

CHAPTER 2
LITERATURE REVIEW

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2.1 Introduction

In 2003, a report in the Financial Analysts Journal argued that in order to capture added value, a pension fund system cannot simply rely on the capabilities and skills of fund managers, it is better to place fewer constraints on management and regulations.

Between 1992 and 1995, alternative assets have been receiving increasing attention in many pension funds. The flow of capital to private equity investments, particularly leveraged buyout funds and venture capital, has increased dramatically. Many public pension funds have invested in other alternative investments such as real estate, foreign currencies, derivatives and some commodities. More recently, pension funds began investing in hedge funds or absolute return. Slux (1995) opined that pension funds need to decide which broad asset classes to invest in. Strategies for asset allocation are the most important part of a pension fund's asset management, as its decisions heavily affect the performance of a pension fund.

2.2 Concepts and Variables

This chapter begins with a discussion of some issues surrounding pension funds in Europe and Commonwealth countries followed by an explanation of alternative investments. As defined by Robertson, Wielezynski (2008) and Groot (2007), alternative investments:

- i.) Are assets other than domestic and global stocks and fixed income assets.

- ii.) Includes private equity, real estate, commodities, hedge funds, foreign currencies and derivatives.

In most cases, alternative assets are a subset of an existing asset class. In this study, three types of alternative assets are studied: private equity, commodity and hedge funds, while traditional assets will include domestic equity, foreign equity, fixed income and MGS.

Private equity is not public traded. Private equity provides the working capital that is used to help private companies grow and succeed. There are four strategies in the market for private investing. First is the venture capital, raising money from investors and invest in start-up companies. Second, there are leveraged buyouts (LBOs) target and take over established mature companies or controlling interest in a company by using significant amount of borrowing money. Third is the mezzanine financing and finally is the distressed debt investing.

Hedge funds are private investment vehicle that pool the resources of sophisticated investors, and allowed to use aggressive strategies including selling short, leverage, swaps, arbitrage and derivative to make capital gain.

2.3 Asset Allocation and Investment Strategy of Public Pension Funds

2.3.1 A Perspective on Public Pension Funds in Commonwealth Countries – United Kingdom

According to Chernoff (2003), a pension fund cannot just maximize its return by using the traditionally efficient frontier method. Many surveys on pension fund asset allocation have been carried out in the US market, Europe and Asian countries.

Groot and Swinkels (2007) have analyzed the question of how much to invest in alternative assets such as emerging markets, real estate, hedge funds, private equity and commodities for a UK pension fund with inflation-protected liabilities. Using data from Thomson Financial Datastream from January 1994 to June 2007, they used the JP Morgan UK Government Bond Return Index, and for global equities the total return on the MSCI World Index. For the alternative investment index, the CSFB/Tremont HFR Index was used for the hedge fund index, for real estate the GPR General Global, and for private equity the Venture Economics Index. The correlation between these asset classes is analysed in the study. Correlations and volatility are the measurement used for allocation decision.

Groot and Swinkels investigated the inclusion of all the emerging markets, real estate, commodities, hedge funds and private equity together as an alternative asset. They showed the optimal portfolio weights according to

standard and robust optimization depending on the expected return on the alternative assets. The results showed that the expected return of alternative assets ranged between 2~3 percent above pension liabilities, the optimal allocation to alternative ranges was between 15~30 percent.

2.3.2 A Perspective on Public Pension Funds in Commonwealth Countries – Australia

Australia Superannuation is a pension scheme in Australia. It has a compulsory element whereby employers are required by law to pay a proportion of an employee's salaries and wages into a superannuation fund. The contribution was originally set at 3% of the employees' income. This was increased to a minimum contribution that has been set at 9% of an employee's ordinary time earnings since 1 July 2002. Superannuation funds are not subject to any asset requirements or investment exposure floors. There is no minimum rate of return requirement or government guarantee of benefits. Consequently, superannuation funds tend to invest in a wide variety of assets with a mix of duration and risk and return characteristics.

Although Australia ranks first in the “Ageing Vulnerability Index”, and the Australia superannuation system has been hugely successful, there are some negatives in the Australia system. The superannuation regime, particularly in taxation rules, is extremely complex and this complexity has created dependence on a large and relatively expensive financial planning industry. While Australian investors are relatively financially sophisticated, there is still insufficient understanding of the portfolio theory and risk/return relationships, and most superannuation investors park their funds in unnecessarily

conservative asset portfolios. There are six main types of superannuation fund – retail funds (33% of share), self-managed funds (22.7%), Public Sector Funds (17.2%), Industry Funds (15.5%), Corporate Funds (8.7%) and balance 2.6% are by others.

An examination of the APRA (2005) statistics suggest that the major changes in aggregate asset allocations by superannuation funds over the past decade have increased in equity exposure at the expense of interest bearing securities. In September 1995 the allocation to equity and unit trusts was 45 percent of total assets. By September 2004 this had grown to 58 percent overall.

A series of papers by researchers at the University of NSW said that the attitudes of mostly larger superannuation funds towards alternative assets had revealed that trustees had a particularly buoyant view of alternative investments as vehicles for enhancing returns while managing returns. In the case of hedge funds, an international study of large institutional investments in alternative investments suggested that the Australian pension fund expected a return over 10 percent in 2007. According to a survey by a Sydney based rating firm, SuperRatings, significant unlisted alternative assets have helped propel Australia's superannuation funds to their best returns in a decade. The return for 2005–06 financial years was 15.65 percent, which is 1.2 percent higher than the previous year.

2.3.3 A Perspective on Public Pension Funds in China National Pension Fund (National Social Security Fund)

China's pension and sovereign wealth funds are expanding their investment into overseas equities and private equity. In 2006, the nation's \$200 billion sovereign wealth fund bought a \$3 billion stake in the world's largest buyout fund (Blackstone Group LP). In June 2008, the Chinese Pension Fund announced it was going to invest up to 10 percent of its assets in private equity funds. However, although the fund is permitted to invest in domestic yuan-denominated private equity funds it is not yet allowed to commit to any foreign private equity funds.

2.3.4 A Perspective on Public Pension Funds in America

According to Healey and Hardy, the largest funds in the United States and Canada in 1995 had almost \$70 billion committed, a 92 percent increase from 1992. The starting point and most important element of CalPers successful return on investment is asset allocation, which is diversified among stocks, bonds, cash and other investments.

Robertson and Wielezyski (2008) examined how alternative assets such as hedge funds, private equity funds and real estate affected public pension fund performance from 2002 to 2006. Data was gathered from a large public employee pension system in each of the 50 states and the District of Columbia. The number of pension plans in the sample allocation assets to alternative investments increased from 37 funds in 2001 to 45 funds in 2006. The results show that public pension plans with at least 10 percent of their

assets allocated to alternative investments had a significantly higher annual return in years 2004, 2005 and 2006. Turning to risk, they found that pension plans that invested in alternative assets had higher standard deviations in returns over the five years period, regardless of the size of the allocation. However, in measuring risk-adjusted returns there were no significant differences between pension plans that invested in alternative assets and those that did not. Robertson and Wielezynski also explored whether hedge fund investments boost performance but found no significant difference in investment returns for public pension plans with hedge fund investments in 2006; this is largely because of the lack of information for their research.

2.3.5 A Perspective on Public Pension Funds in Canada (Canada Pension Fund, CPP)

The yield on the Canadian benchmark 10 year government bonds has fallen to an annual average of 4.9 percent since the start of 2000 compared with 7.6 percent in the 1990s. According to Bloomberg news in 2007, the three largest Canadian public pension funds earned 30.7 percent on average from private equity holdings in 2006, helping increase overall return to 13.6 percent. Canadian pension funds began pursuing their own takeovers in the 1980s because there were few domestic private equity firms. Onex, which is the largest Canadian buyout firm, has purchased 57 companies for about 10 billion dollars since it was founded in 1983. Another buyout firm, Blackstone, has bought more than 300 companies, totalling \$200 billion, since it started in 1986. The Canadian Venture Capital and Private Equity Associate shows that Caisse de depot was the most active Canadian buyout investor in 2006, they

had 16.8 billion dollars in private equity or 12 percent of its assets at the end of 2006. The CPP current asset mix (1997) is 51.8% in public equity, 25.6% in fixed income, 10.9% in private equity and 11.7% in inflation sensitive assets, which totals 22.6% in alternative investments.

2.3.6 A Perspective on Public Pension Funds in Asia – Japan

The Japanese stock market has been quite weak, consequently, many pension funds are experiencing underfunding. Japanese Pension Funds may move up to \$7.5 billion into alternative investment, including hedge funds, market-neutral funds, buyout and venture capital vehicles. So far, Japanese Pension Funds have warmed more to absolute-return strategies, such as market-neutral products, and targeting absolute returns of 10% to 15% from Japan Hedge Funds. Furthermore, they also decided to move into private equity, LBO and venture capital.

2.3.7 A Perspective on Public Pension Funds in Asia – Korea

Alternative investments accounted for 2.5% of the Korean National Pension Service funds in 2007. South Korea's National Pension Service (NPS) has mandated Morgan Stanley Investment Management and Credit Suisse Asset Management to manage certain NPS assets. MSIM has expertise in alternative investment and overall portfolio strategy. NPS aims to increase its alternative investments to 10% in the near future.

2.4 Models

2.4.1 Equity

Healey and Rozenov (2004) studied the 200 largest defined benefit pension funds in the US. They found that equity allocation increased its share from 48 percent in 1991 to 57 percent in 2001. They also reported that funds were increasingly allocating to alternative investments such as real estate as well as enhanced indexes equities and bonds. According to Black et al. (1989), the role of equities in the portfolio of a pension fund are used to achieve a higher expected return and meet the pension obligation in the future while helping to lower expected pension costs. He reported asset allocations of more than 300 UK pension funds, and found that the allocation practices of funds have remained rather steady from 1986 to 1994. One observes the high allocation of equities, which is 78 percent and 14 percent in fixed income. Further, stocks should also be viewed as a hedge against a potential increase in pension liabilities.

Peskin (1997) argues that pension fund's equity exposure is critical to the future contribution cost. However, the equity exposure varies between pension funds, and the optimal equity exposure to each fund depends on the weight attached to surplus value and growth in the workforce. United Kingdom pension funds have traditionally had higher weightings in equities than pension funds in any other country. One of the main reasons for equity bias is the inflationary expectation in the economy. The UK has a high inflation rate relative to many other countries and real assets, such as equities, have been important in achieving real returns.

Global Equity includes both matured market equity and emerging market equity. This asset class provides a great way to participate in foreign growth.

2.4.2 Private Equity

Typically, Private Equity is the investment strategy of investing in companies before they issue their securities publicly, or making a public company private. Private Equity is a class of investment that participates in leverage-buyout (“LBO”) and venture capital. The Canadian Public Pension Fund earned 30.7 percent on average from private equity investment, which brought an overall return of 13.6 percent during 2006 (Bloomberg, 2007). According to Anson (2005), many pension funds access to Venture Capital industry through investment funds in 1980s.

2.4.3 Real Assets

Real Asset investments are considered to be an essential part of a diversified investment portfolio and most desirable during periods of inflation. Therefore, pension funds include real assets in their portfolio. Real Assets include real estate and commodities. They are tangible (as opposed to paper assets) and they are a good hedge to inflationary forces. Hydson-Wilson, et al. (2003) provide several reasons why real estate should apply to the pension fund world. Pension funds are usually a risk-sensitive investor, they have great concern for capital preservation and target rate of return. In addition, they hedge against inflation because their future benefit payments happen in real terms. Further, pension funds have a heavy demand for cash and liquidity requirements to satisfy the liability stream.

2.4.4 Absolute Return/Hedge Fund

Hedge Funds have become an important asset class in recent years. Danielsson, Taylor, and Zigrand (2005) have analyzed the costs and benefits of hedge funds, and they note that hedge funds contribute to economic efficiency by enhancing price discovery and providing additional diversification. Ideally, a hedge fund offers diversification benefits without a large reduction in expected return. University endowment funds in the US have benefited by this approach (Darius, 2002). Phelim and Sun found that corporate and public pension plans have adopted a more cautious and gradual move into hedge funds. In 2002, the California Public Employees Retirement System invested \$50 million in five hedge funds under Risk Managed Absolute Return Strategies and has earned 9.5% annualized return on investment compared with 7.4% return for benchmark over the past 5 years. Hedge funds provide flexibility to move in and out of markets, making them a suitable alternative asset class for many investors.

According to Schneeweis (1996), hedge funds provide superior risk-adjusted returns and low volatility, and show evidence of low correlation to traditional assets such as stock, bond, and currency markets. Some pension funds are now beginning to accept levels of 5 to 15 percent of portfolio holdings allocated in a hedge fund. Gregoriou and Rouah (2001) have outlined that the inclusion of hedge funds in US portfolios represents a unique and proven opportunity for pension funds to protect their investment during bear markets. Hedge funds are considered illiquid investments, pension funds that wish to invest in this alternative asset class must have a long-term outlook.

2.4.5 Fixed Income

Bodie et Al. (1999) argues that a pension fund should not invest in equities at all, a fund should invest in fixed income assets. Fixed income is an asset class that produces a stable flow of income. It provides greater certainty than other asset classes. Blake suggests that fixed income investments are encouraged by regulators simply because the discount rate used in pension liability calculated by actuaries and accountants is based on bond yields. This means that in order to avoid the short-term mismatch between assets and liabilities, pension fund asset allocation should be more heavily weighted towards bonds.

2.5 Asset Correlation

Groot and Swinkels (2007) analyse the correlation between the asset classes such as liabilities, cash, bonds, equities, real estate, commodities, hedge funds and private equity in the UK from 1994 to 2007. The alternative assets show a high correlation with equities, however, the commodities have low or even negative correlations. The study adopted by Gregoriou and Rouch (2001) is to investigate the role of hedge funds in pension fund portfolios. They found that hedge funds provide superior risk-adjusted returns and low volatility; this shows evidence of low correlation to traditional assets that consist of stock, bonds and the currency market. The hedge funds have low volatility and superior performance during negative S&P 500.

Anson (2006) compared the correlation coefficients between S&P 500 and FTSE 100 stock indexes for the past 15 years and found that stock prices in the two countries are less perfectly correlated with a correlation coefficient of 0.87. He also compares the correlation coefficient in the crude oil listed on the

New York Mercantile Exchange and International Petroleum Exchange in London, the correlation is 0.98. However, the US and UK stock markets are negatively correlated with the price of crude oil. M. Craft (2001) adapted the asset correlation matrix and noticed the relatively low correlation of both public and private real estate with stocks and bonds. As a result, it leads to the high allocation of real estate in pension fund portfolios.

2.6 Asset Allocation and Markowitz Portfolio Theory

Asset allocation is allocation of an investor's portfolio across a number of asset classes. It is an investment profile that provides a framework for constructing a portfolio based on measures of risk and return. Asset allocation can trace its roots to the Modern Portfolio Theory (MPT) and the work of Harry Markowitz.

The introduction of the Modern Portfolio Theory (MPT) in 1952 by Nobel Laureate Harry Markowitz was the first attempt to explain the relationship between risk and return in investment portfolio. The contributions of the MPT to investment theory and practice resulted in the development of a journal risk-return framework, in which statistical techniques are used in investment decisions. One technique developed by Markowitz is called "efficient frontier" for a given number of securities. Portfolios that lie along the efficient frontier provide investors with optimal risk-return characteristics, making them a mean-variance efficient portfolio.

M. Craft (2001) mentioned that in the typical mean-variance model of portfolio allocation, pension manager's objective is to minimize the risk of the portfolio

subject to a given level of return. By varying the return between the minimum variance portfolio risk and the maximum variance portfolio return, the manager can trace out the efficient frontier. Craft has applied the standard Markowitz mean-variance model to estimated portfolio allocation consisting of common stock, long and intermediate-term government bonds, private real estate and public real estate. Gregoriou and Rouch (2001) used the efficient frontier to measure the trade-off between risk and return of traditional portfolios, through the incremental additions of hedge funds.

2.7 T-Test Statistic Model

Robertson and Wielezynski (2008) proposed a two-sided test to compare mean investment returns of pension funds with carrying percentages of assets dedicated to alternative investment. They combined real estate and hedge funds as alternative investments. A t-test was used to determine whether there was a significant difference between the two sets of scores. The 95 percent confidence interval indicated that 95 percent of the time the interval specified would contain the true difference between the population means, which is pension fund with and without target allocation of alternative investment.

In the first step, Robertson and Wielezynski compared the mean investment returns of pension funds with alternative asset allocation targets greater than zero to funds with no target allocation for these alternative assets. Target allocations were zero, 5 percent, 10 percent, 15 percent and 20 percent. However, they only report the basic result for zero, 10 and 20 percent as the results were the same at 5, 10, and 15 percent. Gregoriou and Rouch (2001)

also measure performance between a typical US pension fund and a pension fund containing a hedge fund, which is categorized as alternative investment, added uniformly at different levels of 5 percent, 10 percent, 15 percent and 20 percent.

2.8 Yale Model

The Yale model is currently used as an endowment fund for Yale University, and consistently gained a high investment return – 16.3% annual net investment return. Over the past ten years, the fund grew from \$6.6 billion to \$22.9 billion. The Yale model concentrates more on equity investment, it consists of domestic equity (11%), global equity (15%), real assets (28%), hedge fund (23%), fixed income (4%) and private equity (19%).

An argument arises from Guy Fraser (2007), who questions whether the Yale Model could and should be adopted by pension funds in Europe. Guy Fraser deals with the risk, correlation and liquidity, and suggests that the traditional risk model is no longer appropriate for modern investment approaches. He also contends that the existing view of liquidity and solvency is mistaken, and pension funds actually require far less liquidity.

2.9 Summary

The scope of study for this chapter is to review some impacts of alternative investment in other countries including the United Kingdom, Australia, United States of America (California Pension Fund), Canada and the intention of adding alternative assets such as hedge funds and private equity in some Asian countries like Japan and Korea. Groot and Robertson emphasize the

benefits of investing alternative assets in the UK and US pension funds, respectively. It is also indicated that the pension fund model in many countries allows portfolio diversification, largely through investment in overseas markets

In addition, studies have also been done on some variables, including equity, private equity, real assets, hedge funds and fixed income. Each asset has its own influential power on the portfolio return.

As to asset correlation, Schneeweis found that alternative assets have a low correlation with traditional assets such as stock and bond market. This chapter also covers the importance of portfolio optimization and the Markowitz Portfolio Theory.

By using the Statistic t-test, studies have shown the significant difference for returns and standard deviations between pension funds with different alternative target allocations, and finally justify their performance.