

Pension for All

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Abstract :

This paper is an attempt to find answers to the simple questions that a common man may face when saving for old age. With defined contribution (DC) pension likely to become the norm, the growth rate in the population of persons above 60 surpassing the growth rate of the general population and taking into consideration the fact that only a very small proportion of the population in India are covered by any old age security scheme, this paper aims to provide simple answers to the How Much, at What Rate, for How Many years and where to invest during active service life, to provide for pension during old age. It is sincerely attempted to find a relation between the rates of accumulation of the corpus fund to the interest rates that may be available during the pension period.

Over two-thirds of the country's working population will depend on their children as the only source of old-age retirement security wrote The Economic Times on 26th April 2005 quoting the results of a nation-wide sample survey on the Indian workforce by the Pension Fund Regulatory and Development Authority (PFRDA) and the Asian Development Bank to judge how the pension system for the unorganised sector should evolve in the country.

According to the Project OASIS Report, **less than 11% of the estimated working population in India is eligible to participate in a formal pension system**

Less than a sixth of those about to retire in the next decade are covered by some form of pension, and only 2 per cent of those not working in government will be able to fund their retired lives if they cut expenses by half, according to an all-India survey done by the Invest India Economic Foundation (IIEF) quotes The Business Standard, 18th July 2005.

- Can a person with sufficient financial discipline, save for his retired life?
- If so, the questions that will certainly come to his mind are the following.
- How much to invest?
- How many years to invest?
- At what rate to invest?
- What is the required pension at the end of active service years?
- How many years pension is needed?
- What will be the interest available on accumulated corpus?
- Where to invest?

This paper is an attempt to find answers to these questions subject to certain assumptions.

Assumptions

A simple model of a person with the following parameters is considered to arrive at the answers to the above questions.

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|--------------------------------|----------------------------------|
| 1. Starting salary | Rs.1000 |
| 2. Annual increase | 5% |
| 3. Active service years | 30 |
| 4. Monthly savings for pension | 10% of salary |
| 5. Replacement Ratio | 0.5 to 1 |
| 6. Starting Pension | Final Salary X Replacement Ratio |
| 7. Pension Years | 20 |
| 8. Annual Increase in pension | 5% |

9. Taxes	neglected
10. Other Investment expenses	neglected
11. pension commutation	None

The Pension Fund

In simplest terms, a pension fund could be considered as a corpus of money which is accumulated during the earning period of an individual by regular installments at interest rates that matches the investor's expectations and the associated risk. There are several options available to invest and if left to the investor to choose, he will do so depending on his attitude to risk. This corpus nurtured over the period of active service life reaches its maximum at a certain time determined by the investor / service conditions after which the depletion starts by drawing a pie out of this corpus every month for a specified number of months. If this depleting corpus is able to earn interest also, it will be sustained for a longer period.

The amount of interest that is added to the corpus during the pension period may or may not equal the pension that is drawn. For example, Ref Chart-1 that show the amounts invested during 360 months of active service, depleting in the next 240 months together with the interest earned on the corpus. Chart-2 shows the accumulation and depletion of the corpus over the period of 600 months.

How much to invest?

This is a question which cannot be answered in isolation. It depends on how much pension the person needs after certain years of service life, how many years he can save, how many years the pension is required, the rate of interest at which the corpus is accumulated and the rate of interest that may be available on the depleting corpus during the pension period.

For example, it could be seen from Chart-3 that if a person can save 10% of his salary every month with salary increasing 5% per annum for 30 years at an average rate of interest of 12% pa and needs a pension which is 50% of his final salary for 20 years increasing at 5% pa, he will need an interest of 3.9% on his corpus during the pension period. Similarly, the same person if able to accumulate at a rate of interest of 14% pa, will have sufficient corpus at hand to draw pension which is 50% of his final salary for 20 years increasing at 5% pa.

The investment horizon being wider, spread over 30 years of service life, it is difficult to predict the rate of interest that may be available for accumulation and the interest that may be available during the pension period. Hence we try to find the answer to a rather simpler question, how much pension is needed, before attempting any other question.

Replacement Ratio

Replacement Ratio is defined as the ratio of post retirement expenses to pre retirement expenses. It is reasonably assumed that a person would have fulfilled his family responsibilities like children's education/marriage, acquiring a house etc during active service life time. Also the personal expenses that are incurred per month post retirement will be considerably less than that during the service life due to reduction in conveyance expenses, change of life style etc. Hence we assume that the required pension per month will only be a certain percentage of the final salary drawn by the individual during active service life. In this model, we consider replacement ratios between 50% and 100%.

How much Pension is needed?

This is rather the simplest of the questions to answer. In the context of the prevailing economic scenario in India, it would be reasonable to assume that the inflation in the coming years may hover around 5%. Hence to tackle this inflation, an increase of 5% per annum in the salary of the individual is assumed. Thus the final salary of a person with a starting salary

of Rs.1000 per month with an active service life of 30 years will be Rs.4116. The starting pension at the end of next month will be a certain percentage of the final salary depending of the replacement ratio chosen by the individual. Again to take care of inflation, we assume an increase of 5% per annum in the pension.

How many years to invest?

This depends on the number of active service years of the individual. Although this model assumes an active service life of 30 years, the same may vary between individuals. For salaried persons, a certain percentage of salary could be invested separately in a fund specifically meant for old age. In case of such individuals, the accumulation period is the active service period before retirement. For self employed and other individuals where there is no fixed upper age for service, the number of years of service is determined by the state of health and other personal considerations.

At what rate to invest?

The rate of interest for accumulation depends on the following.

The investment horizon being spread over 30 years, it is difficult to predict a single interest rate that will apply. The interest rate as given in the chart-3 is an average achievable interest rate to build the required corpus to fund the post retirement years.

The selection of interest rate depends on the risk appetite of the individual as the risk associated with any investment portfolio is directly proportional to the rate of interest.

With reference to chart-1, during the accumulation phase, the major component that builds the corpus is the interest while the monthly component is only 10% of the salary increasing at an annual rate of 5%. Hence even a small increase in the interest rate will be greatly reflected in the corpus.

The minimum interest rate required for accumulation will be a function of the number of years of pension, the interest that may be available on the corpus during pension period and the replacement ratio. Chart-3 shows five options with replacement ratios varying from 50% to 100%

The following table shows the interest rates that may be available on the corpus during pension years as a function of the interest rate during accumulation of the corpus for an individual with starting pension which is 50% of the final salary (Other variables as assumed above)

Interest for Accumulation	8%	10%	12%	14%
Interest during pension years	12.17%	7.86%	3.89%	0.18%

If a person can invest at the prevailing risk free rate (e.g. Post Office deposits, GOI bonds etc) of 8% for 30 years, he will need to scout for an interest rate of over 12% on his accumulated corpus during his pension years. Similarly, if a person can invest at an interest rate of 12% pa (which seems feasible), the required interest rate on the accumulated corpus during pension years will be less than 4%. Refer to chart-4 for interest rate comparison with employer contribution. For those individuals who are lucky enough to get a matching employer contribution, if they could invest 10% of their salary every month at an average rate

of interest of about 11% pa, the built up corpus will be sufficient to fund their pension at a replacement ratio of 50%.

How many years pension is needed?

This is dependent on the life span of the individual after retirement. We assume here that any person will live for another 20 years after retirement. Providing pension during old age is all about depletion of the corpus accumulated over the active service years. Larger the pie that is drawn out of the corpus, shorter it will last. Based on the assumptions set out above, chart-5 gives how long the corpus will last for different replacement ratios.

How much to save? (Revisited)

How much a person can save from his monthly salary solely depends on the lifestyle of the person, saving habits, incentives for saving, and taxes. In addition to saving for old age, there will be other compulsions to save a considerable proportion of his salary for acquisition of assets like own house, family responsibilities like education / marriage of children and other needs. However going by the New Pension Scheme of Government of India, it is assumed that a person will compulsorily save an amount of 10% of his salary towards pension. A matching contribution by the employer is a privilege enjoyed by a small percentage of the work force. The amount of investment need not be a constant proportion of the monthly salary but can vary over the period of accumulation. A person may be able to save more in risky portfolios during initial service years while the amount invested may be less during the later years. Moreover the returns from investments will also be lesser as the person will choose portfolios with lesser risk/returns as he nears retirement.

Where to invest?

There are a host of investment vehicles available to achieve the required growth interest rate. While some provide risk free returns, others provide higher returns with associated risk. We consider the pros and cons of some of these choices below.

1. **Post Office Savings.** Generally considered the most risk free form of investment. Current interest rates are around 8% pa. When considered with the tax benefits may provide returns slightly higher. As per our model savings at interest rates of around 8% may be grossly insufficient to provide the required pension during the old age.
2. **Bank deposits and FD's Considered** risk free but the associated returns are currently less than the Post Office Savings.
3. **Mutual Funds.** The mutual fund industry in India has grown substantially during the last 2 decades. Currently the Mutual funds manage assets of more than 150537 Cr of rupees as on December 2004. Mutual funds also come in different hues and shapes that match the investor's palette. There are the considerable risk free debt funds to highly risky equity and sector funds. Overall, the mutual fund industry has performed very well in India with an average returns higher than other investment choices. An investor can choose from the different mutual funds available to match his expected returns.
4. **Share Market.** The share markets are considered to be the most risky of the options available. But they can neither be neglected as the share markets have consistently provided higher returns over a longer investment horizon. With the advent of online trading facilities, it has become a lot easier for an average investor to trade on the stock market. The BSE sensitive index currently hovering more than 9000 when compared with a value of about 125 in the year 1979 has delivered around 18 % returns with of course much of volatility.

How to save for Pension?

Once the answers to the above questions are found, what is the strategy one should adopt to live a secured life post retirement. Following are some guidelines.

1. **Invest as much as possible.** It would be easier to invest more during initial service years when the family responsibilities are limited. Ironically this is the period when one would be tempted to live an extravagant life. It is the interest component during accumulation phase that builds the corpus than the contribution. More amounts invested earlier will earn more interest during all the service years. Moreover as years pass by family responsibilities will build and there will be other compulsions to save for house, children's education etc.
2. **Take more risk.** During initial years of service, an individual would be in a position to invest in risky investments like company shares and mutual funds. Investments in such portfolios are likely to appreciate more over the longer period. As years pass by exposures to risky investments could be reduced and more amounts may be invested in risk free portfolios.
3. **Choose your Portfolio.** The portfolio for investment should contain an appropriate percentage of both risk free and risky assets. Going by the recommendations of PFRDA, individual investor may consider investing in index shares, GOI bonds etc. The proportion will depend on the risk aptitude of the individual investor. The proportion will also change over the years of the investment.
4. **Scout for higher annuity.** After retirement, its depletion time for the accumulated corpus. The only addition to the corpus will be the interest earned which may be more than the monthly pension drawn. Hence to prolong the corpus for longer pension years, scout for higher interest rate on the corpus.
5. **Change life style.** Change in life style after retirement will have considerable reduction in the replacement ratio. Lesser pension requirement per month will make the corpus to last longer.
6. **Employer contribution.** A matching contribution by the employer is a privilege enjoyed by a small percentage of the work force. In this age of DC pensions, a matching contribution by the employer will accelerate the corpus as well as limit the employer's liability to pension to the contribution.

Conclusion

This simple model is primarily intended to prove that any person with certain amount of financial discipline can invest for his retired life. Though the real life issues are not as straight forward as given here, it is possible to intelligently and diligently invest over the active service period of an individual to provide for old age. It is possible to extend this simple model to account for irregular installments, variable interest rates and to take care of the mortality of the population and other issues.

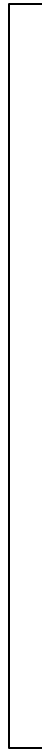
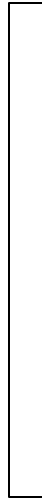
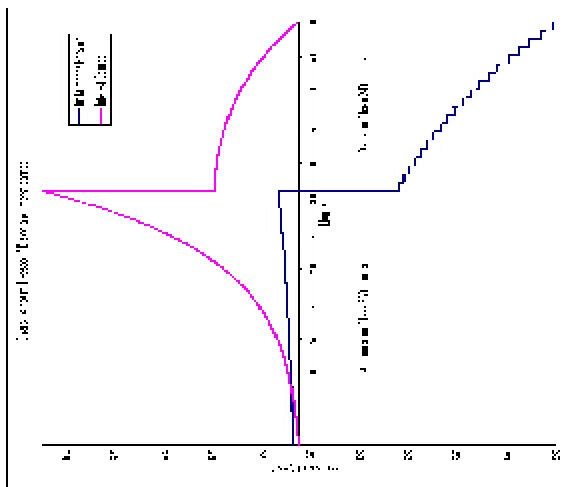
The necessary values used in the enclosed charts calculated using MS-Excel spread sheets along with the automated calculations are available on request.

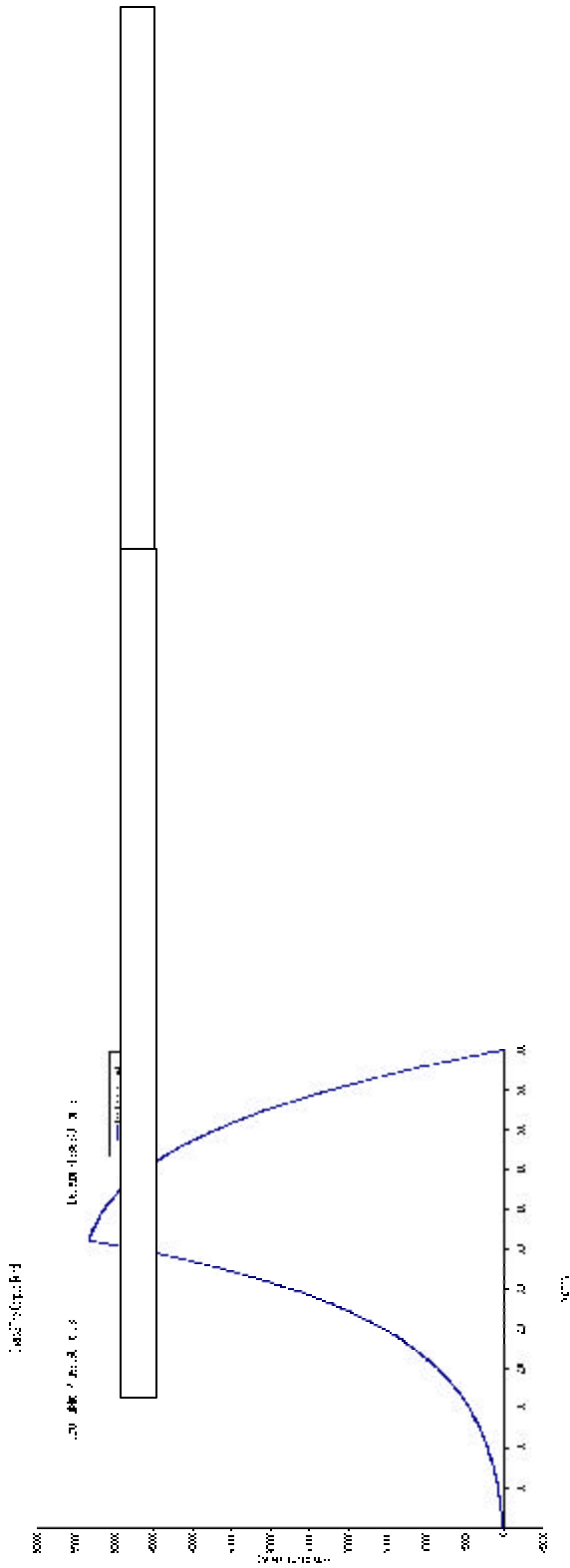
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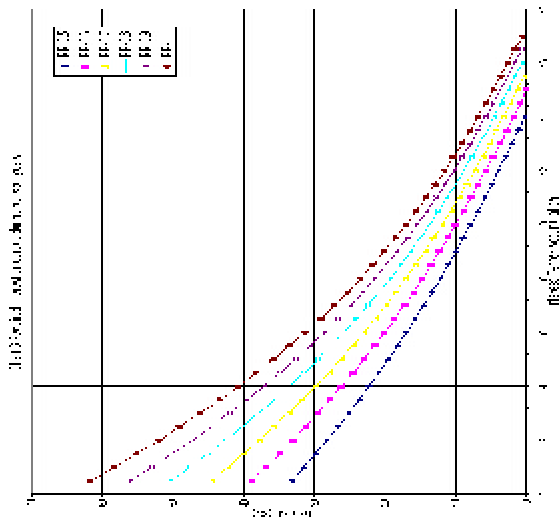
Being a student member of ASI, this is my humble attempt ever to send a paper to GCA 2006 where Actuarial luminaries present papers and ideas. This paper is only an attempt to put to use my computational skills with what ever I have learned from the study material. I acknowledge with gratitude, the papers on pension and social security presented in previous GCA's by eminent fellow members like Sri S.Chidambaram, Sri S G Guhagarkar et al which has been the inspiration to think about this subject .

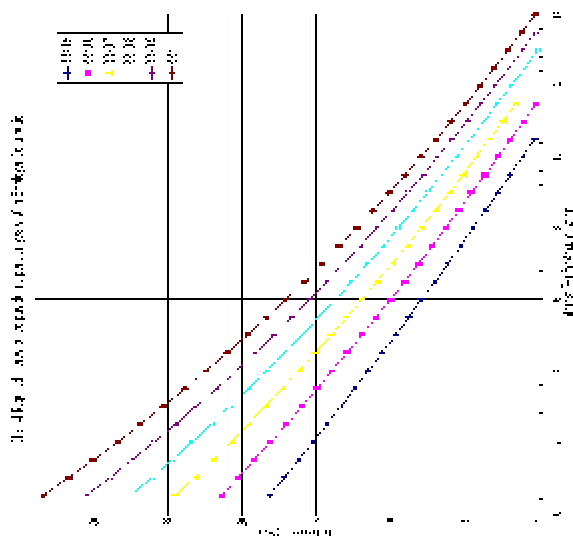
References

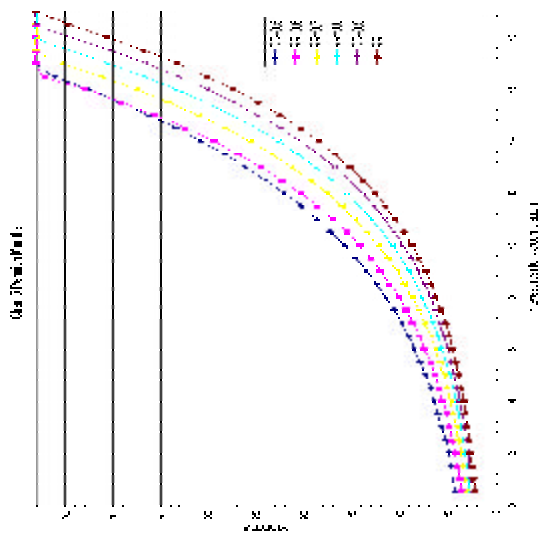
In the process of presenting the ideas in a form of this paper, I have referred to the related websites of Association of Mutual Funds of India (www.amfiindia.com), Bombay Stock Exchange (www.bseindia.com) and web sites of Government of India and Sebi and also to the current financial publications.











About the Author

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