

# **Pension Plan Asset Allocations in an Age of Zero Interest Rates: Risks**

**Thomas T. Amlie**  
**Pennsylvania State University – Harrisburg**

*Since the financial crisis of 2008, the financial markets have been subject to some unusual strains and influences. Many observers believe US equity markets are overvalued, while yields on high-quality debt instruments are at historic lows. In such an environment, managers of defined benefit pension plans may have difficulty finding investments which can yield the levels of returns which are expected, without shouldering excessive risks. The purpose of this paper is to discuss the problems and perils faced by asset managers for defined benefit pension plans, to examine changes in asset allocations over the past 10 years, and to discuss the risks faced in the current environment.*

## **INTRODUCTION**

Defined benefit pension plans provide defined or specified benefits to retirees. In order to fund these payments, firms which sponsor defined benefit pension plans set aside funds in the hands of a pension plan trustee. The pension plan trustee's task is to safeguard those funds, and at the same time invest them in assets which yield some desired rate of return. Since the sponsoring firm has obligated itself to make specified payments, they have an obligation to ensure those funds are available as needed. The greater the return earned on the pension plan assets, the less the firm will have to contribute out of their own funds; hence the desire to earn a high rate of return on these assets. At the same time, if, in the search for high rates of return the firm takes on excessive risk, they run the risk of losing the invested funds, and having to make up the shortfall. Therefore, as with all investing activities, there is an inherent conflict between the goals of earning a high rate of return and avoiding the risk of loss.

## **THE FINANCIAL CRISIS AND RESPONSE**

There has been a recurring cycle of economic expansion and contraction – “boom” and “bust” – which has been especially pronounced over the past 20 years. Many observers attribute the boom and bust cycle to monetary interventions by the Federal Reserve.

In the first years of this century, Fed-engineered reductions in interest rates – in addition to other factors – generated a boom in housing prices. This housing boom carried over to employment expansion in related industries, while the “wealth effects” of increased housing prices led to increased consumer spending and increases in other asset values, especially financial assets. When the unsustainable boom in housing prices came to an end, there followed a collapse of asset prices and economic activity (Ravier and Lewin, 2012).

In an attempt to spur economic activity, the Federal Reserve has pursued a course of “quantitative easing” (“QE”) and “zero interest rate policy” (“ZIRP”) in the years since the depths of the market crash

in early 2009. The supposed benefits from such policies would be transmitted along several different paths:

By reducing interest rates, firms' borrowing costs will be reduced, making otherwise marginal investments attractive. Increased investment activity would thereby spur economic activity;

By increasing the levels of excess reserves in the banking system, and lowering banks' funding costs, banks would have a greater willingness to lend to finance additional investment activities;

By driving down yields on "safer" investments such as bonds, capital would seek out potentially more profitable and risky investments in equity securities, again spurring an expansion of entrepreneurial activity;

The large influx of money balances into the economy would spur wealth growth among security holders, with this "wealth effect" causing consumers to increase their spending, thus spurring economic growth.

This aggressive monetary policy has had an effect on asset prices and interest rates, but the impetus to additional productive economic activity hasn't been quite as successful. The large infusions of money have flowed through to the financial markets, lifting the prices of financial assets. Since the depths of the market downturn in 2009, major stock market indices (S&P 500, Dow 30, Nasdaq 100) have risen by more than 100%, even while questions persist about the fundamental strength of the economy as a justification for these price advances. At the same time, yields on high quality debt securities (Treasury securities and investment grade corporate debt) have fallen by 30% or more. Despite these increases in asset prices, economic growth has remained moribund.

The monetary stimulus provided via the Federal Reserve did have a positive effect on pension plans and their funded status. To the extent that these plans had equity investments, they suffered a dramatic decline in asset values as equity values fell. When the Federal Reserve implemented their "unconventional monetary policy" through asset purchases and reduced interest rates, the values of debt instruments, which have historically been a major component of pension plan assets, increased accordingly (Chodorow-Reich, 2014).

## **HOW CAN FIRMS INVEST THEIR PENSION PLAN ASSETS?**

Given the current extremely low yields on high-grade debt instruments, and equity prices which many believe are overvalued and subject to a sudden reversal, the question of where defined benefit pension plans can invest their resources has become more problematic. One view frequently encountered is that the plan asset managers have to "reach for yield", and will therefore be induced to increase their exposure to more risky investments in an effort to earn their desired rates of return.

### **A Priori Expectations**

The long decline in interest rates has given rise to increased bond prices, and many asset managers have earned positive returns through the increase in the value of their bond portfolios, even while the periodic interest payments have fallen. Now that yields on high quality debt investments are at historic lows, any interest yields are necessarily small. Additionally, given that there's little room for additional downward drift in rates, the potential for additional appreciation of bonds might be likewise limited. These factors would suggest that asset managers might move their funds out of debt instruments and into "equity" and "other" investments in an effort to earn their desired returns.

At the same time, share prices, as reflected by the major stock indices, are also at historic highs. The US economic recovery has been halting, and many believe the equity markets are substantially overvalued with the recent price appreciation being driven by monetary inflation. Many believe that future price appreciation will be limited, if in fact the markets don't suffer a severe correction in prices. A

fear of flat returns – if not of absolute losses – might impel managers to seek out the relative safety of high-grade corporate debt. Although the yields on government securities are low, at least the investor is assured of a return of capital, if not a return on capital.

Given this uncertain investment outlook, where both debt and equity investments are subject to substantial risks, it may be of interest to examine how pension asset allocations have changed over the past several years. Knowledge of the current state of these asset allocations may enable us to make judgments of the current risks faced by these defined benefit pension plans.

### Analysis

In order to examine the changing asset allocations for defined benefit pension plans, data was obtained from the COMPUSTAT database. All US-based firms with defined benefit asset allocations for 2006 and 2014 were selected, and asset allocation information for the years from 2006 through 2014 was obtained. Some firms were missing data for individual years within the 2006 – 2014 time span; limiting the study to only those firms with data for all 9 years curtailed the sample size, while having no appreciable effect on the results.

The COMPUSTAT database provides information for defined benefit pension plan assets invested in “equity”, “debt”, “real estate”, and “other” investments. In examining individual firms’ financial statements, it’s apparent that some firms provide a finer breakdown, including additional categories such as private equity investments, hedge fund investments, annuities, etcetera. Private equity investments are included under the “equity” heading in COMPUSTAT, while hedge fund investments, real estate, and annuity contracts are grouped under “other”.

Once the data was collected, the overall averages for the four categories of investments was calculated for each year. As shown in table 1, the overall level of debt investments has increased over the period under study, while the proportion of the asset pool invested in equity investments has dropped.

**TABLE 1  
PORTFOLIO ASSET ALLOCATIONS**

	Percentage of portfolio invested in:			
Year	Equity	Debt	Other	Real estate
2006	60.5	32.7	4.7	1.5
2007	59.0	33.7	5.3	1.6
2008	51.7	39.6	6.7	1.7
2009	52.7	39.0	6.5	1.4
2010	53.4	38.6	6.3	1.4
2011	50.1	41.3	6.7	1.5
2012	49.6	41.5	7.1	1.6
2013	49.9	41.2	7.1	1.6
2014	46.8	43.7	7.6	1.6

It’s worth noting that in 2006, the ratio of equity to debt investments was about 61:33. By 2014, the ratio had fallen to about 47:44. This large increase in debt investments might have implications for the future safety and solvency of these pension plans. The investment proportions for earlier year – 2003, 2004, and 2005 – were similar to 2006.

## Risks

Normally, debt investments – especially in Treasury or investment grade debt – are viewed as safe investments, while equity investments are more risky. For decades, investments in debt securities (rather than equities) was viewed as evidence of prudent risk-averse behavior. To the extent that the investor is reasonably assured of receiving payment, that view is merited. However, the market value of debt instruments can be subject to significant fluctuations as interest rates change. Given that interest rates are at historic lows, and that there is speculation that the Federal Reserve is about to embark on a program of gradually raising rates, any changes in interest rates are likely to be increases, with a consequent negative impact on bond values.

Generally speaking, yields are higher on longer term debt compared to shorter term debt. In order to attain their target returns on pension assets, firms might be prone to weight their debt investments more towards longer-maturity instruments. At the same time, the values of longer-term instruments are more sensitive to changes in interest rates. Table 2 illustrates the potential impact of increasing interest rates on the value of debt investments of various maturities and types.

**TABLE 2**  
**EFFECTS OF RATE CHANGES ON VALUES OF SELECTED DEBT SECURITIES**

Issuer/Coupon/Maturity date	Years until maturity	Yield to maturity	Price change with 0.5% increase in market rates	Price change with 1.0% increase in market rates	Price change with 1.5% increase in market rates
Burlington Northern RR 3.2% 1/1/45	30	4.26%	-8.37%	-15.79%	-22.37%
30 year t-bond 3% 11/15/45	30	2.91%	-9.25%	-17.38%	-24.56%
Lowes Cos 5.5% 10/15/35	20	4.11%	-6.28%	-12.03%	-17.30%
30 year t-bond 4.5% 2/15/36	20	2.65%	-6.94%	-13.27%	-19.04%
Procter & Gamble 6.45% 1/15/26	10	2.90%	-3.79%	-7.40%	-10.84%
T-bond, 6%, 2/15/26	10	2.25%	-3.88%	-7.57%	-11.08%

As can be observed from table 2, if rates increase there could be substantial losses on any bond investments held. If firms want to earn a yield of 4% or more, they need to be looking at maturities of 20 years or more. For these investments, a one percent increase in interest rates could generate a loss of 12% or more, resulting in additional difficulties in maintaining the funded status of these pension plans.

It may be that pension asset managers have entered into hedging arrangements which will protect them from the potential losses associated with increases in interest rates. Such hedging arrangements are not costless, and to the extent these risks are not hedged the pension plans are exposed to the risk of substantial losses.

One of the stated goals of Federal Reserve policy is to spur a certain level of inflation. Attainment of this goal could have two severe negative consequences for defined benefit pension plans. To the extent that employee wages keep pace with inflation, increases in inflation will increase the expected future pension payout, increasing the measured pension obligation. At the same time, increases in inflation are generally accompanied by increases in interest rates, which would have disastrous consequences for the value of bond portfolios held by defined benefit pension plans.

## REFERENCES

- Becker, B. & Ivashina, V. (2015). Reaching for yield in the bond market. *The Journal of Finance*, 70(5), 1863-1901.
- Bookstaber, R. & Gold, J. (2015). In search of the liability asset. *Financial Analysts Journal*, 71(1), 18-28.
- Chodorow-Reich, G., Lucas, D., & Vissing-Jorgensen, A. (2014). Effects of Unconventional Monetary Policy on Financial Institutions/Comments and Discussion. *Brookings Papers on Economic Activity*, Spring, 2014, 155-227.
- Ravier, A. & Lewin, P. (2012). The subprime crisis. *The Quarterly Journal of Austrian Economics*, 15(1), 45-74.
- Weller, C. & Wenger, J. (2009). Prudent investors: the asset allocation of public pension plans. *Journal of Pension Economics and Finance*, 8(4), 501-525.