



Institute of Actuaries of India

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Rate revision consideration in retail health products

1st Capacity Building Seminar in Health Insurance
3rd September, 2012



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- All data published in the presentation are just for representation purpose.



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When and Why

How

Approach

- Across all lines of GI we need to monitor the portfolios on an ongoing basis
- We need to know when our assumptions have failed before it is too late
- To monitor if any new variables which were not considered earlier in pricing have now started to have a major impact on the portfolio
- Incorporation of any new cover which was not originally covered
- Regulatory guidelines
- Should not be too frequent



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When and Why

How

Approach

- Key objective is to understand and Identify loss making buckets and check if they can be taken care by our existing price grid by changes in the Underwriting guidelines
- To improvise the competitive edge over the period of time by diversifying the portfolio
- Building a pricing model based on the risk involved.



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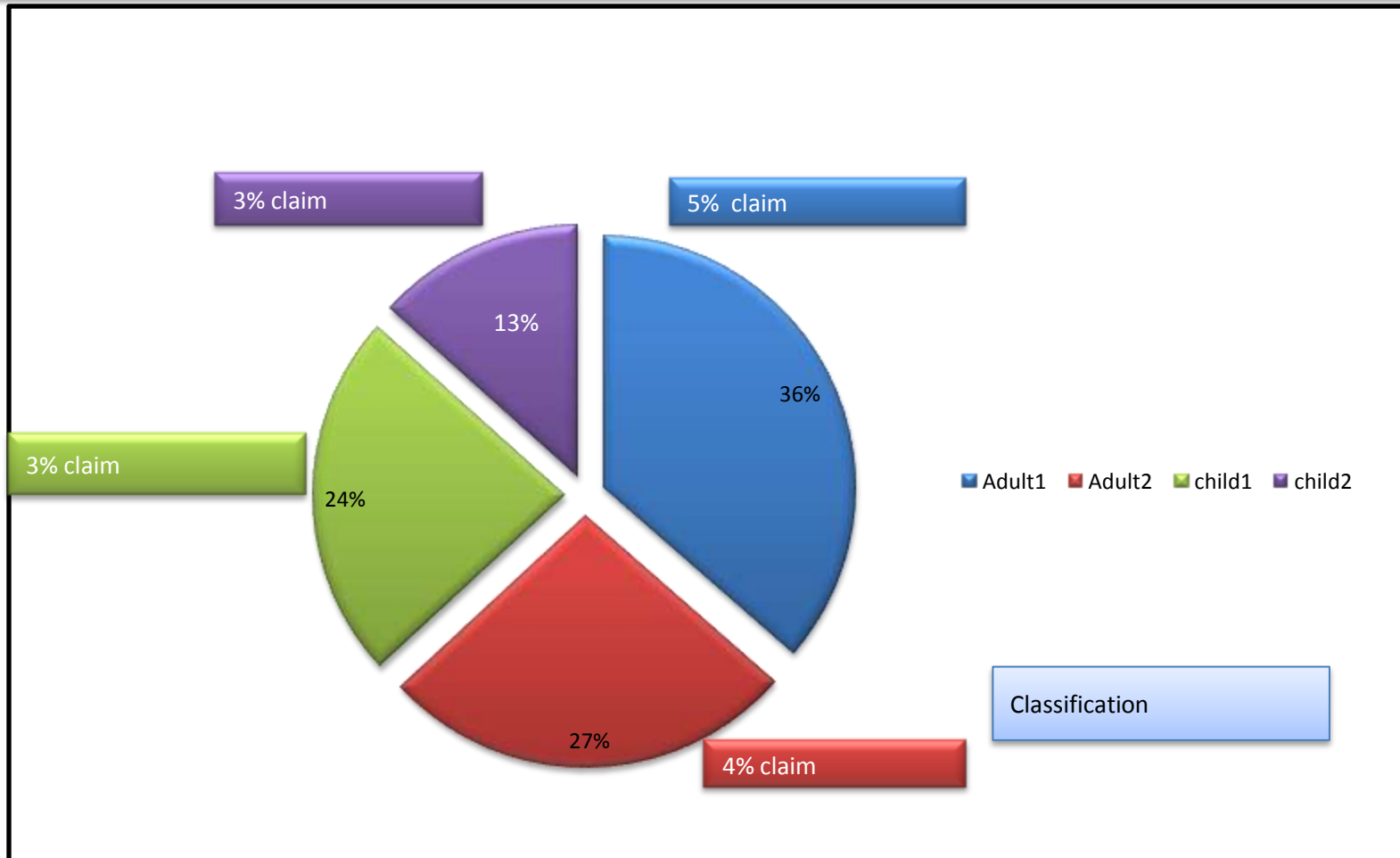
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Studying the claims distribution

- Classification
- UW year
- Sum Insured
- Age Band
- Business Type
- Geography
- Vintage
- Gender
- Key IMD's

Studying the claims distribution



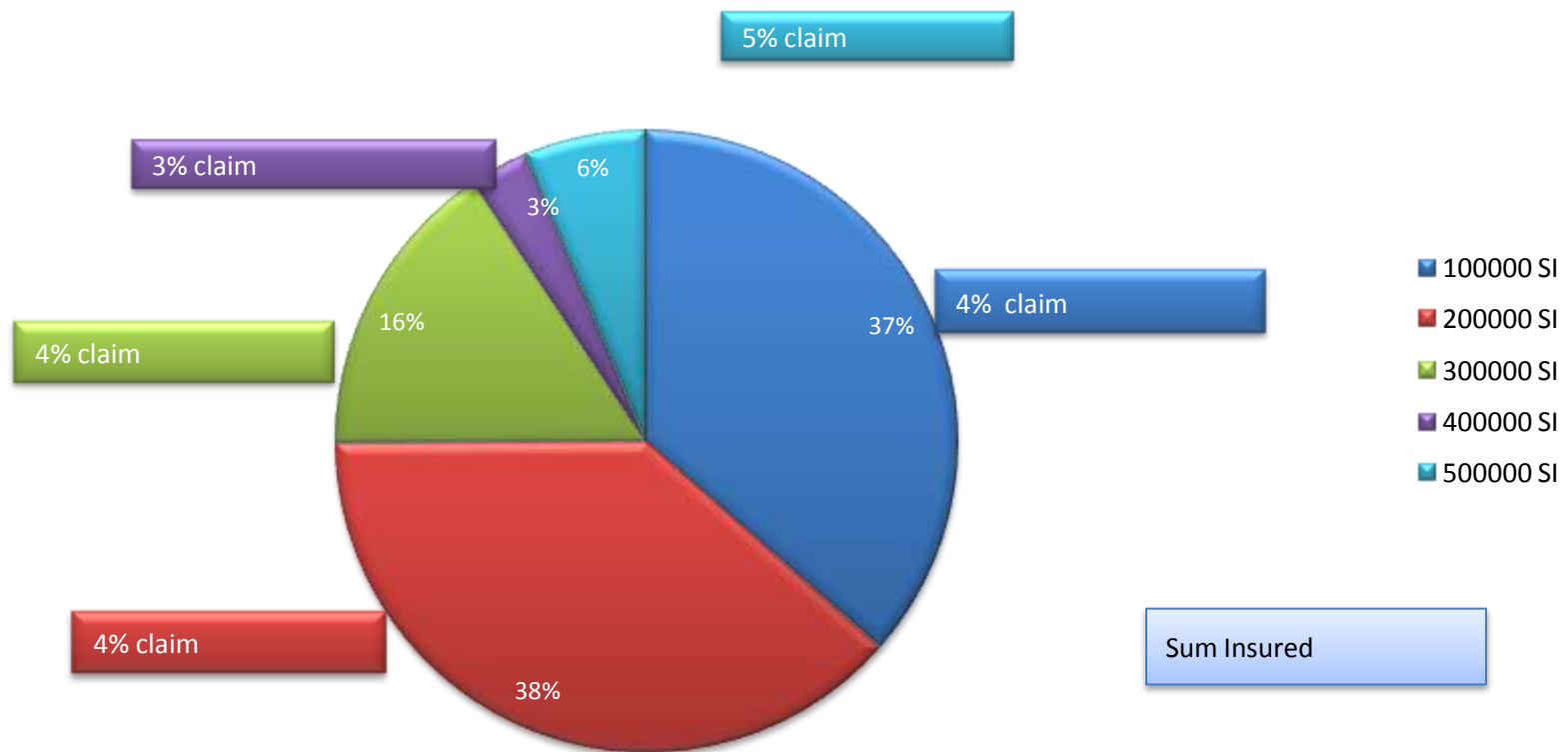


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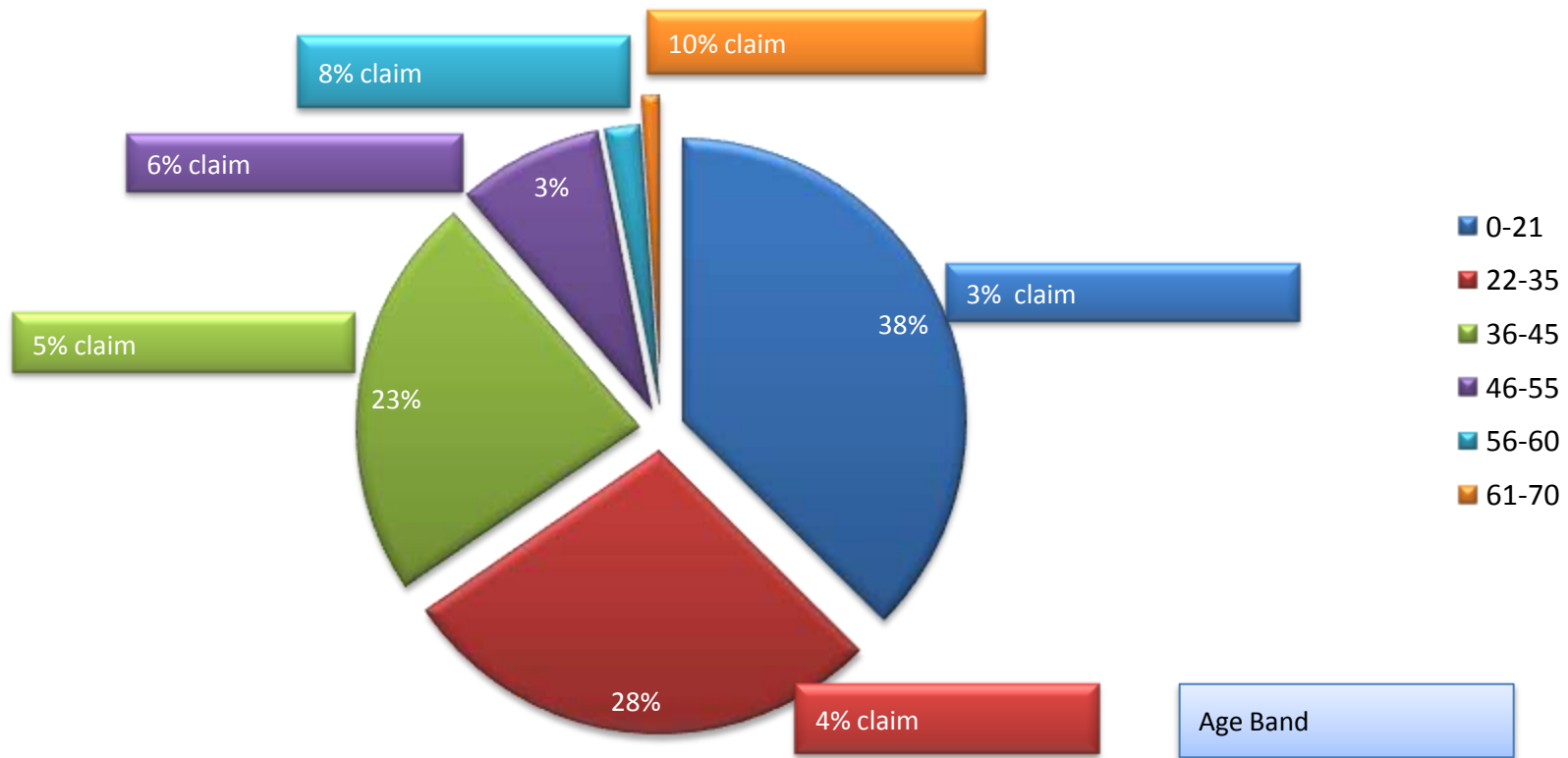


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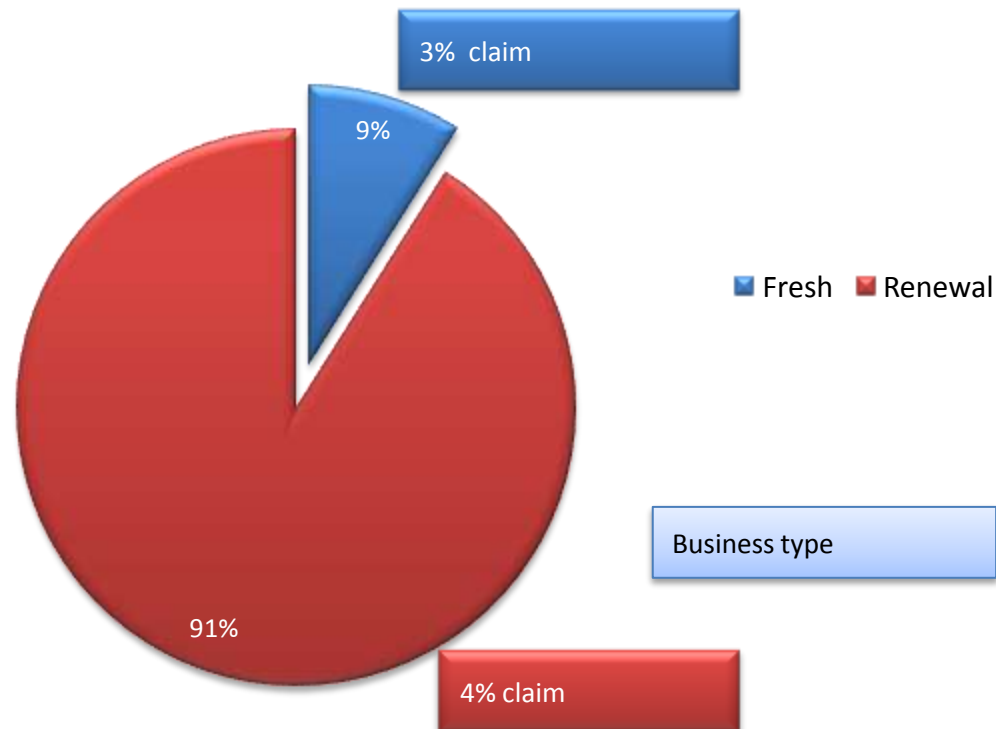


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When and Why

How

Approach

Modeling window

- 2011 Quarter 1
- 2011 Quarter 2
- 2011 Quarter 3
- 2011 Quarter 4

Data waterfall :

- Sample of 37893 policies with 5% claim rate.
- Sample of 104003 insured with 3% claim rate.

Factors considered

- Controllable factors: Cost of acquisition, Add on.
- Uncontrollable factor: Inflation.



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Methodology

Generalised Linear Mixed Model (GLMM)

- Extension to the generalised linear model in which the linear predictor contains random effects in addition to the usual fixed effects.

Variables considered:

Fixed :

- Sum insured.
- Age of the insured.
- Business type

Random:

- Classification of the insured
 - Adult1
 - Adult2
 - Child1
 - Child2



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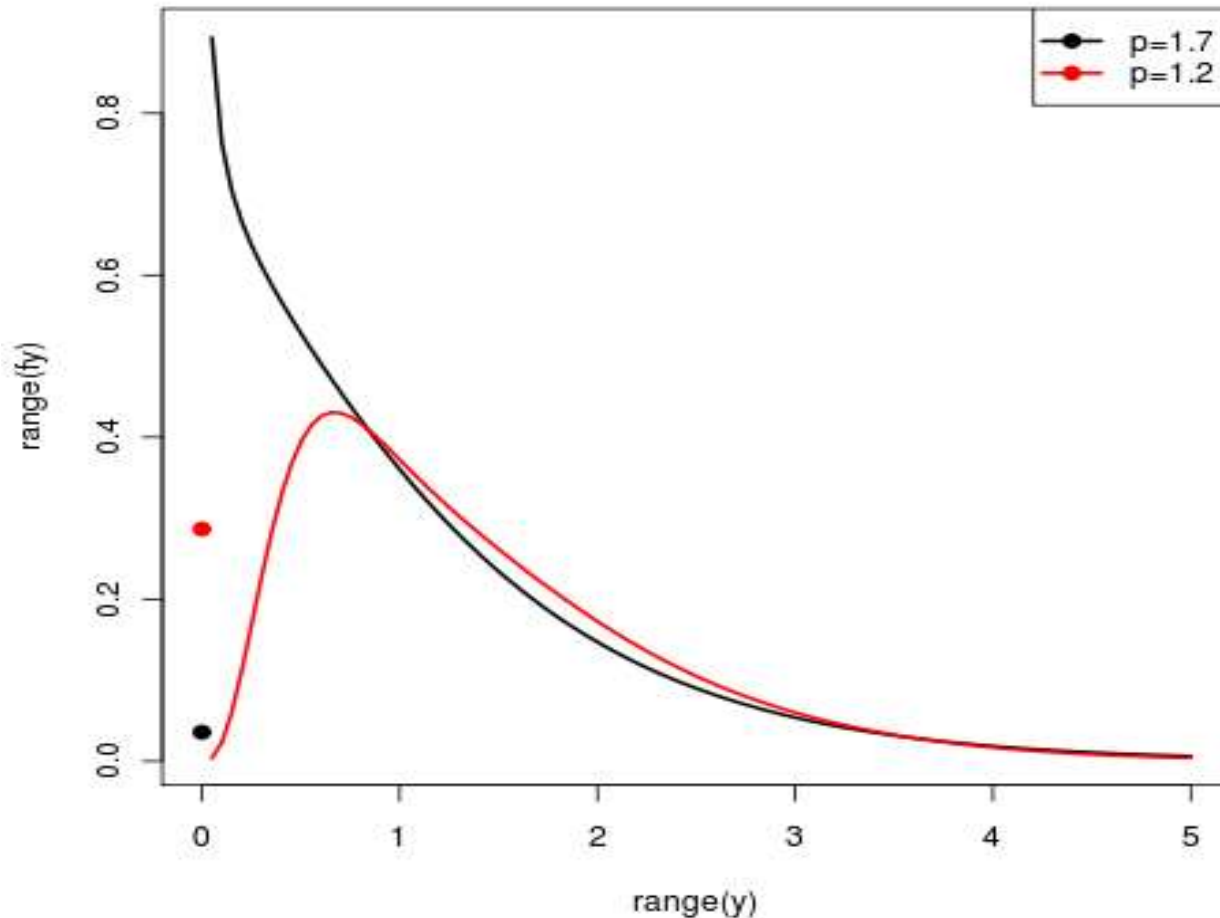
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Calculation of burning cost

- Idea is to consume the correlation structure between the claims and accordingly derive the burning cost.
- Distribution used: **Tweedie**.
- Tweedie is a compound distribution of Poisson and gamma distribution which takes care of both frequency and severity.
- The Tweedie distribution is a special member of the exponential family with p being an additional parameter.
- The distribution can be Poisson-like (as p approaches 1) or Gamma-like (as p approaches 2).

Tweedie distribution with varying value of p





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Comparison of means

Sum Insured
400000

Variable	N	Mean	Std deviation	Minimum	Maximum
Risk_P	3,183	2,168	1,449	760	7,435
Existing_P	3,183	3,490	2,251	1,623	12,851
Clamed_Amt	3,183	2,168	16,687	-	400,000

Sum Insured
500000

Variable	N	Mean	Std deviation	Minimum	Maximum
Risk_P	6,572	1,667	1,628	910	8,927
Existing_P	6,572	4,143	2,563	2,123	14,821
Clamed_Amt	6,572	1,667	15,152	-	500,000



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Little statistics

<i>Statistics</i>	<i>claimed_Amt</i>	<i>Existing_prm</i>	<i>Risk_prm</i>	<i>Estimated_prm</i>
Mean	1115.8	1689.779	1171.093	1756.643
Standard Error	21.623	3.668	2.268	3.402
Median	0	1320.641	993.342	1490.02
Mode	0	1203.335	446.152	669.221
Standard Deviation	8335.46	1414.49	874.958	1312.437
Sample Variance	99256964.9	2858253.38	1093647.4	2460706.66
Kurtosis	309.652	11.753	11.438	11.438
Skewness	12.054	2.394	2.247	2.247
Range	350000	14375.228	8564.374	12846.561
Sum	165780801	251060606	173996724	260995086
Count	104003.2	104003.2	104003.2	104003.2
Largest(1)	350000	14821.324	8927.254	13390.888
Smallest(1)	0	446.096	362.88	544.32
Confidence Level(95.0%)	42.385	7.189	4.452	6.671

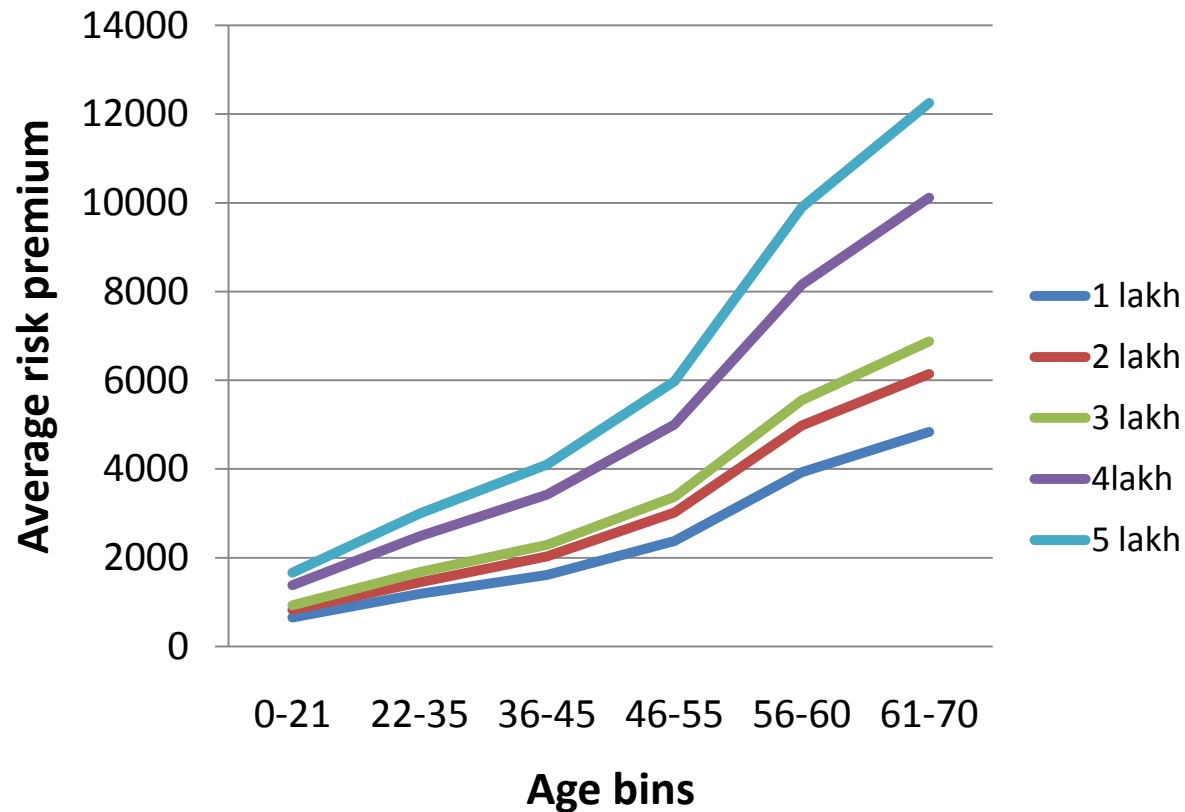


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Age and SI trend





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Key takeaways

- Portfolio should be well diversified
- Underwriting Guidelines should be in place to reduce anti selection
- Constant monitoring and identifying the pain points of the portfolio is critical for survival
- Rate revision should not be too frequent and neither should be too sharp



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Thank You