

# The NBER Digest

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## Indexed Corporate Bonds

In a period of high and variable inflation, it is puzzling that no U.S. corporations have issued "index" bonds that pay a low real rate of interest plus a premium that varies to compensate lenders for price level changes. For one thing, index bonds probably would be a cheaper form of financing than conventional bonds, which pay a fixed interest rate. Several years ago, NBER Research Associate **Stanley Fischer** of MIT developed a model of the demand for index bonds and concluded that the real yield on them would be lower than the real yield on nominal bonds, if equity and human capital were imperfect inflation hedges. Since empirical studies suggest that both equity and human capital are imperfect hedges, it seems curious that index bonds have not been issued. It is particularly surprising since many other types of contracts (for example, labor contracts) are tied to the price level, and because in recent years there has been no shortage of financial innovation.

Fischer has attempted to resolve the paradox in a new paper that develops a theory of the supply of index bonds, **Corporate Supply of Index Bonds**, *Working Paper No. 331*. His model suggests that some companies would profit from issuing index bonds instead of nominal bonds, but others are better off selling nominal bonds. After establishing that index bonds make sense for some potential issuers, Fischer briefly examines some of the conventional explanations of why they have never been issued. He argues that most of the explanations are unsatisfactory, but that several may play a significant, although diminishing, role in dissuading prospective issuers of index bonds.

Fischer's theory of the supply of index bonds is developed in the context of a model in which the firm's optimal debt-equity ratio is a function of its expected maximum and minimum profits, the tax rate, and the cost of bankruptcy. It pays a firm to issue bonds up to the point at which the tax saving on another dollar of interest payment is equal to the cost of the increased risk of bankruptcy.

Since neither index nor nominal bonds are inherently superior financing vehicles, the answer for an individual company depends on how its profits are affected by inflation. Companies whose profits rise with inflation are likely to have higher-priced stock with index bonds than with nominal bonds. The benefits to be reaped from issuing index bonds increase with both the degree of correlation

between the firm's profits and inflation and the volatility of inflation. Conversely, companies whose profits are negatively correlated with inflation are likely to have higher stock prices if they issue nominal bonds.

After establishing that some companies theoretically could profit by switching to index bonds, Fischer examines the relationship between inflation and the aftertax (but preinterest payments) profits of sixteen large industrial, utility, transportation, and merchandising companies, from 1954 to 1973. Most of the correlations are negative, but a few are positive. Of the sixteen companies, Mobil, IBM, and Sears were most likely to have benefitted from index bonds. Fischer concludes, therefore, that the reason index bonds are not issued is not because there are no companies that could gain from them.

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Another common explanation for the absence of index bonds is ambiguity over the possible tax treatment of the inflation-related portion of interest payments. Fischer also finds that explanation unsatisfactory. There are two ways of indexing bonds. One is to pay a fixed real interest rate of, say, 2 percent plus a variable rate equal to the change in the price level. The other is to index the principal, increasing it each year by the rate of inflation. Fischer observes that since interest payments on floating rate notes are tax deductible, it is probable that indexed interest payments would also be deductible. In addition, he points out that uncertainty about the tax treatment of variations in principal could be resolved by an IRS ruling when an issue of index bonds is proposed.

Index bonds may be unattractive to prospective issuers because ex post real interest rates on nominal bonds have been so low during the postwar period (less than 2 percent from 1954 to 1973). It is tempting to conclude that real rates have turned out so low because lenders have continually underestimated future inflation. However, that reasoning provides a credible explanation for the continued

nonexistence of index bonds only if one assumes that borrowers have had higher—and better—inflation expectations than lenders. In fact, lenders' expectations are not identical, and there may be enough lenders who are so pessimistic about inflation that they would buy index bonds with very low (perhaps even zero) interest rates, with the expectation that those bonds would pay more than nominal bonds that reflect lower inflation predictions. In sum, Fischer finds the explanation based on lenders' expectations of a low rate of inflation questionable at best.

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It also has been argued that call provisions on nonindex bonds have precluded the issuing of index bonds because call provisions enable sellers to protect themselves from the risk that inflation and nominal rates will fall in the future. Fischer refutes this argument on two grounds. First, the provisions only protect issuers after five or ten years, and interest rates can fluctuate widely in that period. Second, index bonds could also have call provisions, in the form of clauses setting minimum and maximum nominal payments.

Fischer prefers to explain why index bonds are not issued by the low variability of the rate of inflation over most of the past twenty-five years combined with the costs of introducing a new financial instrument. His theoretical analysis shows that the relative benefits of index bonds are small unless inflation is volatile. Given the low variability of inflation in the past, and the existence of some costs to educate lenders about a new instrument and obtain tax and regulatory clearance, the incentive to issue index bonds has been slight. However, inflation has been much more volatile in the seventies, and if this continues, it could lead to the emergence of index bonds. AE

## **Saving and Capital Flows**

Additions to the domestic supply of capital do not appear to move abroad in search of the maximum return, but rather tend to remain in the country of origin, according to a recent study done by **Martin Feldstein** and **Charles Horioka** as part of the National Bureau’s program of research on capital formation. The authors compare two views of international capital mobility in **Domestic Saving and International Capital Flows**, *Working Paper No. 310*: (1) the perfect capital mobility theory that sees little relationship between domestic saving and domestic investment, and (2) the imperfect capital mobility theory that believes increases in domestic saving are largely reflected in increases in domestic investment. Their statistical evidence shows that the second view is closer to reality, a

finding that has important implications for national policy toward saving and capital formation.

With imperfect capital mobility, a “closed” economy, increased saving is reflected in the domestic capital stock and does not flow abroad or replace foreign investment at home. The nation therefore earns a return on additional domestic saving that is equal to the full pretax productivity of capital. With perfect world capital mobility, on the other hand, incremental saving may be invested abroad or may replace foreign capital at home. If incremental saving is invested abroad, the foreign government collects the additional tax revenue that is generated. If the additional saving reduces capital imports, domestic tax revenue is unchanged—since investment is being replaced, not expanded—and national income rises only by the *aftertax* return to the new domestic investors. Since *aftertax* yields are roughly one-half as large as *pretax* yields, the question of whether capital is perfectly mobile is critical to ask when formulating an appropriate national savings policy.

Although conventional economic theory assumes the perfect international mobility of long-term capital, the authors are skeptical about that view for several reasons:

1. Risk aversion and prudent portfolio behavior limit investors’ willingness to make long-term investments abroad.
2. Multinationals make direct investments on the basis of market strategy considerations rather than simple yields comparisons.
3. Official restrictions limit the export of capital from some countries.
4. Institutional rules and special characteristics limit the international movement of long-term capital—for example, U.S. savings institutions are required to invest in domestic mortgages, and insurance companies with dollar liabilities limit their risks by investing in dollar assets.

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While short-term security yields and forward currency rates in the Eurocurrency market indicate that liquid financial capital does move to the country with the highest real short-term yield, there is no analogous way of observing the expected real yields on long-term capital investments. In order to test the two views of capital mobility for long-term capital, Feldstein and Horioka examine the relationship between the domestic saving rate and the domestic investment rate among major industrial countries, analyzing the experience of twenty-one OECD countries for the period 1960–1974.

The authors note that there is substantial variation among these countries in domestic saving rates, with the gross saving rate ranging from a low of 18 percent in the United Kingdom to a high of 37 percent in Japan. The pattern of high and low saving rate countries remains fairly stable throughout the fifteen year period.



Feldstein and Horioka find that "the evidence strongly contradicts the hypothesis of perfect world capital mobility and indicates that most of any incremental saving tends to remain in the country in which the saving is done. The substantial international capital flows that exist thus do not appear to respond to international differences in saving rates." The authors further conclude that "while the link between domestic saving and investment may vary among countries, we found no evidence that it varies in relation to either the size of the economy or the importance of international trade."

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Since data broken down into household, corporate, and government saving are available for nine of the countries—Australia, Belgium, Canada, Finland, Germany, Japan, Netherlands, and the United Kingdom—the authors test the responsiveness of investment to the three types of saving. They find no "major difference among the three types of saving in their contribution to total investment or total private investment," but "corporate investment is more responsive to corporate saving than to other sources of funds." The greater sensitivity of corporate investment to corporate saving may reflect institutional rigidities or portfolio preferences within national economies, or corporations may simply save more in countries where corporate investment is greater. In either case, the evidence is inconsistent with the premise of perfect world capital mobility.

Although the study focuses on the long-term relationship between saving and investment, the authors briefly examine the short-run responsiveness of domestic investment to changes in domestic saving. They find that domestic investment rates adjust within a few years to changes in saving rates.

## **Social Security and Retirement**

The recent jump in Social Security payroll taxes has drawn widespread attention to the accelerating cost of the Social Security program. A key cause of today's high Social Security cost is the move toward earlier retirement. While more than one-half of the men over age 65 were still working fifty years ago, less than one-quarter are today. A new NBER study by **Anthony Pellechio, *The Effect of Social Security on Retirement, Working Paper No. 260***, shows that the current level of Social Security benefits is a primary cause of the high rates of retirement.

Pellechio's estimates of the impact of Social Security on retirement are based on an econometric study of the ex-

perience of approximately two thousand older men in 1972. The Census Bureau and the Social Security Administration collected these data on the employment experience of these men and on the Social Security benefits for which they were eligible.

Pellechio illustrates the likely impact of Social Security by calculating how different levels of Social Security benefits would affect the retirement rate among married workers who were 65 years old in 1972. For example, Pellechio calculates that among men who faced the choice between earning \$5 an hour or receiving Social Security benefits of \$300 a month, about 75 out of every 100 would choose to retire. If benefits were raised to \$400 a month, more than 90 men out of every 100 would retire. Reducing benefits by 20 percent would cut the retirement rate to only about 50 per 100 men.

The impact of Social Security benefits on a man's decision to retire depends critically on his alternative earnings opportunity. Pellechio's analysis indicates that with potential Social Security benefits of \$3,000 a year, a man was twice as likely to retire if he could only earn \$4 an hour than if he could earn \$8 an hour.

Pellechio also studied the retirement behavior of 62-year-old men. When a man between the age of 62 and 64 accepts benefits, his benefits during the rest of his life are actuarially reduced. In effect, he "pays back" the benefits that he receives between the ages of 62 and 64 by accepting lower benefits later. An individual receives a very much smaller reward for postponing retirement beyond age 65. Pellechio's estimates imply that employees are well aware of this difference and are deterred from accepting benefits at age 62 by the actuarial reduction of benefits. Retirement behavior is even more responsive to Social Security benefits among men 65 and older than among 62 year olds.

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This sheds indirect light on the effect of the "earnings test"—the Social Security rule that reduces benefits by fifty cents for every dollar of earnings above some relatively low threshold. The lower responsiveness among 62 year olds to potential Social Security benefits that must be "repaid" shows that individuals are responding to the *net* cost of retirement. This therefore implies that the earnings test, by lowering the net cost of retirement, raises the retirement rate significantly.

Pellechio's figures indicate that a rise or fall in Social Security benefits has a magnified effect on the total cost of the program. For example, if a 20 percent reduction in the level of individual benefits at age 65 reduces the retirement rate by 25 percent, the total cost of providing benefits for 65 year olds falls by 40 percent. Conversely, because of induced retirement, the 20 percent rise in the level of individual benefits that was enacted several years ago would raise the total cost of those benefits by more than 50 percent.

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