

6th Seminar on ERM (*Jun 28, 2019*)

Annuity –

A Business Opportunity or a Risky Proposition?



Pawan Kumar Sharma

Vice President, DHFL Pramerica Life Insurance

Agenda

A

Opportunity

B

Challenges

C

Risk

D

Methodology for optimum asset mix

E

Illustrative example

F

Testing the effectiveness of asset mix

G

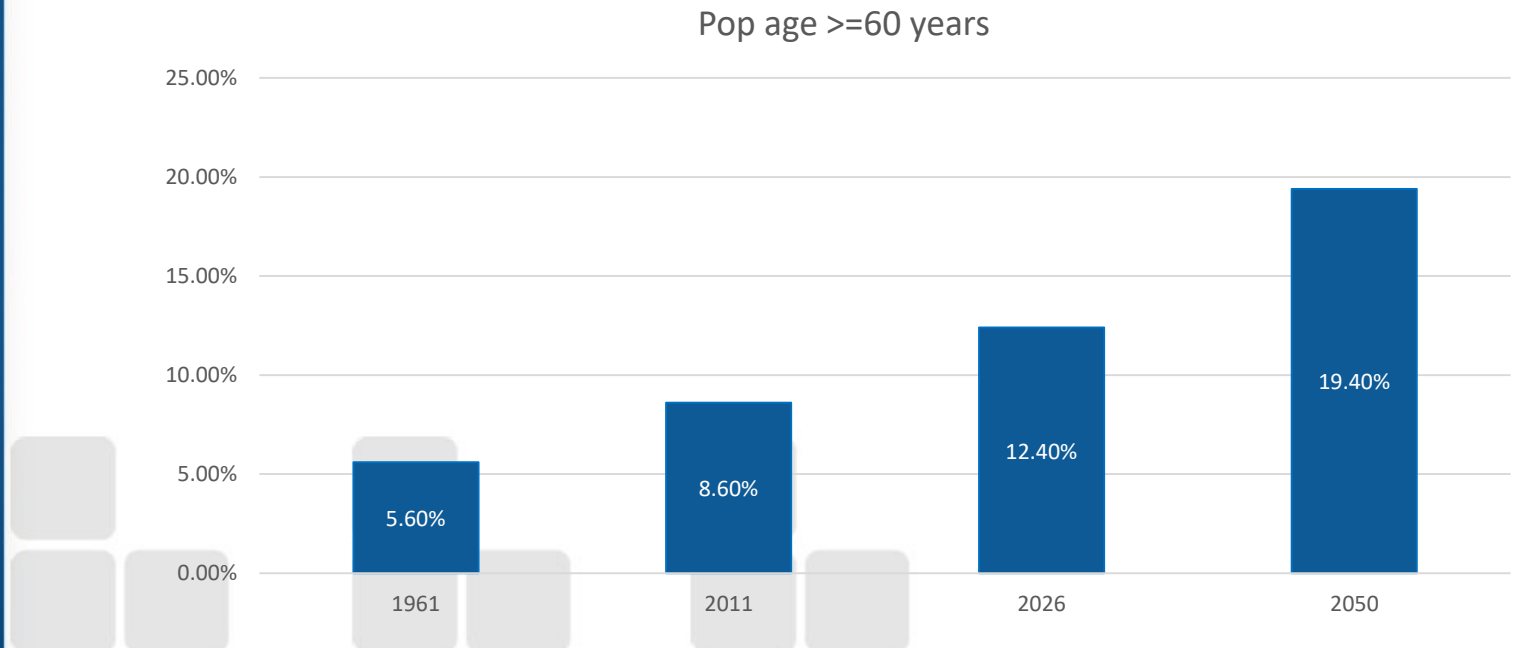
Illustration

H

Results

Opportunity

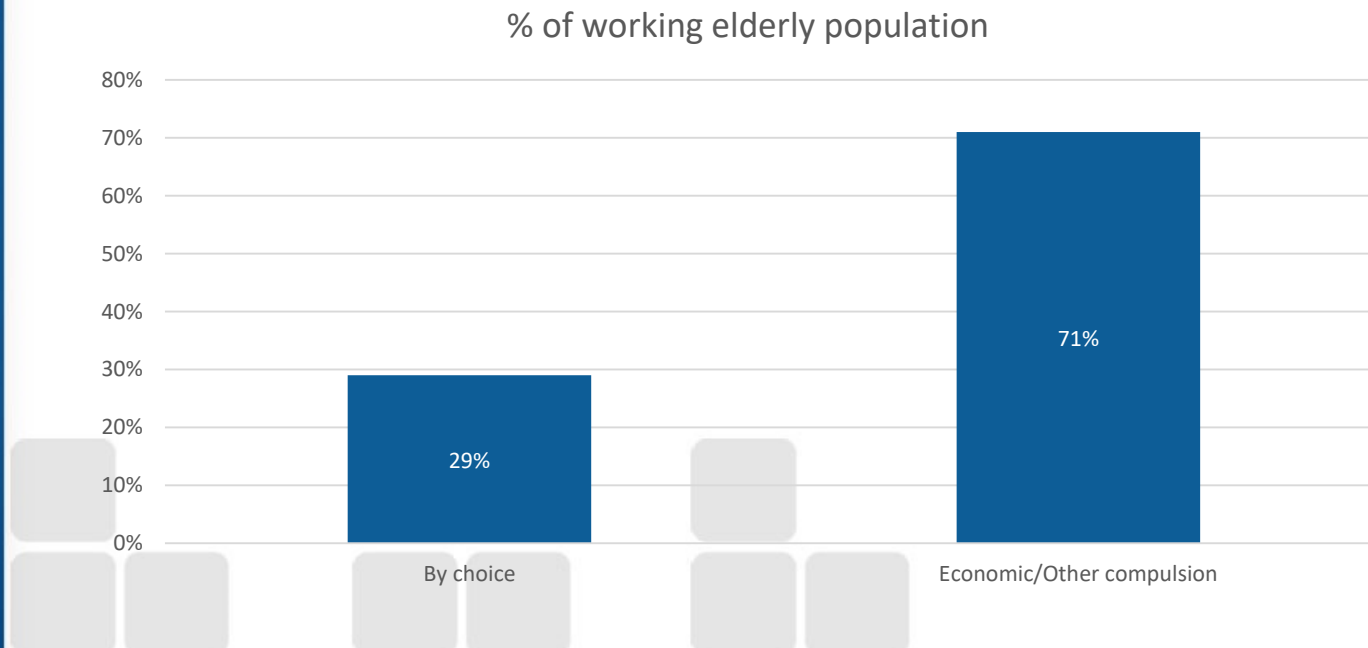
- Young country – increasing ageing population
 - Persons above 60 will increase from 9% to 19% by 2050
 - Persons above 80 will increase from 1% to 3%
 - Every fifth will be sexagenarian as compared to 12



Source: PFRDA report

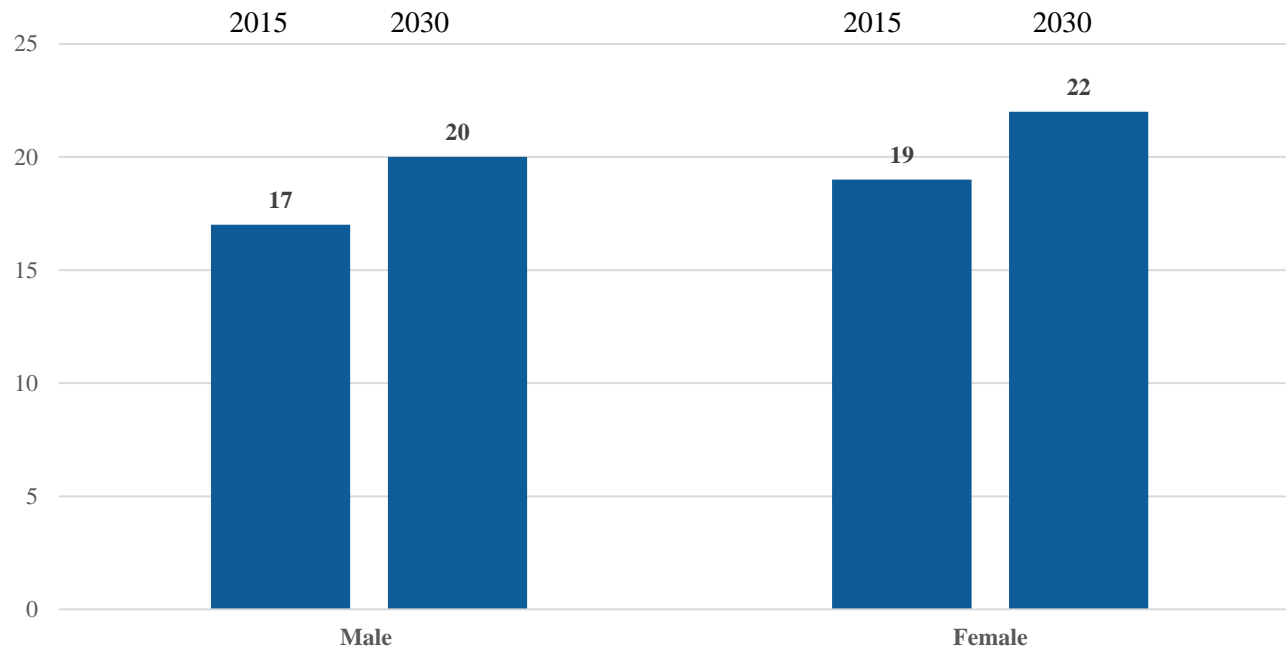
Opportunity

- Unorganized sector – Totally untapped
- Change in society structure
 - Joint family system acted as barrier
 - Urbanisation & Nuclearisation of families



Opportunity

- Improvement in life expectancy post retirement



- Low penetration in the pension / retirement space compared to other countries

Challenges



- People mindset and lack of awareness
- Saving in physical assets as compared to retirement products / annuity
- Bank deposits more popular
- Lack of product innovation
- Tax treatment of annuity

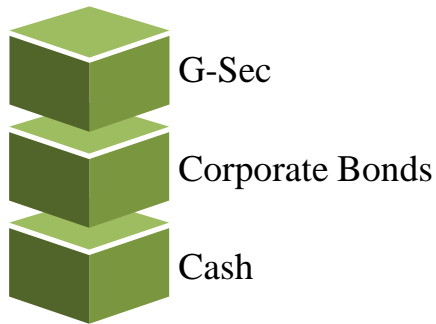
Risk



- Longevity
- Guarantee
- ALM mismatch

Methodology (1/2)

A Determine the liability cash flows for annuity portfolio

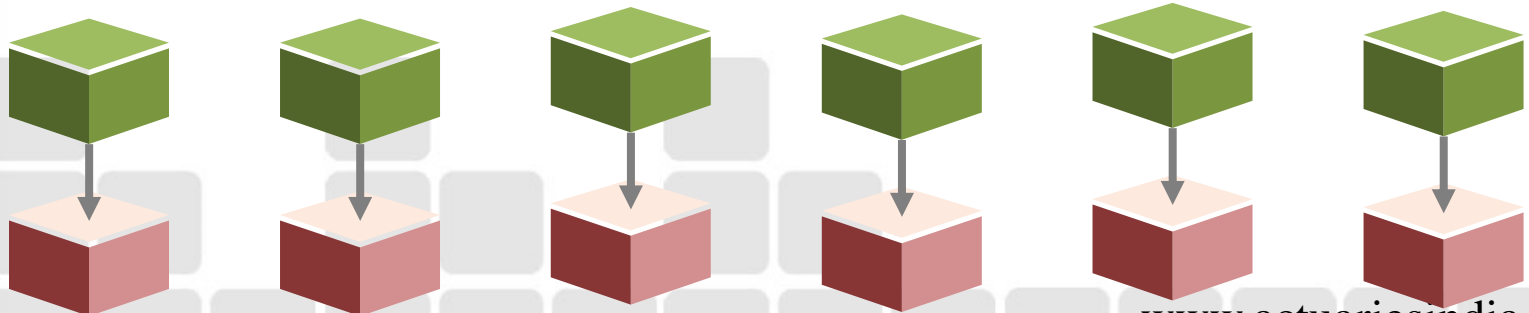


B Select the model portfolio of assets, basis the availability

Modal portfolio comprising of fixed coupon securities

C Match asset & liability cash flows

Nominal value of bonds calculated so that coupons & principal payments match the liability cash flow at different tenors



Methodology (2/2)



- A Identify the bond that matures, just before the last liability payout
- B Determine its nominal value to match the liability cash flows post maturity
- C Same process carried to match the remaining liability cash flows by changing the nominal value of the bonds with next available bonds
- D Similarly, nominal value of other bonds are determined to match the liability cash flows in different duration buckets
- E Liabilities of initial years can be matched by keeping an equal amount of cash in portfolio

Illustrative example

Liability Cash flows	
Tenure	Value
1	54,142
5	43,825
10	42,957
15	43,443
20	44,368
25	44,097
30	41,616
35	36,760
40	30,179
45	170,711

Assets of different Tenure	
Name of security	Terms to Maturity
G-Sec A	30
G-Sec B	25
G-Sec C	20
G-Sec D	15
Corp - A	10
Corp - B	5

Illustrative example



Institute of Actuaries of India

Tenure	Liability Cash flows	Asset Cash flow G-Sec A	Excess/(deficit) balance	After reinvestment*
30	41,616	495,991	454,375	454,375
31	40,824		(40,824)	431,726
32	39,938		(39,938)	409,057
33	38,961		(38,961)	386,459
34	37,899		(37,899)	364,018
35	36,760		(36,760)	341,819
36	35,550		(35,550)	319,942
37	34,277		(34,277)	298,462
38	32,952		(32,952)	277,448

*reinvestment rate= 4% p.a.

Illustrative example

Tenure	Liability cashflow	Asset cashflow G-Sec A	Excess/(deficit) balance	After reinvestment
39	31,583		(31,583)	256,964
40	30,179		(30,179)	237,063
41	28,751		(28,751)	217,795
42	27,308		(27,308)	199,199
43	25,859		(25,859)	181,307
44	24,414		(24,414)	164,145
45	170,711		(170,711)	(0)

Illustrative example



Institute of Actuaries of India

Tenure	Liability cashflow	Asset cashflow G-Sec A	Excess /(deficit) balance	Asset cashflow G-Sec B	Excess/(deficit) balance	After reinvestment
25	44,097	33,916	(10,181)	43,614	33,433	33,433
26	43,796	33,916	(9,880)		(9,880)	24,891
27	43,400	33,916	(9,483)		(9,483)	16,403
28	42,904	33,916	(8,988)		(8,988)	8,071
29	42,310	33,916	(8,394)		(8,394)	-

Illustrative example

Model Portfolio

Name of security	Nominal Value	Coupon rate
G-Sec A	462,075	7.34%
G-Sec B	40,647	7.30%
G-Sec C	32,484	7.25%
G-Sec D	19,885	7.00%
Corp - A	10,422	6.75%
Corp - B	9,627	7.17%
Cash	17,728	

A small proportion(5%) of longest available security can be invested in equity to gain advantage in the long term

Effectiveness of Asset mix



- A Around 5000 scenarios of interest rate and equity return are generated using the ESG to test effectiveness
- B Asset cash flows from optimum asset mix and liability cash flows projected to determine surplus (or deficit)
- C Equity portfolio assumed to be disinvested evenly over 10 years period from 30 years onwards
- D Surplus (or deficit) invested (or borrowed) at interest rate specific to that simulation
- E Net amount rolled forward at simulated rate to calculate final cumulative balance of surplus (or deficit) at end
- D Surplus (or deficit) at end discounted using the RFR to determine Net discounted surplus (or deficit)
- E Process is repeated for all scenarios

Illustration

Tenure	G Sec-A	G Sec-B	G Sec-C	G Sec-D	Corp-A	Corp-B	Cash	Equity	Total Asset Cash flows
1	32,220	2,967	2,355	1,392	704	690	19,030	-	59,358
5	32,220	2,967	2,355	1,392	704	10,317	-	-	49,955
10	32,220	2,967	2,355	1,392	11,126	-	-	-	50,061
15	32,220	2,967	2,355	21,277	-	-	-	-	58,820
20	32,220	2,967	34,839	-	-	-	-	-	70,027
25	32,220	43,614	-	-	-	-	-	-	75,835
30	471,191	-	-	-	-	-	-	31,877	503,068
35	-	-	-	-	-	-	-	49,113	49,113
40	-	-	-	-	-	-	-	-	-
45	-	-	-	-	-	-	-	-	-

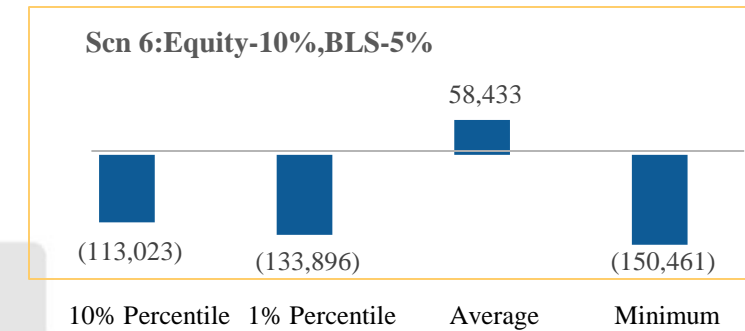
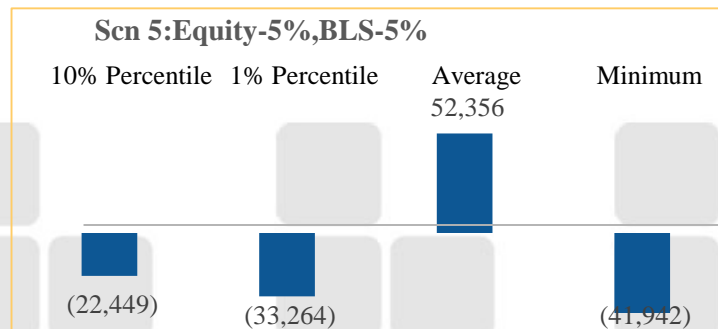
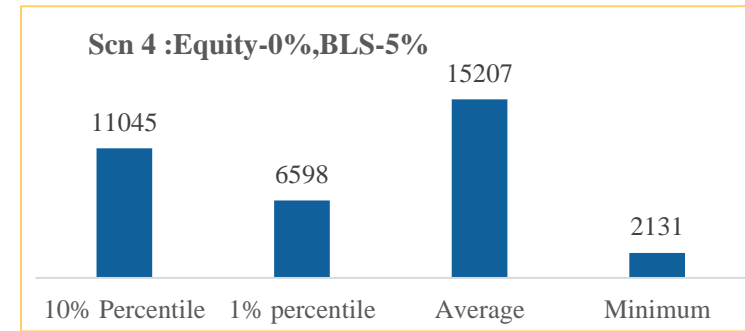
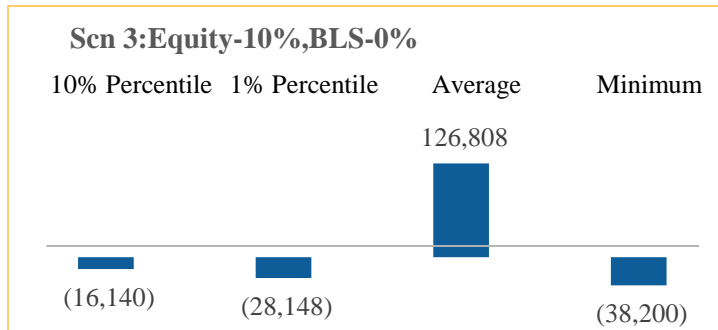
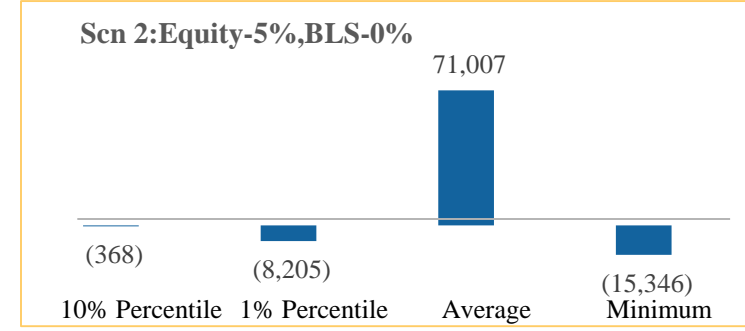
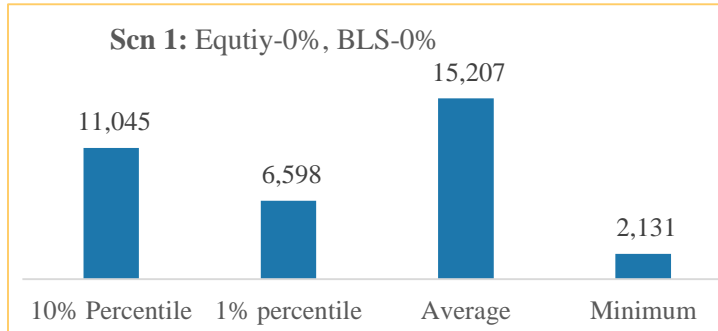
Illustration

Tenure	Total Asset Cash flows	Total Liability Cash flows	Surplus	Deficit	Earning rate	Borrowing rate	Cumulative Surplus/Deficit
1	59,358	54,142	5,216	-	7%	12%	5,216
5	49,955	43,825	6,130	-	8%	13%	336
10	50,061	42,957	7,104	-	8%	13%	(13,530)
15	58,820	43,443	15,378	-	9%	14%	(33,178)
20	70,027	44,368	25,659	-	8%	13%	(69,157)
25	75,835	44,097	31,737	-	8%	13%	(146,548)
30	503,068	41,616	461,452	-	8%	13%	130,892
35	49,113	36,760	12,354	-	8%	13%	204,646
40	-	30,179	-	(30,179)	8%	13%	402,675
45	-	170,711	-	(170,711)	8%	13%	291,846

Results

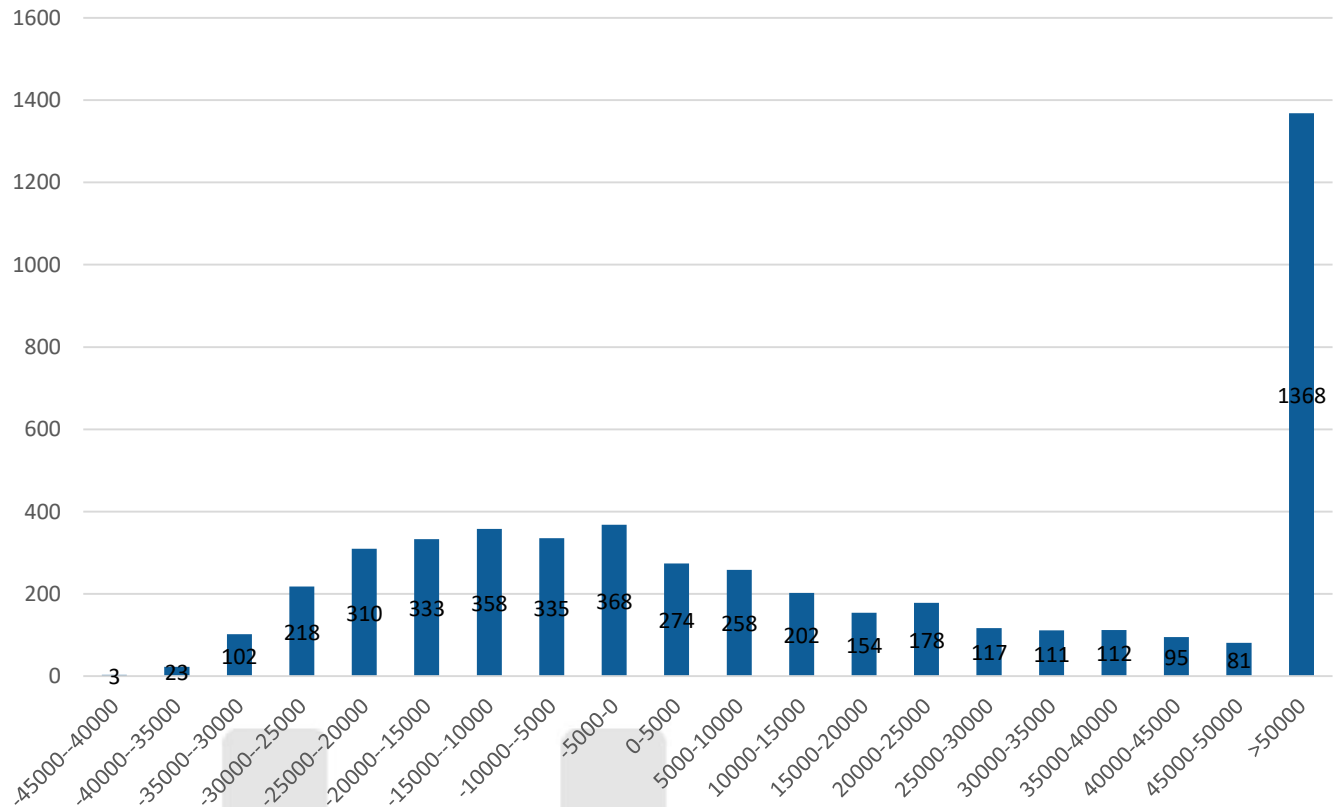


Institute of Actuaries of India



Results

Distribution plot of discounted value (Scenario 5)



Thank You

Any Questions?