Current issues in Retirement Benefits
Mumbai
6 September 2019

Case study of actuaries and social security

Atal Pension Yojana (APY)

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Agenda

Background and Introduction

The 3 pillars for pension provision

Pillar I	Pillar II	Pillar III
State Pensions	Occupational Pensions	Private Pensions
Compulsory	Compulsory	Voluntary
Non - contributory	Contributory*	Contributory

* Public sector DB schemes contributory to the extent that no EPF contributions are made by the Government

Atal Pension Yojana - Background

- The APY scheme was launched by Government of India in June 2015 to provide voluntary pension benefit to workers in the unorganized sector
- The social security scheme was introduced as a replacement to previous government's Swavalamban Yojana.
- The APY scheme was launched with an objective to address the longevity risks among the workers in unorganized sector and to encourage the workers to voluntarily save for their retirement.
- The scheme allows members to opt for Minimum Guaranteed Pension ranging from INR 1,000 to INR 5,000. The members get to choose the preferred slab at the time of enrollment. There is freedom to migrate to a different pension slab at a later date.
- The contribution amount paid by the members depends on the age he/she joins the scheme at, the pension slab he/she opts for from and the time between payments - monthly, quarterly, or half-yearly.
- For those who joined before 31 December 2015, the Government provides 50% of the required contributions for the first 5 years (only for those not covered by other statutory plans and non income tax payers).
- Funds managed by appointed investment managers in line with an investment strategy prescribed by the Regulator. Each subscriber to have their individual ‘ring fenced’ pots of money – similar to the National Pension System (NPS).

Atal Pension Yojana – Contribution Chart

Atal Pension Yojana

Transforming the pension less society into pensioned society.

BENEFITS AND FEATURES

- All citizens between 18-40 years can join through any bank branch.
- Guaranteed monthly pension of Rs. 1000 to Rs. 5000 per month after the age of 60 years.
- Govt. of India co-contributes* 50% of the total contribution or Rs. 1000 per annum, whichever is less and is available for 5 years who joins the scheme before 31st Dec, 2015.
- Spouse gets same amount of pension after subscriber's death.
- Upon death of spouse nominee gets back pension wealth of Rs. 1,70,000 - Rs. 8,50,000.

*Government co-contribution is available for those who are not covered under any Statutory Social Security Schemes and for non income tax payee.

For Registration under APY,
Please contact your Bank Branch immediately.

Subscriber's Monthly Contribution Chart

Age of Entry	Years of Contribution	Monthly pension of Rs. 1000. Indicative return of corpus Rs. 1.70 lacs	Monthly pension of Rs. 2000. Indicative return of corpus Rs. 3.40 lacs	Monthly pension of Rs. 3000. Indicative return of corpus Rs. 5.10 lacs	Monthly pension of Rs. 4000. Indicative return of corpus Rs. 6.80 lacs	Monthly pension of Rs. 5000. Indicative return of corpus Rs. 8.50 lacs
18	42	42	84	126	168	210
19	41	46	92	138	183	228
20	40	50	100	150	198	248
21	39	54	108	162	215	269
22	38	59	117	177	234	292
23	37	64	127	192	254	318
24	36	70	139	208	277	346
25	35	76	151	226	301	376
26	34	82	164	246	327	409
27	33	90	178	268	356	446
28	32	97	194	292	388	485
29	31	106	212	318	423	529
30	30	116	231	347	462	577
31	29	126	252	379	504	630
32	28	138	276	414	551	689
33	27	151	302	453	602	752
34	26	165	330	495	659	824
35	25	181	362	543	722	902
36	24	198	396	594	792	990
37	23	218	436	654	870	1,087
38	22	240	480	720	957	1,196
39	21	264	528	792	1,054	1,318

For more information contact Call Center No:

1800-110-069

Assisted under Financial Inclusion Fund Maintained by "NABARD"

Source: https://www.tmb.in/doc/apy_chart_01_big.jpg

Atal Pension Yojana – Why an Actuarial Valuation is Needed

- Willis Towers Watson was appointed by the Pension Fund Regulatory and Development Authority ("the PFRDA") to carry out an actuarial valuation of the Atal Pension Yojana ("the Fund" or "APY") as at 31 March 2018.

- The purpose of the valuation was to estimate the likely shortfall or otherwise on account of the minimum guaranteed pension / corpus and recommend suitable provisioning for any future shortfall

- Under the current benefit design, subscribers were guaranteed:

    - A minimum accumulated corpus at the age of 60 (in line with level chosen – to be paid in full at the time of cessation of the Joint Life Survivorship)
    - A minimum pension with 100% Joint Life survivorship (in line with level chosen)
    - In case of higher than expected investment returns, benefits to be enhanced at an individual level (no cross subsidy)

- This was the first such valuation of the Fund since the APY commenced on 1 June 2015

- In addition to the actuarial valuation, recommendations were given to PFRDA on:

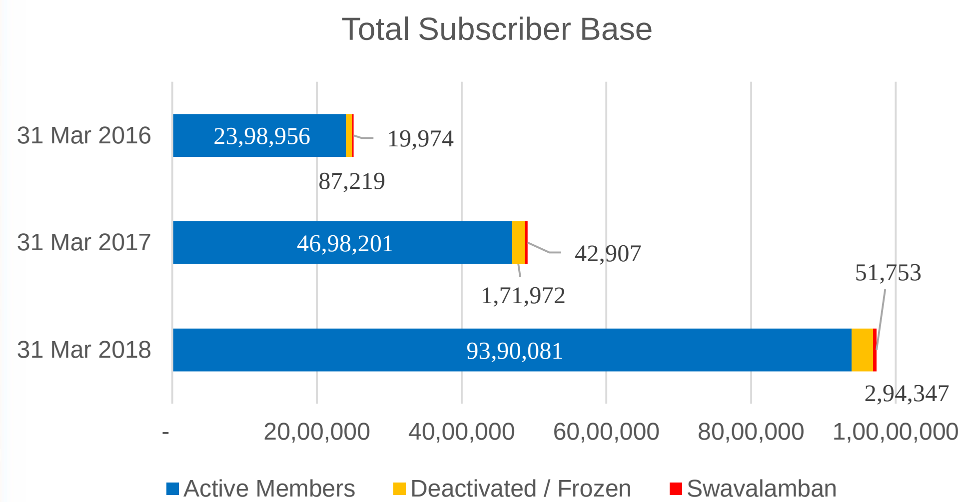
    - Financial Impact of introduction of additional benefit scheme designs (e.g. impact of introducing higher pension brackets)
    - Contribution schedules for extended ages and pension choices
    - Future projections considering new entrants in the scheme

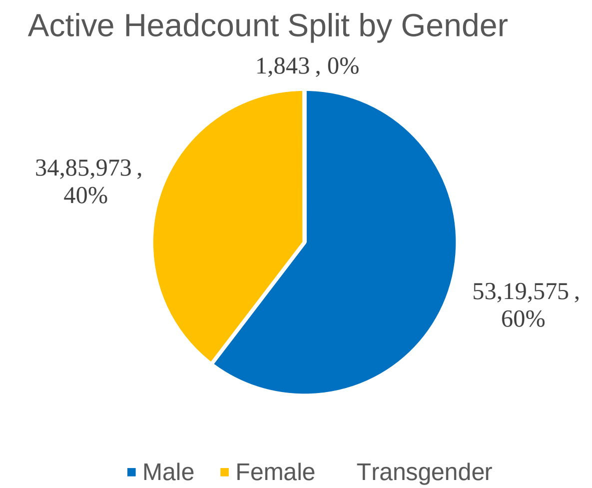
Atal Pension Yojana - Scheme Rules

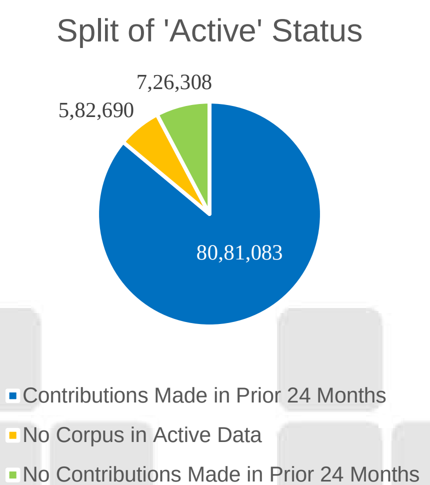
Criteria	Eligibility
Covered Subscribers	Open to all citizens of India. The minimum age of joining APY is 18 years and maximum age is 40 years.
Normal Retirement Age	60 Years
Choice of Pension	Guaranteed minimum pension of INR 1000 / 2000 / 3000 / 4000 or 5000 per month
Form of Annuity	JandS 100% + Return of Corpus
Benefit Payable on :	
Normal Retirement	Minimum guaranteed pension based on subscriber choice of level of pension.
Death in Retirement	Spouse is entitled to receive the same pension amount as that of the subscriber
Death / Illness before retirement	Accumulated pension wealth till date would be given to the nominee or the subscriber or, an option is available to spouse to continue contribution in the APY account of the subscriber for the remaining vesting period, till the original subscriber would have attained the age of 60 years

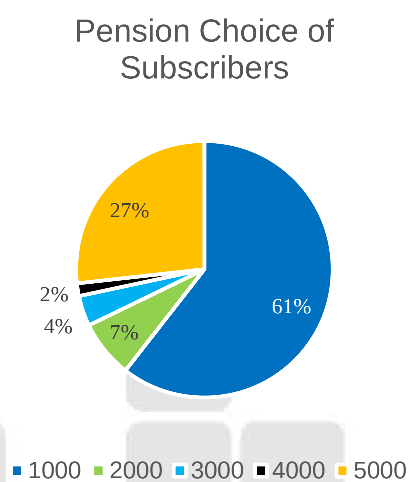
Membership Data and Asset Information

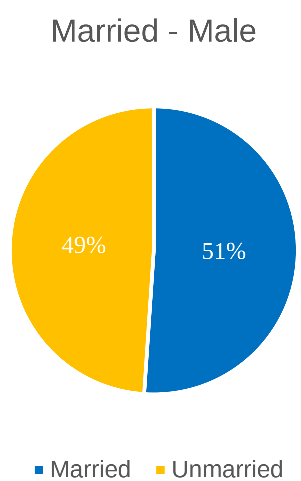
Membership Data

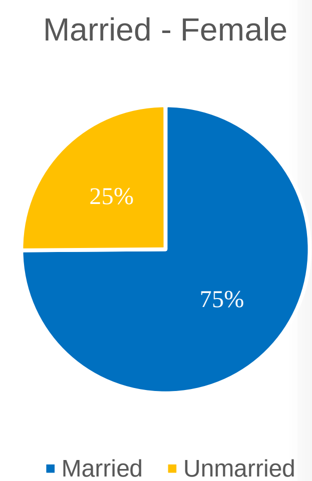




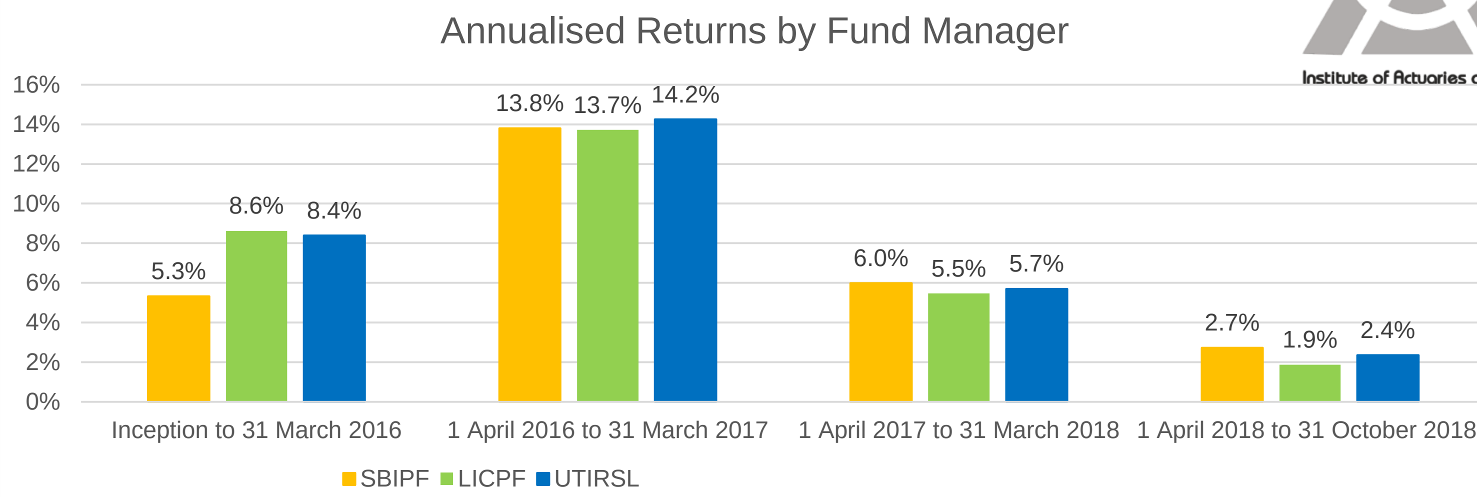


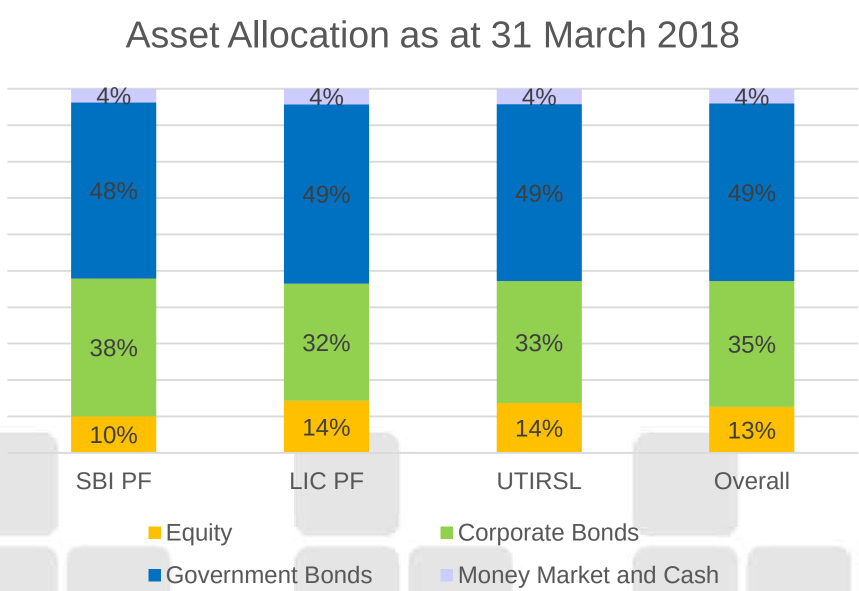


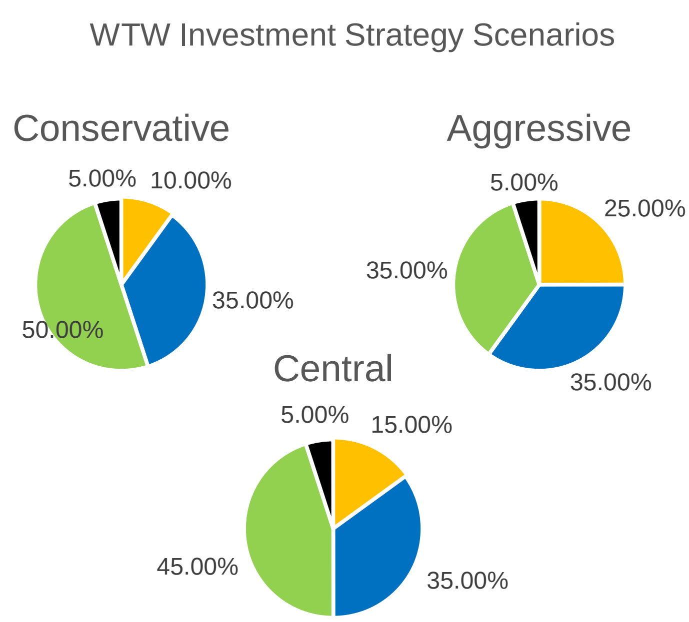




Asset Information







Valuation Methodology

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Methodology

Use of model points to simplify actuarial valuation

Entire APY membership clubbed to form ‘model points’ to simplify calculations

Each ‘model point’ can be considered to be a homogeneous group and will be valued together

~1.0CR

~1,000

Model points created by considering:
A. Current Age (rounded to nearest year)
18, 19, .. 43 = 26 points
B. Term spent in APY (rounded to nearest year)
0, 1, 2, 3 = 4 points
C. Pension choice made – 1,000; 2,000; 3,000; 4,000; 5,000
= 5 points
D. Member’s sex – Male or Female
= 2 points

Hence, total model points
= 26 x 4 x 5 x 2 ~ 1,000

Methodology (Cont.)

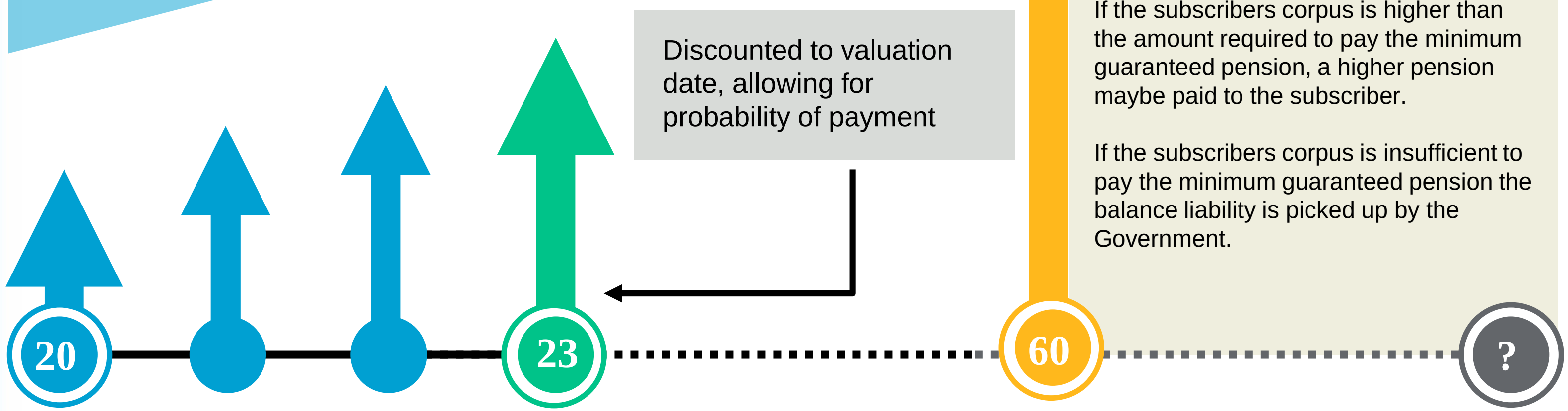
Corpus in three years

Projected corpus at age 60

The subscribers pension is based on the accumulated corpus at age 60.

If the subscribers corpus is higher than the amount required to pay the minimum guaranteed pension, a higher pension maybe paid to the subscriber.

If the subscribers corpus is insufficient to pay the minimum guaranteed pension the balance liability is picked up by the Government.



The probabilities of payment considered are death, terminal disease, or account closure due to lapse of contribution. In all instances, the corpus accumulated will be returned to his/her nominee (death) or the subscriber (terminal disease and lapse).

After age 60, the subscriber will continue to receive the monthly pension amount until his/her death.

In the event of the subscriber's death, his/her spouse will receive the guaranteed monthly pension amount until his/her death.

In the event of the death of both the subscriber and his/her spouse, their nominee/s (e.g. children) will be returned the corpus accumulated by the subscriber at age 60.

Key Assumptions

Setting Appropriate Assumptions is Key

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Actuarial Practice Standard (APS) 20: Actuarial Practice for Social Security Programmes applies to the current valuation

APS20 provides some guidance on the setting of assumptions as below:

"The assumptions should be set according to the purpose of the investigation.

Normally for an Social Security Plans (SSP), assumptions are expected to be determined on:

- *A best estimate basis. In case there is need to build in prudence over the best estimate, then the degree of such prudence should be specified.*
- *Each assumption should be individually set.*
- *An explicit, as opposed to implicit, basis to the extent possible.*
- *A basis taking into account:*
  - *Internal consistency, e.g. all assumptions should be mutually consistent by virtue of their correlation or interrelationship.*
  - *Overall consistency, e.g. the economic and demographic assumptions used should be consistent with the long-term experience and the outlook for the economy."*

Expected Return on Assets

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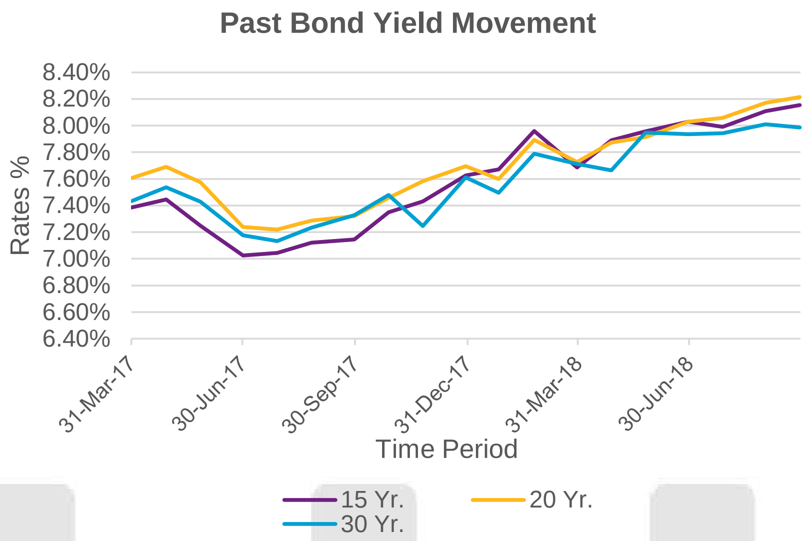
Expected Future Investment Returns and Volatility		
Asset Category	Expected Long Term Return	Expected Volatility
Government Securities and Related Investments	7.50%	10.00%
Corporate bonds and Related Investments	8.80%	11.50%
Equities and Related Investments	13.00%	30.00%
Asset Backed, Trust Structured and Miscellaneous Investments	6.50%	3.75%

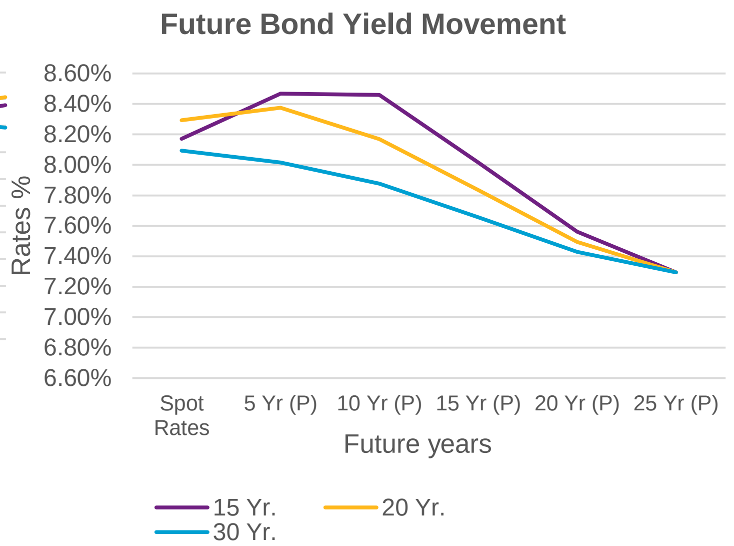
Asset Split under different Scenarios			
Asset Category	Conservative	Central	Aggressive
Government Securities and Related Investments	50.00%	45.00%	35.00%
Corporate bonds and Related Investments	35.00%	35.00%	35.00%
Equities and Related Investments*	10.00%	15.00%	25.00%
Asset Backed, Trust Structured and Miscellaneous Investments	5.00%	5.00%	5.00%

- The assumptions were derived through a blend of economic theory, historical analysis, views of investment managers and, inevitably, contain an element of subjective judgment.
- **The assumption was set considering the long term return on each asset category along with portfolio volatility generated through Economic Scenario Generators (ESG's)**
- **The EROA was set equivalent to the long term median return/geometric average**
- The approach to assumption setting was based around a belief that markets were broadly efficient
- The timeframe in establishing our asset model and assumptions was long-term

Discount Rate

- To be consistent with long term cash flows and duration of the liabilities we have referred to zero coupon government bond yields for all terms.
- The rate was set considering the past and the future projections and also considering the uncertainty related to any structural changes.
- Considering the fluctuations in the movement of bond yields of different tenure we have used +/-100bps for the sensitivity analysis

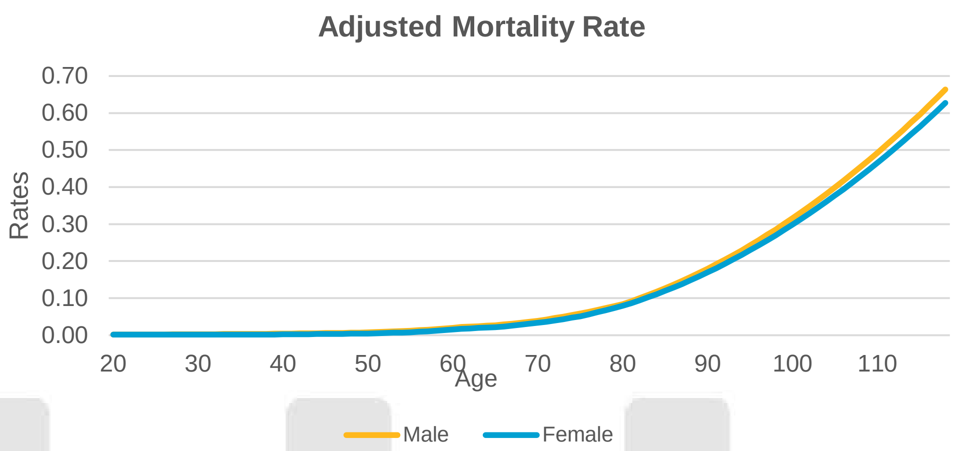




Note: Zero Coupon Indian Government bond yields and forward rates as at 22 October with a duration of 15, 20 and 30 years were considered for the recommendations.
Source: Bloomberg

Base Mortality

- To derive the mortality rates we had to rely on a report issued by Department of Economic and Social Affairs (United Nations) available in public domain in their 2017 World Population Prospects 2017
- The report provides the mortality rates in a block of 5 years till age 80 (as summarized below). We did recognize that the rates were applicable to all citizen's of India but may be suitable given the target group for APY is the unorganized sector
- Due to the unavailability of any other reliable source the rates provided in the UN report were calibrated and graduated assuming the shape of the curve remains identical with the LIC Annuitant (96-98) table, in order to get the individual annual age rates. The LIC table is only used for referencing shape

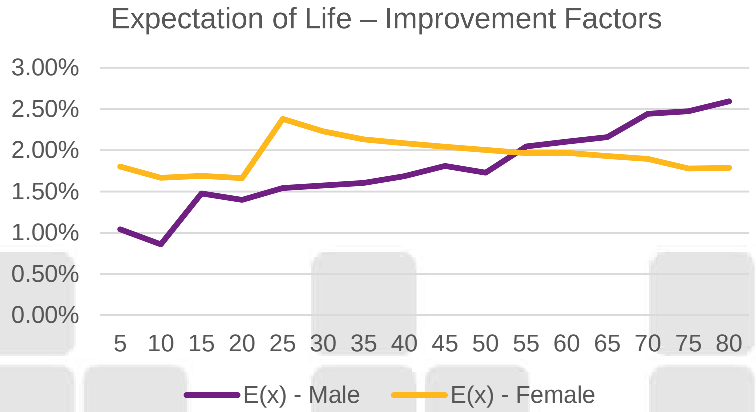


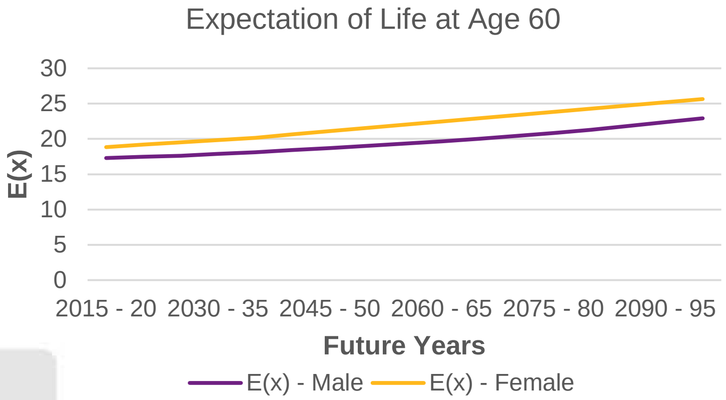
UN Data Source		
Age (x)	**Male (5qx)**	**Female (5qx)**
0	0.034512	0.035294
1	0.008680	0.011390
5	0.004185	0.004315
10	0.003093	0.003125
15	0.005082	0.005645
20	0.008121	0.007371
25	0.009899	0.007390
30	0.012818	0.007937
35	0.018104	0.009876
40	0.023747	0.012801
45	0.033929	0.018891
50	0.047617	0.028501
55	0.071252	0.046082
60	0.105393	0.080973
65	0.163090	0.130932
70	0.235458	0.201185
75	0.325142	0.284446
80	0.423617	0.400227

Mortality Improvements

As the membership data was not sufficient to conduct a full scale future improvement study, we had to use a report issued by Department of Economic and Social Affairs (United Nation) available in public domain to analyze the future improvement in the mortality.

- The UN report provided the improvement in the expectation of life at age 60 for each block of 5 years till year 2100.
- Gender wise improvements were available in the report.
- We have back calculated the improvements to be applied to the mortality for the expectation of life to be consistent with the UN Report.
- Rates post year 2100 in the report assumed the improvement to be same as for the last block assuming the improvement will remain the same.
- **A gender based future mortality rates based on the improvements derived from the UN report used for one of the scenarios of APY valuation.**





Key Learnings

Key learnings

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Data:

- Valuation being done for the first time
- Understanding member-wise data available with NSDL and simplifying the data collection process

Assumption setting:

- Limited past data - not possible to carry out credible experience analysis
- Investment returns and conversion of lump sum into annuities were the two critical assumptions
- Formal approach awaited on administration of annuities given first payment not due for 17 years from valuation date
  - If insurer annuity rates to be used as a proxy, would current rates be appropriate?
  - Deciding standard mortality tables for the unorganized sector
  - Mortality improvements over such a long time period
- Limited information was available on other demographic assumptions, e.g. Proportion married, Spouse age difference
- Investment return assumption – collaborating with investment experts and other actuaries with global experience

Projections:

- Setting out new entrant profile for members joining in any of the pension choices ranging from INR 1,000 to INR 10,000 and with entry age ranging from 18 to 49
- Two dimensional new entrant profile based on historical data distribution agreed after several rounds of discussion with PFRDA

Other key Learnings

Project planning

- Not just a standard actuarial valuation
- Scope exhaustive e.g. projections, assessing impact of design changes
- Understanding the expectations of the PFRDA and the DFS

Resources and timescales

- Meeting tight timelines (e.g. entire project executed in about 2 months)
- Identifying the right team
- Creating sub-teams with roles and responsibilities
- Adequate number of skilled actuarial resources including qualified actuaries

Project Management

- Liaising with key stakeholders, e.g. NSDL for data, PFRDA for assumption sign-off
- Managing expectations of Government (DFS) officials
- Face to face meetings

Managing large database

- Managing individual data of 1 crore members whilst adhering to strict data confidentiality procedures

Using the right Software

- Data analysis
- To enable cashflow projections for 80 years in the future

Consulting and value additions

- Explanation of results and scenarios – e.g. new age groups, additional pension slabs etc.

Thank You

Atal Pension Yojana v/s Pradhan Mantri Shram Yogi Maan-Dhan Pension Plan

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Criteria	Atal Pension Yojana	Eligibility
Eligibility	Open to all Citizen of India aged between 18 to 40 years of age and having a saving bank account	Open only to unorganized worker whose monthly income does not exceed INR 15,000 and aged 18 to 40 years
Monthly Pension Choice	INR 1,000- 5,000	INR 3,000
Scheme Benefit	• Minimum guaranteed Pension of ₹ 1,000 5,000 at 60 years to Subscriber • Spouse entitled to receive 100% of Pensions on death of Subscriber • Return of pension wealth to nominee after death of spouse. (INR 1.7 to 8.5 lakhs indicative)	• Minimum guaranteed Pension of ₹ 3,000 at 60 years to Subscriber • Spouse entitled to receive 50% of Pensions on death of Subscriber
Contribution	Subscribers Contribution for INR 3000 pension option is – • INR 126/month at age 18 years and – • INR 873/month at age 40	Subscribers Contribution for INR 3000 pension is INR 55/month at age 18 years INR 200/month at age 40 years
Government contribution	No Contribution from Government of India as members bears to the total cost of contribution	Government of India will contribute equal monthly contribution to subscriber
Exit before Retirement	• Exit is permitted in the event of the death/ terminal disease: The accumulated pension wealth is paid to spouse (default nominee) or to the nominee opted by the subscriber • In case of death of subscriber. Spouse has an option to continue the Scheme	• Exit within 10 years: Subscribers contribution + Banks interest will be paid • Exit after 10 years: Subscribers contributions+ actual interest earned by Pension Fund or saving Bank interest whichever is higher will be paid