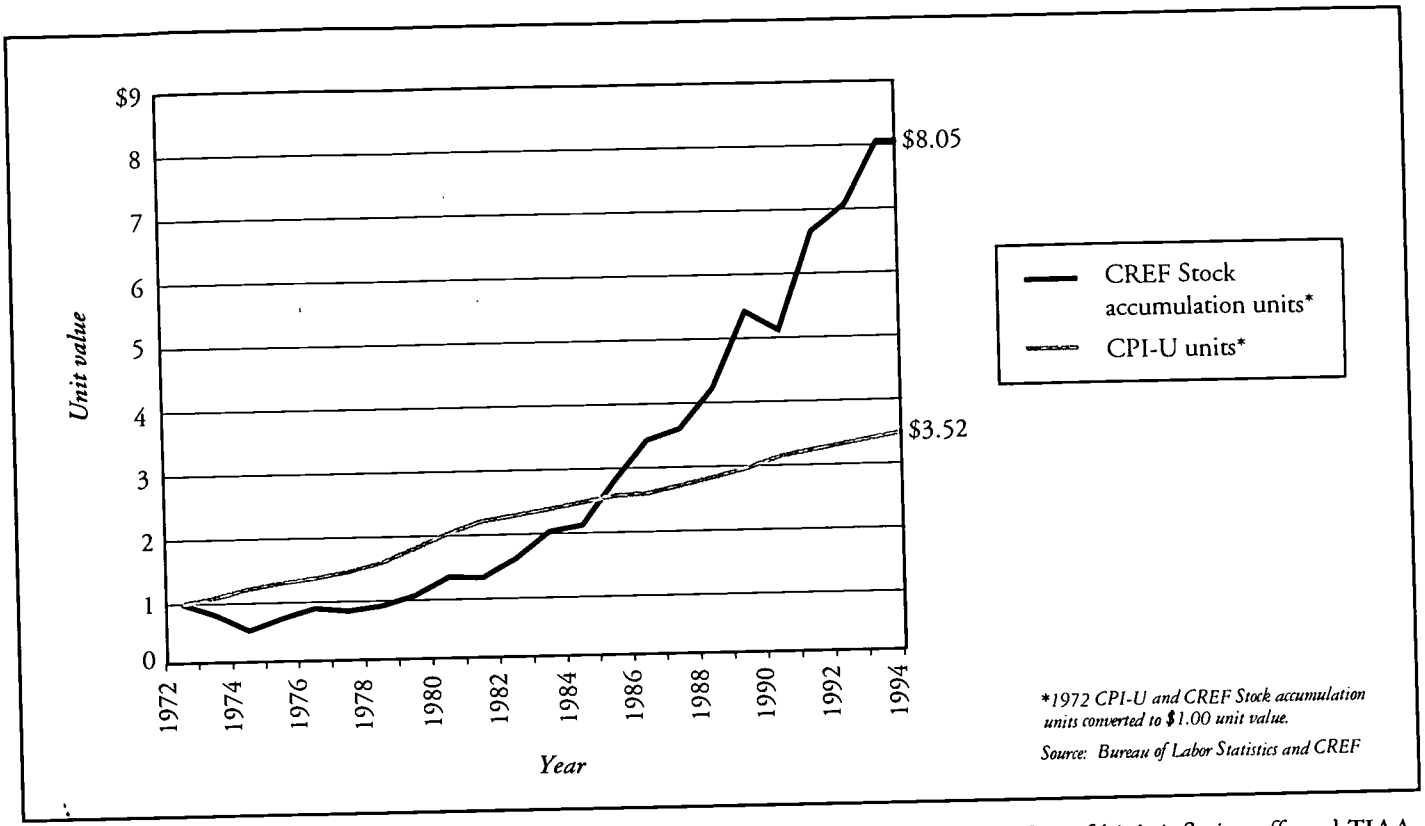
In Greenough's report, the CREF initiative was described specifically in terms of inflation: "TIAA initiated a comprehensive study to determine if there was any way to provide a retirement income which would overcome some of the troubles inflicted by inflation."[1] The report elaborated on the cost-of-living problem:

> *Various factors have caused and seem likely to continue to cause changes in the cost of living. These changes affect the purchasing power of fixed-dollar annuities, and, therefore, the standard of living of retired persons. This [situation] is altering the idea that the contributions toward retirement income should be invested wholly in fixed-dollar obligations and that annuity payments should be limited to fixed-dollar amounts.*[2]

The study sought a way to "overcome some of the troubles inflicted by inflation" and concluded that adding an annuity plan investing in common stocks over the period studied — 1880 to 1950 — would have provided better returns and better purchasing power than from fixed-income investments over most periods:

> *This economic study should result in a basic change in planning retirement systems in the future. The factors of inflation and deflation have pretty gen-*

Chart 3
CREF Stock Accumulation Unit Values vs. Inflation, 1972-1994
1972=$1.00



erally been disregarded in past planning, with unfortunate results. This study shows that common stocks would have provided better returns than those available from fixed-income investment in most periods.[3]

Variable annuities are so common today that it is hard to realize that they were a new invention in 1952. Some powerful insurance industry interests initially opposed the concept, and common stock and mutual fund ownership by individuals was not nearly as widespread as it is today. Almost as important as the product itself were TIAA-CREF's educational initiatives. Meetings with educational associations, college boards of trustees, college administrators, and TIAA participants, all aided substantially in introducing and supporting the new CREF program.

Was the creation of variable annuities the holy grail of inflation protection? The CREF Stock Account, as it is now called, has done very well over the past forty years. During that time, CREF Stock Account accumulation units have risen over 10 1/2 percent per year, as compared with inflation's 4+ percent per year (see Chart 2).

Today, TIAA-CREF's communications place more emphasis on the long-term returns to stocks and somewhat less emphasis on CREF as the original holy grail of inflation protection.

Although CREF is inflation responsive, it follows the stock markets and is not inflation proof. As Chart 3 shows, CREF Stock accumulations failed to keep up with inflation during the 1970s and early 1980s. This lengthy period in which CREF returns declined dramatically in the face of high inflation affected TIAA-CREF's participants and annuitants directly. For those still saving for retirement, it reduced for a time the expected value of future retirement income based on pension savings and the earnings on those savings. (But it did offer the advantage of some valuable dollar cost averaging, and in fact CREF performed well in the 1980s.)

For those receiving annuities, the period of the 1970s had a more directly negative effect. Because of the market's performance in relation to CREF's contract provisions for paying income, CREF annuity income rates dropped seven times between 1972 and 1982.

Today, TIAA-CREF's communications place more emphasis on the long-term returns to stocks and somewhat less emphasis on CREF as the original holy grail of inflation protection.

Fighting Inflation with TIAA. CREF represented a step forward in the attempt to preserve purchasing power, and in the

early 1980s TIAA reacted to stagflation by devising investment and income policies to improve resistance to inflation on the TIAA side.

In brief, TIAA made changes in its investment policy, which at that time emphasized mortgages and long corporate bonds held to maturity. In the area of corporate bonds, the company moved to bonds of shorter maturity unless these included equity features that protected longer-term returns. The equity features turned out to be extremely successful in the 1980s, although the shorter-maturity strategy missed the chance to lock in very high nominal returns at the beginning of the decade.

TIAA also focused on ways to tap investment income streams that could improve a mortgage portfolio's ability to hedge against inflation. It developed the concept of participating mortgages, in which, as a lender on a long-term basis, TIAA receives the interest on the loan plus a percentage of property income above a threshold amount. Loans without a participating feature were limited to shorter maturities. Participating loans today represent about 40 percent of TIAA's mortgage loan portfolio.

And finally, in the early 1980s TIAA moved into real estate as a major asset class for the benefit of participants, to hedge against rising property prices. As of 1995, TIAA's real estate portfolio was valued at nearly 10 percent of total assets.

The segment of TIAA annuitants choosing the graded payment method has grown substantially, from about 2 percent in 1982 to 14 percent in 1994.

In 1982, TIAA made changes on its retirement income side by introducing the TIAA Graded Payment Method. This new annuity option, with a guaranteed minimum interest rate, equipped fixed-income annuities to accommodate inflation better (for a more complete description, see *Research Dialogues,* no. 46, December 1995).

Under the graded method, annuity payments in the first year are based on an interest rate assumption (AIR) of 4 percent — higher than the TIAA minimum 2.5 percent guarantee, but lower than the total interest rate used for the TIAA Standard Method (this has recently been in the neighborhood of 7 to 8 percent).

The graded AIR is lower than the standard TIAA interest rate earned because under the graded method, the annuity dividend, based on interest in excess of the 4 percent AIR, is added to the annuity reserve in order to purchase additional annuity income for the following year. The remainder, including the guaranteed income, is paid as current income. The proportional benefit increase each year is close to the difference between a 4 percent rate and the total interest rate earned.

For many annuitants who retired at various points over the past twenty-five years, the graded payment method would have tracked inflation well, as indicated by hypothetical illustrations for the period before its introduction and by actual experience afterward.[4] However, as under CREF, an increase in income each year under a TIAA graded annuity is unlikely to match inflation exactly. But the graded method is excellent at keeping up with expected inflation as reflected in nominal long-term bond rates. When combined with the inflation-resistant TIAA investment approach described earlier, the graded payment method can also reflect part of unexpected inflation, with a brief lag for inflation results to become integrated into investment returns.

Of course, the quid pro quo for steadily increasing annual benefits is that the initial benefit under the graded method is lower than that under the alternative standard method.[5] This means that new retirees face a choice between higher initial income through the TIAA standard method or a better chance at inflation resistance but lower initial income through CREF or the TIAA graded method. In pursuit of high nominal rates, some people fall prey to a "money illusion" and pick the first option. But as interest rates have moderated somewhat since the 1980s, more are selecting the second. For example, the segment of TIAA annuitants choosing the graded payment method has grown substantially, from about 2 percent in 1982 to 14 percent in 1994. In fact, in 1994 among people with over $200,000 in annuity assets, over 20 percent selected the graded method.

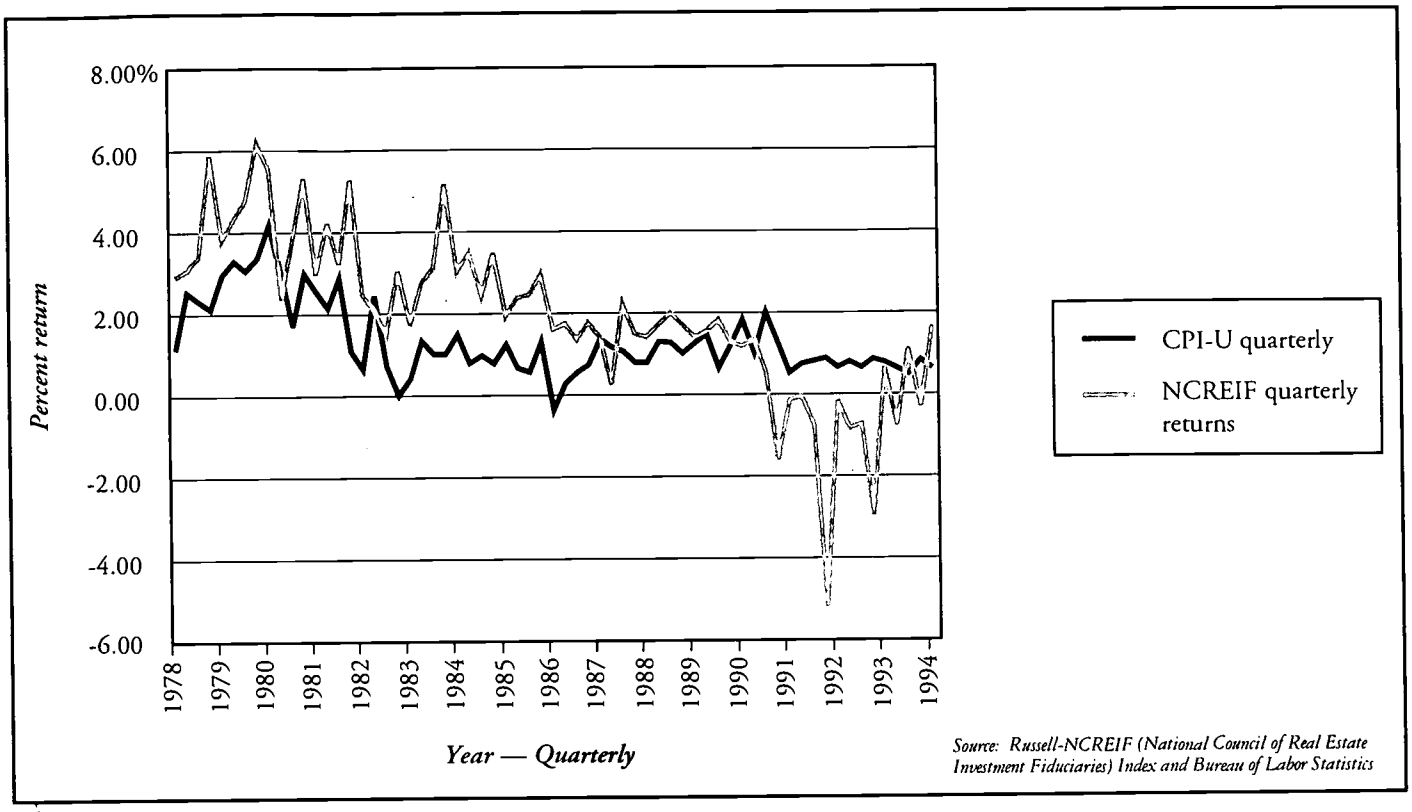
Another consumer choice is between CREF and TIAA. In response to the inflationary decade of the 1970s and CREF annuity income levels then, retirees overwhelmingly preferred TIAA to CREF. Starting about four years ago, however, new retirees have increasingly opted for CREF annuities.

There is also a growing awareness of the need to supplement Social Security and the basic retirement plan with personal savings.

Educational Efforts. In their joint Statement of Principles on Academic Retirement and Insurance Plans, the Association of American Colleges and the American Association of University Presidents stress that a key pension goal is to maintain retirement income purchasing power.[6] TIAA-CREF has long recognized the need to educate participants about ways to protect their retirement income against inflation. It updates its publications frequently, trains telephone and field staff, and constantly adds new services, including retirement planning software, to provide the information participants need to save effectively for retirement.

As a result of such efforts, a substantial proportion of TIAA-CREF retirees use inflation-resistant annuities in retirement. Over 50 percent of the total assets of TIAA-CREF participants and annuitants and 60 percent of all premiums

Chart 4
Russell-NCREIF Index Quarterly Nominal Returns vs. Inflation (CPI-U) over Time
1978-1994



Source: Russell-NCREIF (National Council of Real Estate Investment Fiduciaries) Index and Bureau of Labor Statistics

now go into CREF stock-based funds — far higher percentages than in most other defined-contribution plans. More retirees are also now choosing to get income from TIAA under the graded method. In addition, there is also a growing awareness of the need to supplement Social Security and the basic retirement plan with personal savings.

Protection against inflation remains a central element in the TIAA-CREF strategic plan for the next few years. On the education front, more sophisticated financial planning software is to be introduced, enabling each participant to estimate retirement savings needs under various assumptions about real earnings and salary growth.

In the area of consumer choice, TIAA-CREF has introduced postretirement flexibility, which for the first time allows retired annuitants to change some of their asset allocations.

Real Estate: A Next Step. In the area of investments, TIAA introduced in 1995 a new variable annuity — the TIAA Real Estate Account — that will offer participants a further chance to keep pace with or even outperform inflation. This account will focus on real estate, which over time has enjoyed returns that have kept abreast of the increasing cost of living.

TIAA-CREF has a long-standing commitment to protecting participants against inflation through the thoughtful introduction of new products and services.

Ideally, to keep pace with inflation in the short and medium term, participants and annuitants should look for an instrument where ordinary (i.e., nominal) returns have a high positive correlation with changes in inflation and real returns are not correlated with changes in inflation. The problem with stocks and bonds is that in the short run they move together, but inversely to inflation. For example, since at least 1978, correlations between short-term changes in large-company nominal stock returns as well as short-term changes in nominal intermediate- and long-term bonds and changes in inflation are negative (-0.28 and -0.52 respectively). Correlations between short-term changes in comparable real returns are even more strongly negative (-0.47 and -0.75 respectively).

In contrast, unleveraged real estate, as measured by the Russell-NCREIF (National Council of Real Estate Investment Fiduciaries) index, starting in 1978, is not highly correlated with stocks and bonds. And at least since 1978, changes in real estate's nominal returns as measured by this index are correlated positively with inflation (0.53) and its real returns are relatively uncorrelated with inflation (0.01).[7] (See Chart 4.)

TIAA's Real Estate Account, in contrast to real estate investment trusts (REITS), will not be leveraged with mortgages, so that the underlying assets will be able to isolate returns to real assets as well as an inflation component. In combination with CREF and TIAA, a retiree can create a retirement portfolio with a 4 percent AIR composed of three asset classes:

(1) TIAA, with the inflation-protection investment policies described previously;
(2) one or more of the CREF funds; and
(3) the TIAA Real Estate Account.

This could provide strong inflation resistance as well as asset diversification.

One cloud on this horizon is the most recent history of real estate returns, which have been below inflation rates. This recent experience illustrates the well-known risks of real estate, including fluctuations in the value of property, uncertainty about future income and expenses, and other issues such as environmental compliance. Still, both TIAA and CREF enjoyed good returns during this same period: So a combination strategy could be an effective hedge against future real-estate downturns.

Looking to the Future: *Real* Bonds

TIAA-CREF has a long-standing commitment to protecting participants against inflation through the thoughtful introduction of new products and services. The company's experience indicates what a retirement services provider can do in the battle against inflation. Yet, while TIAA-CREF has worked hard to deal with inflation, no one policy is the holy grail of inflation protection. The final question is how government inflation-indexed bonds — *real* bonds — might fit into a participant's or retired annuitant's inflation-fighting mix.

Real bonds are government debt securities that provide investors with a variable real return plus an inflation-adjusted amount added to both the principal and the coupon. The result is an asset that can vary (because real asset returns vary over time), but nonetheless tracks inflation better than any existing asset class.

Real bonds can be designed in several ways. The United Kingdom, for example, adjusts the coupon and principal amount on its real bonds — called indexed gilts — every six months to account for increases in inflation during that time, as measured by the official government cost-of-living index. If the U.S. Treasury were to issue real bonds, it might follow the lead of other countries such as the United Kingdom, Australia, and Canada, which all now regularly issue real bonds of various maturities. Real bonds represent a small proportion of total new public debt in each country; the balance of new debt continues to be issued as ordinary bonds of varying maturities.

In the United States, it has been estimated that intermediate real bonds would pay a real rate of return roughly 0.50 to 1.00 percent less than the return for ordinary intermediate bonds.[8] The positive trade-off is that real bonds would be less volatile than their ordinary counterparts and would, of course, track inflation better than any other asset a participant or annuitant could purchase.

A real bond fund would protect the saver's assets entirely from inflation, with the market value of the assets varying only a little.

As such, real bonds might be used by any retirement services company both to allow the creation of new pension products and to improve portfolio management of current assets. For example, a retirement services company might purchase, hold, and pool U.S. real bonds to create products such as inflation-indexed annuities based on an especially secure, inflation-resistant bond fund. These new instruments would be useful to retirees as well as to people saving for retirement, in the form of complementary assets to the securities already employed in a personal investment portfolio.

Meeting Retirement Savings and Payout Needs with Real Bonds. The demand for retirement products based on real bonds differs according to whether people are in their accumulation or saving phase (preretirement) or in their annuity or payout phase (postretirement).

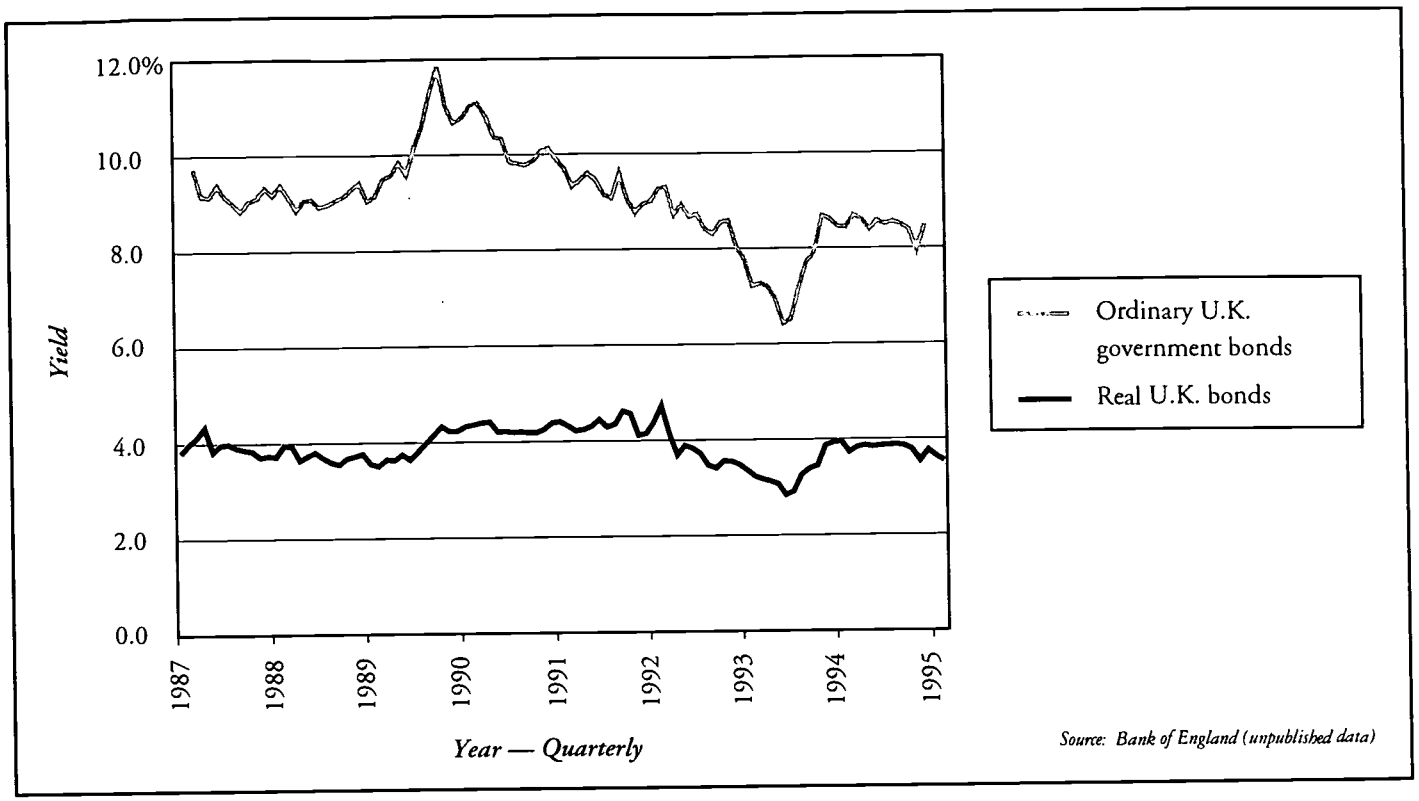
If we assume that returns on ordinary bonds equal those on real bonds over time via arbitrage forces, these two instruments should be close portfolio substitutes. The additional inflation-resistant characteristics of indexed instruments would be very attractive to some investors and less so to others, depending on how much inflation protection they desire and the character of their asset/liability profile. Also, while on average real bond returns won't differ much from ordinary bond returns, the correlation of real bond returns to other portfolio asset returns is likely to be low. This will reduce risk in the overall investment portfolio.

Other conventional inflation-protection schemes have drawbacks. Treasury bills have tracked inflation well in nominal terms, but in real terms the relationship is a great deal more variable. Equities will provide returns with very high probabilities of exceeding inflation, but must be held for relatively long periods. If these drawbacks are taken into consideration, real bonds present characteristics that could prove attractive. Investors who don't need inflation protection may wish to diversify their portfolios with some real bonds or to reflect the actual composition of Treasury debt outstanding in passive bond portfolios.

Accumulation Phase. Most participants who are saving for retirement are looking for long-term returns that not only preserve principal but offer significant returns as well. And they can afford to wait through temporary market downturns or inflationary spikes. Therefore, they may do better with long-term stock returns and TIAA than with indexed bonds.

However, some participants now seek a special level of stability through a money market fund. A real bond fund based on real U.S. Treasury bonds might also be attractive to participants looking primarily to preserve principal. Such a fund would be designed to purchase and hold real bonds with staggered maturities in order to reduce the volatility associated with

Chart 5
Comparison of Yield Volatility of U.K. Real and Ordinary Bonds
1987-1995



fluctuations in real asset returns. A real bond fund would protect the saver's assets entirely from inflation, with the market value of the assets varying only a little, since real rates do not fluctuate as dramatically as nominal rates, even scaling for the differential in mean returns. To illustrate, evidence from the U.K. bond market shows that real bonds, which have been available there since 1981, are less volatile than ordinary bonds. (See chart 5.) For at least one measure of risk, the ordinary bonds in the illustration show a standard deviation of 1.0 percent, while the real bonds show a far lower standard deviation of 0.38 percent.

Investors could employ an inflation-indexed bond fund as a more secure short-term alternative to a money market fund. And individuals near retirement might seek the stability of an indexed fund and its ability to resist the vagaries of the equity markets or inflation's effect on ordinary bond returns.

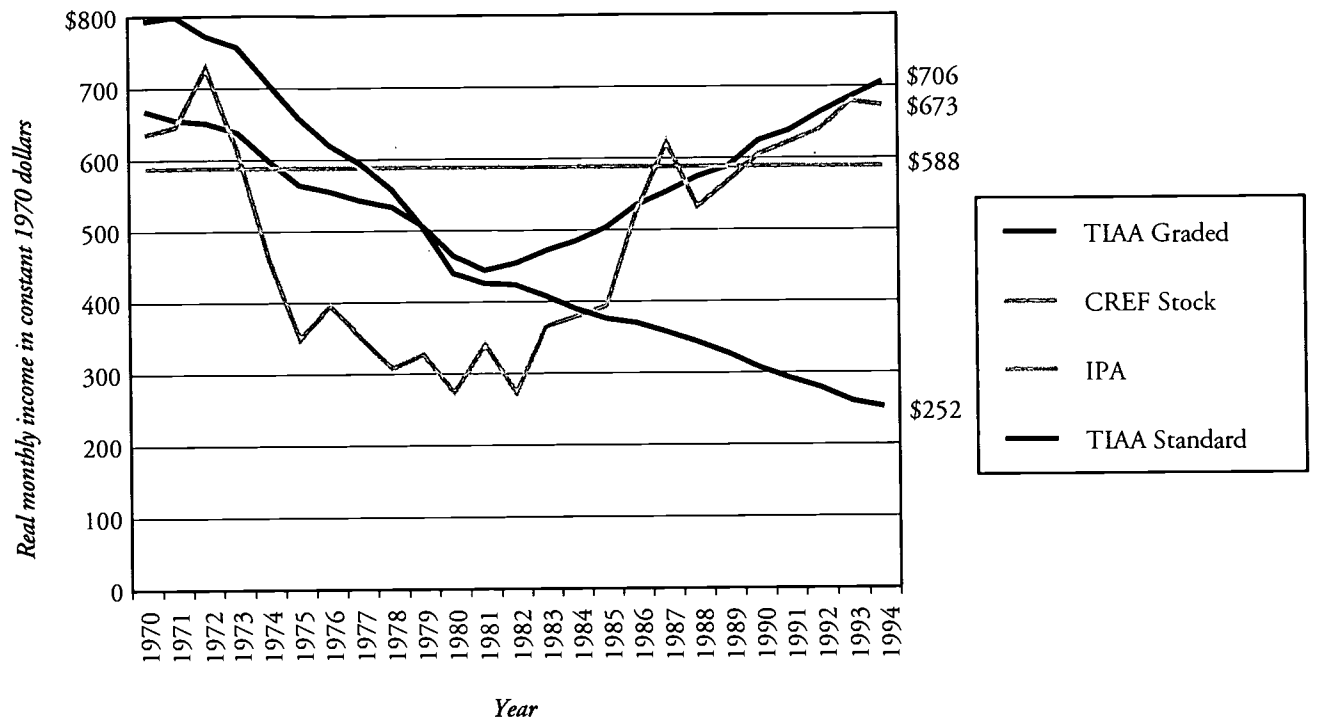
Annuity Phase. Retired people are frequently thought of as the members of society most vulnerable to inflation. Unlike working individuals, retirees have liquidated their human capital, which is highly resistant to inflation through wage adjustments (albeit often with a lag). Instead, they rely on securities and liquid assets, both more sensitive to inflation than wages. And although Social Security payments are indexed, such payments typically do not represent all of a retiree's income. Thus there may be a need or desire among some retirees to protect a larger proportion of their income.

As a first step, in order for individuals to assess their own situation and need for inflation protection, they must understand the difference between real and nominal payments. To illustrate, Chart 6 compares for retirement at age 65 in 1970 the difference in initial payments and subsequent real payments under TIAA graded and TIAA and CREF Stock standard payout methods, both with an accumulation of $100,000 at retirement and selection of a one-life annuity with a 10-year guaranteed period. It also shows the income for a "hypothetical" inflation-protected annuity (IPA), which is a real (inflation-adjusted) annuity income for a comparable retirement at age 65 in 1970. The relationships between the payment histories shown in Chart 6 are for retirements in 1970; retirements taking place in earlier or later years than 1970 are likely to show different results.

Individuals near retirement might seek the stability of an indexed fund and its ability to resist the vagaries of the equity markets or inflation's effect on ordinary bond returns.

The actuarial net present value as shown in Chart 6 is the same for each product, but there are two problems for

Chart 6
Comparison of Real Annuity Payments: TIAA Standard and Graded, CREF Stock, and Hypothetical Inflation-Protected Annuity (IPA)
1970-1994



Assumptions:

1. The participant retired at age 65 with a $100,000 accumulation and chose a one-life annuity with a 10-year guaranteed period.
2. CREF Stock figures reflect actual annuity values for periods covered.
3. TIAA graded method figures for the 1970-1982 period before the graded method was intoduced reflect actual TIAA dividend and mortality rates then in effect.
4. Graphs use the April Consumer Price Index (CPI) to calculate changes in purchasing power.
5. IPA is a hypothetical inflation-protected annuity payout and is based on a 2.5 percent assumed investment return (AIR). Nominal payouts under this annuity were assumed to increase exactly with changes in the CPI.

Source: TIAA Actuarial

the annuitant. First, there is an inflation *money illusion*, whereby the standard annuity initially looks like a much better deal. Second, the money illusion can be exacerbated by an accompanying *mortality illusion*, whereby many people are convinced that they're not going to live as long as the odds indicate they might. Especially during periods of stable and low inflation, buyers will need to be shown that real as well as graded annuities make sense. Conversely, during periods of high, volatile inflation, such products might be especially attractive. For example, during the later 1970s, years of very high inflation in the U.K., the British government successfully marketed *granny bonds*, savings instruments that paid a rate equal to inflation but offered no additional real interest at all.

Perhaps the most important advantage to retirees would be that the option of taking annuities in inflation-protected form would allow them to choose how much inflation coverage they want for their income. If they are conservative or are concerned about the possibility of reduced Social Security benefits, they could increase their inflation protection by choosing to allocate some or all of their assets to the proposed indexed bond option.

The Supply of Real U.S. Treasury Bonds. The discussion up to this point assumes that variable annuities might be created based on real U.S. Treasury bonds. However, although the U.S. Treasury has indicated that it is considering issuing real bonds and although there is widespread support for the creation of a portfolio of real debt, the Treasury has yet to do so.[9]

Economists as far apart as Milton Friedman and James Tobin have endorsed the creation of real assets, such as bonds that guarantee holders a real return. Experts have analyzed the advantages of real bonds compared with conventional debt and other securities.[10] As noted, governments, firms, and citizens in the United Kingdom, Canada, Australia, and other countries have all realized some of these theoretical advantages by using real bonds as an attractive supplement, or even as an alternative, to nominal interest-rate savings.[11]

Commonly cited benefits of using inflation-indexed assets in the U.S. include the following:

• To *lenders,* real bonds offer the possibility of investing in an asset immune to the value-eroding effects of inflation. Investors concerned about future inflation and dissatisfied with the inflation-tracking performance of such conventional assets as stocks and bonds could purchase real bonds as an inflation-proof alternative. Large pension plans and mutual fund companies have expressed an interest in owning such debt.

• For *issuers,* inflation-indexed debt might decrease borrowing costs. Issuers could benefit from investors' anxieties about future inflation rates by offering inflation-indexed debt at rates lower than those of comparable conventional bonds. And if opportunities for profit or savings in borrowing costs appear to exist, private agents could issue such securities regardless of the government's decision. Indeed, a few American, British, and Canadian corporations issued this type of debt in the 1980s.[12]

• The *economy* could benefit from real bonds by allowing both lenders and borrowers to distribute risks more efficiently than it is now possible to do. A number of excellent studies outline the possible losses or gains associated with the hypothetical introduction of real assets into an economy where people and firms have varying risk preferences.[13] For example, firms with revenues closely tied to the inflation rate, such as regulated utility companies, may wish to borrow funds via inflation-indexed contracts in order to match their liabilities better to their revenue streams. In this way, inflation risk could be transferred within the economy to those most capable of bearing it.

• For *policy makers,* real bonds could become tools for gauging future inflation expectations. Alan Greenspan, chairman of the board of governors of the Federal Reserve System (the Fed), and other Fed governors believe that the pricing information generated by an active trading market in inflation-indexed debt will prove useful in the formulation of monetary policy.[14] Changes in the yield gap between indexed and similar conventional bonds would provide real-time data on the market's current expectations concerning inflation and its appraisal of Federal Reserve policy measures.

• For *government securities traders,* real bonds would be a new instrument that could be sold to retirement services companies and others interested in inflation protection or whose income or payment streams track inflation. One worry some traders have expressed about real bonds is the possibility that these would be bought and held by companies and individuals, thus offering little opportunity for subsequent trading. Experience in the United Kingdom indicates that although the turnover (trades per year) for U.K. inflation-indexed gilts (real bonds) is lower than that for ordinary gilts, turnover of all gilts (ordinary and real) *increased* after the introduction of indexed gilts in 1981.[15] One possible explanation for this is that real gilts replaced the ordinary bonds that buyers had bought and held in the past, thus freeing up the ordinary bonds to be bought and sold at a greater rate.

Retirement services companies such as TIAA-CREF already have an arsenal of tools to offer retirement plan participants and retired annuitants seeking to protect their incomes against inflation. Real bonds could represent a powerful new tool in this arsenal.

In addition to active trading of real bonds themselves, government securities traders as well as the U.S. Treasury could create various types of derivatives based on real bonds. This is already being done in the United Kingdom and could easily follow the experience in the United States with derivatives based on ordinary bonds.

Although the private sector has occasionally issued real debt, government is a prime candidate for this role, since its revenues come from a broad-based, partially indexed income tax structure and from taxes on the nominal amounts paid for sales of consumer items.

Conclusion

Retirement services companies such as TIAA-CREF already have an arsenal of tools to offer retirement plan participants and retired annuitants seeking to protect their incomes against inflation. Real bonds could represent a powerful new tool in this arsenal. Real bonds offer potential advantages to annuitants and to people saving for retirement in defined-contribution plans, even those where inflation-protection policies have long been a feature of the plan. Some of TIAA-CREF's retirees, for example, might choose to use them in a portfolio along with CREF Stock, TIAA, and the new TIAA Real Estate Account. This would facilitate the use of annuities designed to help protect annuitants' purchasing power over the remainder of their lives and extend any protection from inflation they enjoyed while they were working. Less compellingly, for risk-averse savers real bonds could represent an especially safe and stable investment asset.

For defined-benefit funds, real bonds might allow investment managers to include inflation-protected assets in their portfolios to increase diversification and dilute the vulnerability to inflation of the portfolio as a whole.

The advantages of real bonds and annuities would appear most readily accessible to government pension groups and defined-benefit providers whose obligations are partially or fully indexed themselves and whose asset-allocation decisions are made by trained professionals. Defined-contribution providers, such as TIAA-CREF, would need to heighten the financial literacy among participants before they would be likely to choose a real bond fund or purchase real annuities in great numbers.

However, consider the U.K. experience for a moment. After being able to purchase indexed government bonds of vari-

ous maturities beginning in 1981, U.K. pension funds now allocate almost 5 percent of their total assets to these bonds. Of course, in contrast to the U.S. pension market, U.K. pension funds rely more heavily on defined-benefit plans than on defined-contribution plans. But placing a similar proportion of the U.S. pension fund market of $4.7 trillion in indexed bonds could lead to a shift of tens or even hundreds of billions of dollars into those instruments. □

(This report was prepared for Research Dialogues *by P. Brett Hammond, Director of Strategic Research, TIAA-CREF.)*

Notes

1 William C. Greenough, *A New Approach to Retirement Income* (New York: TIAA-CREF, 1951), 5.

2 Ibid.

3 Ibid., 6.

4 "The TIAA Graded Payment Method and the CPI," *Research Dialogues,* no. 46 (December 1995).

5 Ibid.

6 The statement is printed in American Association of University Professors, *Policy Documents and Reports* (Washington D.C.: American Association of University Professors, 1990), 173-178.

7 Quarterly data for these correlations are drawn from Jeffrey D. Fisher, "Alternative Measures of Real Estate Performance: Exploring the Russell-NCREIF Data Base," *Real Estate Finance* (January 1995, pp. 79-86) and the CPI-U.

8 P. Brett Hammond and Andrew C. Fairbanks, "Indexation and the Inflation Risk Premium," paper presented at a conference on inflation-indexed bonds, Washington, D.C., April 21, 1995.

9 Statement of U.S. Depury Assistant Secretary of Treasury Darcy Bradbury at a conference on inflation-indexed bonds, Washington, D.C., April 21, 1995.

10 Robert L. Hetzel, "Indexed Bonds as Aid to Monetary Policy," *Federal Reserve Bank of Richmond 1991 Annual Report,* 1991: 4-15; Zvi Bodie, "Inflation, Index-Linked Bonds and Asset Allocation," *The Journal of Portfolio Management,* Winter 1990: 48-53; James Tobin, "An Essay on the Principles of Public Debt Management," *Macroeconomics,* Vol. 1 of *Essays in Economics* (Cambridge, Mass.: MIT Press, 1987).

11 Alicia H. Munnell and Joseph P. Grolnic, "Should the U.S. Government Issue Indexed Bonds?" *New England Economic Review,* Federal Reserve Bank of Boston, September/November 1986: 3-21; Gabriel de Kock, "Expected Inflation and Real Interest Rates on Indexed-Linked Bond Prices: The U.K. Experience," *Federal Reserve Bank of New York Quarterly Review,* Autumn 1991: 47-60; G. Thomas Woodward, "The Real Thing: A Dynamic Profile of the Term Structure of Real Interest Rates in the United Kingdom, 1982-1989," *Journal of Business* 63, no. 3, 1990: 373-398; C. A. E. Goodhart, "Appendix: U.K. Indexed Gilts: A Case Study of Financial Indexation," in *Money, Information and Uncertainty,* 2nd ed. (Cambridge, Mass.: MIT Press, 1989); John F. Boschen and John L. Newman, "Monetary Effects on the Real Interest Rate in an Open Economy: Evidence from the Argentine Indexed Bond Market," *Mimeo,* June 1988.

12 Until its demise for unrelated reasons, Franklin Savings Association of Ottawa, Kansas, was the most prominent private-sector issuer of indexed debt in the United States. In the United Kingdom, some privatized utilities, such as Anglian Water, have also issued partially indexed bonds. A private Canadian construction company and bridge operator, Strait Crossing, Inc., issued a forty-year, AAA-rated indexed debt obligation in 1993.

13 Alan D. Viard, Alan C. Stockman, and David W. Wilcox, "The Welfare Gain from the Introduction of Indexed Bonds," *Journal of Money, Credit and Banking,* August 1993: 612-636; Stanley Fischer and Lawrence Summers, "Should Governments Learn to Live with Inflation? A Reply," *The American Economic Review,* March 1993: 312-313.

14 U.S. Congress, House Committee on Government Operations, Commerce, Consumer, and Monetary Affairs Subcommittee, *Hearings on Inflation-Indexed Treasury Debt as an Aid to Monetary Policy,* 102nd Cong. , 2nd sess. (Washington, D.C.: U.S. Government Printing Office, June 16 and 25, 1992); Robert L. Hetzel, "Indexed Bonds as Aid to Monetary Policy." *Federal Reserve Bank of Richmond 1991 Annual Report,* 1991: 4-15; Alan S. Blinder, "A Way to Free Small Savers from Casino Society," *Business Week,* December 8, 1986.

15 Based on data supplied by the Bank of England for the period 1980 to 1990.

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