Investment Risk and the Pension Fund

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In the United States, after a decade of experimentation the investment community has finally settled upon a definition for investment risk. For common stocks it is beta, or the extent to which the given portfolio magnifies or diminishes market movements. For bond investments it is duration, or the average period the borrower retains the funds. In each case the results are measured quarterly and investment services publish these risk characteristics for the various bank and insurance comingled funds, etc.

The plan sponsor of a defined benefit pension plan will usually receive reports quarterly or annually from the investment manager setting forth not only the investment return but the risk associated with it as well. Too few plan sponsors have expressed uneasiness when told that their fund earned 2% less than the average portfolio, but considering the lower standard deviation of returns that was achieved, this was an outstanding performance. The mathematics may be precise, but the statement is not convincing.

Modern portfolio theory and the capital asset pricing model have been developed with the mutual fund investor in mind. The variation in yield from quarter to quarter reflects an uncertainty which is important to an individual who has purchased a mutual fund with money he may need at some unknown, near-term future date. The sponsor of a pension plan has a much longer investment horizon. Contributions are determined by the actuary only once each year and this makes the use of quarterly variations in yield somewhat hypothetical to begin with. In addition the actuary may well employ smoothing devices on the asset values that may sharply dampen the effect of market variations on contribution requirements. Then too the pension contribution itself may

involve some spreading of the effect of asset variation over future service or over the remaining period for amortizing past service.

If it is granted that a pension fund has a long investment horizon. then the conventional measures of investment risk are not appropriate. Lowering short-term volatility has little or no positive effect on long-term investment performance, although it may lengthen the client relationship for the investment advisor. Indeed, the present measures of investment risk seem to have been designed with the view that the asset value will be incorporated on the plan sponsors balance sheet and any variation up or down will affect estimated quarterly profit figures directly. Of course, the variability in quarterly yields does measure something, and to some extent securities with greater variation are riskier. The problem is that there is no accepted formula by which a pension plan sponsor can quantify the extent to which he is willing to sacrifice yield in order to obtain lesser variance in the quarterly investment results.

A good illustration of the failure of conventional risk measures is the current bad advice on international investments that pension fund sponsors are receiving. Investment managers claim that because international markets do not rise and fall concurrently with the U.S. market (the exception being Canada), a U.S. pension fund can lower its risk by investing in international markets. They recommend international investments that do not increase yield simply because they decrease quarterly variance in yield. Actually, international investments involve significant currency risks since benefits are payable in U.S. dollars. Further, there are added political risks and the risk of expatriation. By assuming that risk can be measured by the variance in quarterly yield, investment advisors concentrate on the irrelevant. Their conventional risk measures are not

sufficiently sophisticated to reveal the more important long-term risks.

The approach taken by the investment community to bonds is even less satisfactory. Here the investment advisors recommend that the funds should be invested short because the resulting lower investment income is more than offset by the decrease in risk. From the standpoint of investment theory, a thirty-year bond is clearly more risky than a one-year Treasury note if one is going to measure the results precisely one year in the future. The greater certainty of the investment results at the end of the first year is, however, offset by a greater uncertainty about the investment results after the first year. For the pension plan there are benefit obligations ten, twenty and thirty years out into the future that must be met. Thus what appears safer by the investment managers' short-term yardstick may actually be riskier for a pension fund.

A simple example will illustrate this fundamental point. If a fund has a single obligation to meet thirty years in the future and purchases a zero coupon thirty-year bond with a face amount equal to the benefit obligation, then investment risk has been entirely eliminated. There is a cost for this added security, of course. The thirty-year zero coupon security may well provide a lower yield than might be attainable over the same period of time through the use of other bonds or of equities. Thus the plan sponsor views the process of immunization as one which decreases yield slightly in order to provide greater assurance that the long term yield will be a precise and definite amount. The investment advisor, on the other hand, views the thirty-year zero coupon bond as an extremely risky investment. Even though a government bond might yield as much as 15% per year over a thirty year period, an investment advisor might well prefer the use of a one year T-Bill because the market value of the

thirty-year bond can subject the first year's yield to very wide variations.

This fundamental difference between the interest of an individual who has invested in mutual funds and a pension fund which is being invested to cover future benefit payments has not been explored thoroughly. The actuarial profession has explored the process of immunization, and in the United States this has led to the adoption by certain plans of dedicated portfolios. The measures being used by the investment community, however, continue to be the conventional investment measures that are intended to appraise investment results over a quarterly period. What is needed is a new set of criteria describing investment risk for pension funds. It simply will not do to continue to follow the myth that somehow or other minimizing short term variations in yield is something for which a pension plan sponsor should be willing to sacrifice any significant investment return.

In general, a pension plan has a safer set of investments with long-term bonds than with short-term bonds. Thus, the usual measure of risk for the bond portfolio is irrelevant. The question is not whether the period is shorter or longer, but how it compares with the duration of the liabilities. For pension plans with liability obligations stretching decades into the future, it seems appropriate to invest the funds with the longest possible duration. Surprisingly, with the exception of zero coupon bonds, the securities with the longest duration are common stocks. Thus, from an actuarial prospective, a pension fund that is invested heavily in common stocks, might well be less subject to the risk of variation in interest rates applicable to reinvested funds over a 30-year period than one which is invested in short-term bonds or ninety-day T-bills. Similarly, an immunized fund that guarantees a pension fund a specific return for the next 5 years ending with cash equivalents may

be far more subject to the risk of variation in the level of the market 5 years out.

Since actuaries view investment results from a specialized prospective, then actuaries should require a specialized set of risk measurements. Alternatively, the actuarial profession is going to have to demonstrate, and widely publicize, just why the conventional measures used by the investment community are inappropriate.