Reforming of Punjab Pension Funds: Funding Strategies and International Diversification

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ABSTRACT: Pension fund is a one of the largest source of capital investment in any economy which represents major part of GDP and is allocated from government budget. As it is considered heavy burden by Government, so policy makers are more concerned of this threat. Ageing of population is an increasing trend which tends to increase liabilities rapidly at high level and it becomes essential to review pension system of Pakistan. In case of Pakistan the pension system is pay-as-you-go where government offers predefined benefits to pensioners which latterly converted in fully or partially funded pension schemes. The whole world specially developing countries is facing downsizing economically, workers face insecurity about jobs; therefore they are more concerned about pension fund. Three pillars of pensions are working in pension system of Pakistan i.e. private workers as EOBI, pension schemes of provincial & central Govt. and registered individual persons. Under the current regulations of Punjab pension fund international investment of pension fund assets is prohibited, in this paper I want to explore the effect of international diversification of Punjab Pension fund and effect of the return from that investment on Punjab pension fund keeping in view the respective risk for this diversification.

Perhaps Punjab is largest province with respect to population and there is no comprehensive study on government of Punjab pension. This study will explore new area of research and it will be beneficial to contribute positively in order to help the government in managing pension fund.

Keywords: *Pension fund, GDP, Private workers as EOBI, Govt., registered individual persons, diversification*

INTRODUCTION

Pension fund is a one of the largest source of capital investment in any economy which represents major part of GDP and is allocated from government budget. As it is considered heavy burden by Government, so policy makers are more concerned of this threat. Ageing of population is an increasing trend which tends to increase liabilities rapidly at high level and it becomes essential to review pension system of Pakistan. In case of Pakistan the pension system is pay-as-you-go where government offers predefined benefits to pensioners which latterly converted in fully or partially funded pension schemes. The whole world specially developing countries is facing downsizing economically, workers face insecurity about jobs; therefore they are more concerned about pension fund. In 2003, Government of Punjab formed a working group to study its existing management of liabilities to give suggestion about structure and reforms (Repot of Cheema), as a result in March 2007 Government of Punjab set up Punjab Pension Fund under Punjab pension Act 2007. Punjab Pension Fund has been disclosed the assets of the Pension Funds of Rs. 3 billion first time since June 6, 2009. As on March 31, 2012 Current assets are 15.114billion, Punjab pension fund revenue is 5.4% of GDP (Feb 2012, Monthly Review of Investments). In 2011 the Punjab pension fund revenue was 5.8% of GDP. Due to the decrease in pension revenue and increase in liability it is required to use aggressive strategies

to deal with this problem in future. Elderly population has increased 7.34 million to 11.9 million in 2013 and it is estimated that it will increase 23.76 million in 2030 (Pakistan ageing in population 2002)

Three pillars of pensions are working in pension system of Pakistan. Pillar 1 is for private workers as EOBI, Pillar 1, 2 is for both provincial and central Government Pension Schemes and Pillar 3 is for voluntarily pension funds for the individuals having NTN. (Rehman, 2010)

Under the current regulations of Punjab pension fund international investment of pension fund assets is prohibited, in this paper I want to explore the effect of international diversification of Punjab Pension fund and effect of the return from that investment on Punjab pension fund keeping in view the respective risk for this diversification.

Perhaps Punjab is largest province with respect to population and there is no comprehensive study on government of Punjab pension. This study will explore new area of research and it will be beneficial to contribute positively in order to help the government in managing pension fund.

Fahd Rehman (2009) suggests that Punjab pension funds to be diversified. Wade D. Pfau (2007) suggests reforms in Pakistani pension system as demographics of Pakistan mortality and fertility rates both are decreases.

Research Question:

- What is the impact of Mortality rate, Inflation rate and Life Expectancy on Pension liability of Punjab pension fund?
- What is the impact of internationally diversified portfolio of Punjab Pension Fund on its performance?

Objectives:

- To Developed a hypnotized model to calculate the liability of Punjab pension fund instead of actuarial study conducted annually.
- To Review and evaluate the performance of Punjab Pension Fund policies.
- To give suggestion about increase in returns by international diversification as government is facing monetary constraints of budget deficit.
- To provide the government the better way to evaluate future liabilities and to give some investment strategies.
- To review critically the existing Punjab pension fund investment strategy.

LITERATURE REVIEW

(Roldos, 2004) argues that pension funds can provide many advantages to local financial markets that are providing the basis of demand for long-term liabilities, improving the governance of financial markets. (Iglesias & Palacios, 2000) says that mismanagement of pension funds can also be a problem; also he gave an international evidence about the tendency for low returns among public pension systems of developing countries. Policy makers all over the world consider the new reforms of their respective country in pension system due to increasing old age dependency ratio in emerging counties. Pakistan also faces the problem of aging due to high fertility and lower mortality rate. Elderly population is continuously increasing in Pakistan and according to an estimate it will be increased up to 15.7% in 2050(united nation 2004). Inflation risk, interest rate risk and longevity risk are the main risks which are specifically associated with pension fund liabilities. Nobuyuki Nakagome (2005) the improvement mortality rate is because of the development in medical technology, improvement of diet and funding of social security. (McKeown, 1976) and (Fogel, 2004) concluded that mostly the increase in life expectancy is due to improved health conditions and

nutrition. In developing countries health conditions and nutrition is more concern (Cutler & Lleras-Muney, 2006) (Dorfman & Shajenko, 2009) consider that the people of low income in emerging economy should be protected by offering flat rate pension and full indexation advantages to avoid financial crises. Inflation is accounted for as a major factor in indexation by Punjab government (indexing pension 2009).

As the Population aging has been increased so the sustainability of public pension systems is the most important to consider (OECD 1998; World Bank 1994). While calculating the pension liabilities the transfer from young to the aged population is much more concern (Marchand and Pestiau, 1991). The retirement income should therefore depend on the years of service (Diamond & Mirrlees, 1986). Many retirees receive other source of income then pension portion of total income in countries where pension system is less liberal (Disney & Johnson, 2001). International diversification provides many benefits because they are not related with country specific rik (Solnik and Mc Leavey 2009). (Asher, 2008)argued that, pension fund allocation particularly in Asian countries, is greatly influenced by tight government policies and regulations that do not necessarily benefit members.

(Markowitz, 1952) give the theory of maximum returns on assets by diversifying assets which have low or negative correlation at given or low level of risk.

Empirical studies show that currency risk is slighter than the threat of the corresponding stock market (Solnik, 2005). By using asset swap without disturbing the local capital market (Bodie and Merton 2002) with the expansion of pension funding asset diversification became emerging issue in pension fund management (Giang & Pfau, 2008). Portfolio diversification also reduces systematic risk which is not possible in domestic market. Lack of supply and diversity in local market also increased importance of international diversification (Roldos, 2004). (Levy & Sarnat,

1970) argued that US investors, depending on the assumptions used for the risk-free rate, between 49 and 73 % of the portfolio should held in international assets.

Research plan:

My research question is to calculate the estimated liabilities through proposed model after diversifying the portfolio of Punjab pension fund. In order to do this, I used many actuarial studies also read American Academy of Actuaries analysis and then variable for the model were being selected. The objective to do such types of research is to suggest Punjab pension that if they will diversify their portfolio internationally then they can earn well in return to invest more on the old age population and the aging population of Pakistan especially in Punjab can get more benefits from Punjab pension fund. The variables that are used to calculate the expected future liability are given below.

- ✓ Life expectancy
- ✓ Mortality
- ✓ Inflation
- ✓ Average age above 60
- ✓ Expected behavior of employee
- ✓ Average pay (scale wise)

THEORETICAL FRAMEWORK
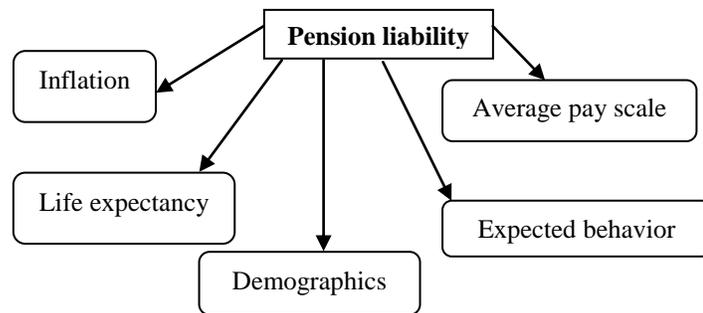
DATA AND METHODOLOGY

Data for this research has been taken from the website of united nation and the web site of Punjab pension fund. Average pay scale of employees is given according to age

wise distribution of active employee. I have calculated the average salary of employee for this purpose from report for the time period of 2007, 2009 and 2010. Further I assume this increased till 2015 at the rate according to historical trends

Using the least square regression model I have calculated the pension liability and diversified portfolio by maximizing return and minimizing risk by using Markowitz theory of diversified portfolio optimally

Equation

Following model has been used for this study

$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + u$

Pension liability $= \beta_0 + \beta_1$ (Mortality rate) $+ \beta_2$ (Inflation rate) $+ \beta_3$ (Life Expectancy) $+ u$

Hypothesis

Null hypothesis:

H_1: Mortality rate has no effect on pension liability ($\beta_1 = 0$)

H_2: Inflation rate has no effect on pension liability ($\beta_2 = 0$)

H_3: Life expectancy has no effect on liability ($\beta_3 = 0$)

Alternative Hypothesis:

H_1: Mortality rate has negative effect on pension liability ($\beta_1 < 0$)

H_2: Inflation rate has positive effect on pension liability ($\beta_2 > 0$)

H_3: Life expectancy has positive effect on pension liability ($\beta_3 > 0$)

EMPIRICAL RESULTS & DISCUSSION

Above results show that the coefficient of mortality is – 0.032, which is affecting negatively the pension liability of Punjab pension fund. 1% increase in mortality rate pension liability decreased by 0.032.because as death rate increased in economy pension liability decreased accordingly.

The coefficient of inflation is 0.146, showing that if there is 1% increase in inflation the pension liability will increase by 0.14 billion.

The coefficient of life expectancy is 19.297, which is affecting positively and showing that by 1 year increase in

life expectancy the pension liability will increase by 19.297 billion.

R-square=0.993 which shows that this model has high explanation power and independent variables efficiently explaining the dependent variable, where the value of R^2 which is 0.9937 is good enough to explain the model, showing strong explanation power of the independent variables for the dependent variable.

Correlation between life expectancy and inflation is .044 which shows life expectancy and inflation are not perfectly correlated.

Correlation between life expectancy and mortality is .90 which is higher correlation but it is also not a perfect correlation, this high correlation is due to interpolation in these two variables which is used in this model because of non-availability of the data.

Correlation between inflation and mortality is .52 which is not perfect correlation so this fulfills the assumption of not perfect correlation between independent variables.

For the purpose of hypotheses testing H0 shows that there is no relation between morality and pension liability, against the alternative that mortality has negative impact on pension liability. Because p value of b1 is .001 which is less than the threshold value of 5% so I rejected H0 in favor of H1. It also makes logical sense that when death rate increased the liability of pension fund in Punjab pension fund decreased.

While in case of second hypotheses of coefficient which stat that inflation has no effect on pension liability against the alternative that inflation has positive impact on pension liability. Its p value is 0.177 which is greater than the threshold p value so the null hypothesis do not rejected. It means that the coefficient of pension liability (β_2) is statistically insignificant at 5%.

While the null hypothesis of in (β_3) stat that life expectancy has no effect against the alternative it means that it has positive impact on pension liability because its p value is less than the threshold p value. So the null hypothesis is

rejected and we can say that life expectancy is statistically significant at 5% confidence level.

CONCLUSION & LIMITATIONS

Result proves that life expectancy has positive impact on pension liability this result also matches with Nobuyuki Nakagome (2005). The inflation has no impact because funds make adjustment with the interest rate which is earned on investment of fund. While the mortality rate showed negative impact because as death rate increased then liability of pension has decreased.

Limitations of Research

This model has some problem of multicolinerity due to interpolations of variables for data collection .Major issue with this research is the unavailability of data and these issues can be resolved by using some corrective measures. If there is availability of data for this research so finally it can be concluded that either Punjab pension fund of government of Punjab can diversify its portfolio or not to get the maximum benefits for the old population of country and through diversification while earning more revenue the Punjab pension fund can facilitate the old retirees of Punjab.

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Root MSE
=1.0233

Appendix

Table 1

Source	SS	df	MS	Number of Obs =11
Model 1	1161.18413	3	387.061377	F(3,7) = 369.62
Residual	7.33024576	7	1.04717797	Prob > F = 0.0000
Total	1168.51438	10	116.851438	R-Squared = 0.9937 Adjusted R-Squared =0.9910

Table 2

Pen-Lib	Coef	Std. Err	T	p>|t|
Mort	-.0324169	.0063262	-5.12	0.001
Infl	.146453	.0976371	1.50	0.177
Life exp	19.29779	1.041789	18.52	0.000
Cons	-1019.368	37.2129	-27.39	0.000

Table 3

	Lif exp	Infl	Mort
Lif exp	1.0000		
Infl	0.4490	1.0000	
Mort	0.9045	0.5259	
			1.0000