



Institute of Actuaries of India

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the **Actuary** **INDIA**

THE MAGAZINE OF THE INSTITUTE OF ACTUARIES OF INDIA

June 2018 Issue

Vol. X - Issue 06

Pages 40 • ₹ 20

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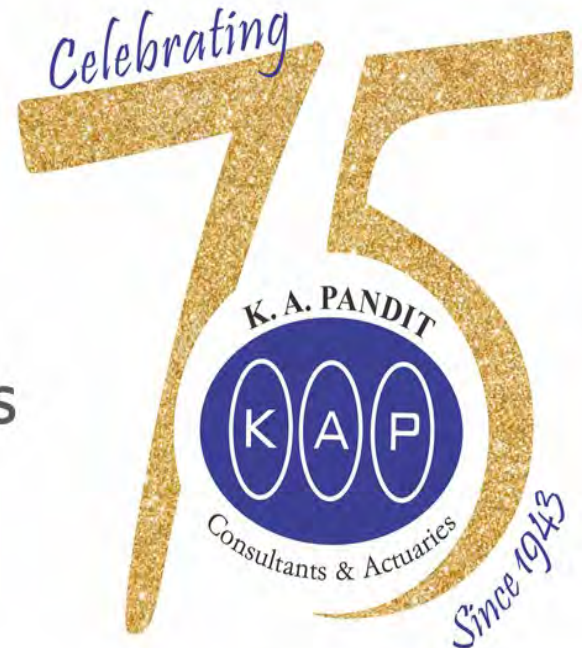
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"A noble man's thoughts will never go in vain. - Mahatma Gandhi."

"I hold every person a debtor to his profession, from the which as men of course do seek to receive countenance and profit, so ought they of duty to endeavour themselves by way of amends to help and ornament thereunto - Francis Bacon"

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Printed and Published monthly by Vinod Kumar Kuttierath, Head of the Education and Training, Institute of Actuaries of India at PRINT VISION, 75/77, 1st floor, Punjani Ind. Estate, Near Abhishek Hotel, Khopat, Thane (W) 400 601, for Institute of Actuaries of India L & T Seawoods Ltd., Plot No. R-1, Tower II, Wing F, Level 2, Unit 206, Sector 40, Seawoods Railway Station, Navi Mumbai 400 706
Email: library@actuariesindia.org, **Web:** www.actuariesindia.org

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5th SEMINAR ON Current Issues in General Insurance (5th CIGI)

Organized by: Advisory Group on General Insurance
Date: 26th & 27th July, 2018 Venue: Hotel Sea Princess, Mumbai

The Seminar would focus on the following topics:-

1. **CEO Panel Discussion:** The road ahead for the Indian general insurance (GI) industry
2. **IFRS 17:** The implications for GI companies in India
3. **New Reinsurance regulations:** The new rules, opportunities and challenges
4. **Claims Process Automation:** Challenges and Opportunities
5. **Insuretech:** How can tech change the insurance landscape in India
6. **Customer service in GI:** some key pain areas and issues from the views of consumer, IRDAI, Intermediary, Insurer
7. **Underwriting in GI:** Evolution of underwriting techniques - from ancient to new age
8. **Expense of management caps:** where does the industry stand, challenges in achieving the cap ratio

General Points:-

- ❖ **Registration Fees (Excluding 18% GST):**
Students & Associate Members: ₹ 3,750/-
Fellow Members: ₹ 7,500/-
Non Members: ₹ 9,000/-
- ❖ **CPD Credit for IAI members:** 12 hrs. Technical in General Insurance (As per APS 9 -Rev. Ver 2)
- ❖ **Registration last Date:** 23rd July, 2018. Admission on first come first serve basis
- ❖ **Point of contact:** Ambreen@actuariesindia.org
- ❖ **For Registration, kindly visit:** <http://www.actuariesindia.org/index.aspx> - Seminars - Upcoming Seminars- Seminar Registration

Other Upcoming Seminars

(Detailed announcement/s will be available soon at <http://www.actuariesindia.org/index.aspx> - Seminars - Upcoming Seminars- Seminar Registration)

Title: **1st Seminar on Data Science and Analytics**
Organized by: **Working Group on wider areas of Actuarial Science**
Event Date: **21st July 2018**
Venue: **Marriott Hotel (Whitefield), Bengaluru**
CPD Hours: **6 hrs. Technical (As per APS 9 -Rev. Ver 2)**

Title: **6th Capacity Building Seminar in Health Care Insurance (CB HCI)**
Organized by: **Advisory Group on Health Care Insurance**
Event Date: **2nd August 2018**
Venue: **The Pillazio Hotel, Gurugram**
CPD Hours: **6 hrs. Technical (As per APS 9 -Rev. Ver 2)**

Message from the President



Dear All,

With declaration of results of the April 2018 diet, let me begin with wishing all the students who have cleared their exams. This time we had taken stretched targets to declare results in May, earlier than previous year and we could achieve that. I thank you the examiners and the Institute staff who could achieve it. Let me also emphasize to

students on the importance of a timely start for the next examination. Careful Planning backed by sincere preparation is the key to success more importantly for those who take the exams with full time employment.

On the front of seminars and training programs, number of programs were held during the current calendar year. I have covered some of them in my earlier columns. It is worth mentioning the innovation in training program - a health insurance product design and pricing workshop for new comers in health insurance area. This was a three days class room teaching classes in Institute office followed by a two full days webinar training for the same group of students by expert faculties. I thank the volunteer actuaries who led the program and make it happen. We plan to do many such programs going forward for our students.

To expand our wings into non traditional areas (beyond insurance and pension) and to train/ update our students and members, we have recently concluded a seminar on "Finance & Investment" on 18th May 2018 in Mumbai. Over 60 delegates attended this event. I firmly believe that actuarial curriculum is thoroughly competitive in preparing the students in the area of Banking, Finance and Investment and with right amount of training and support to our members we can enter into these areas and make great accomplishments.

There were a few presentations and panel discussions which were aimed at increasing the awareness of the participants of the nature of work being done in Finance and Investment Banking and identifying how various actuarial subjects can prepare students in different areas of these functions such as investment trading, Credit ratings, ALM Venture Capital etc.

Some of the areas of Investment Banking and Finance where actuaries can easily contribute would be

- ❖ Dynamic Financial Analysis which involves building a financial model that allows for the interrelationship between various risks in overall risk assessment.
- ❖ VaR and T-VaR modeling to identify the loss interval of any portfolio, actuaries do it for insurance, the principles can easily be extended to Pension and other large Investment Funds.
- ❖ Fund Management functions; especially for the funds with long term liabilities.
- ❖ Pricing Strategies for derivative securities and Option Valuation based on Black and Scholes model. This is based on complex financial mathematics and actuaries may have an advantage here over other professionals.
- ❖ Project Appraisal; Actuaries may be better placed to allow for the inherent long term risks in the projection models and adding a lot of value in scenario and sensitivity analysis.
- ❖ Credit risk analysis for rating agencies based on credit and interest rate models

Globally a large number of Actuaries are working in Finance and Investment and I am sure this can happen in India as well given our academic training and practical exposure. In this context it may be worthwhile to revisit the example of risk function, around 10 years ago there were hardly any actuary working in the function of risk but now actuaries are leading the risk function from the front in some insurance companies and I can say with a lot of confidence that actuaries are perceived as more valuable in the risk function than other professionals.

As I have many times said in my column the key here would be the initiatives taking on the part of the student and fellow actuaries, of course alongwith the Institute. While IAI would be very keen on extending whatever support is possible and would try and increase the engagement with the professional in these areas yet the onus would be on the students to keep ears and eyes open and utilize these opportunities and identify the areas where some skill building is needed.

I see this as a great opportunity which is waiting to be tapped and we cannot afford to spend any more time at the shore, it's perhaps time to take that leap of faith and emerge as a winner in years to come.

We are conducting a five day Orientation Program in our Institute Office in Life Insurance area for fresh/ unemployed students by senior actuaries to give them initial training in Life insurance actuarial work. We hope with this training exposure, the students will be able to work better when they start working. We will have such programs repeated in other locations and in other practice areas.

All the best!

Organized By: Working Group on Wider Areas of Actuarial Science, IAI
Venue: Hotel Sea Princess, Mumbai **Date:** 18th May 2018

With a preamble that the Institute has taken a great step by creating a group called “Wider areas for Actuaries”, a seminar on the Finance and Investment was organised by the Institute with the help of the members of the group. It was a first of its kind of seminar where people from areas other than actuarial domain turned up to explain how Actuaries could explore themselves beyond Actuarial domain.

WELCOME & INAUGURAL ADDRESS



The President of Institute, **Mr. Sanjeeb Kumar**, in his inaugural address, welcomed the delegates and emphasized the aspiring actuaries to come out of their comfort zone and start seeing opportunities beyond the traditional areas. He quoted that he started running at the Age of 43 and now he has completed many Half Marathons and gearing up himself for the full Marathon and this could only happen when he pushed himself out of his comfort zone. Nothing is impossible for those who always live on the edge, he

Session: Role of Actuaries in Banking Sector in India

Speaker: Mr. Raminder Singh Pal Bagri

Session Highlights

The session kick started with a brief background about the Banks doing the Basel III and IFRS 9 reporting. The

discussion continued with a brief explanation about the BASEL III (Pillar I, II and III requirements) and IFRS requirements in Banks and how Actuaries can explore themselves in these niche areas of Banking.



Mr. Raminder strongly pitched that Banks are the uncharted territory for Actuaries especially in Indian Context and there is an enormous scope as Banking entails dealing with risks just like Insurance do, also, there are synergies between Banking and Insurance as they complement each other since Banks requires Insurers to insure the collaterals and credit, similarly insurers require banking services to hedge their risk and as most of the Insurance companies in India are owned by the Banks, there exists a Parent/Subsidiary relationship between Banks and Insurance companies. He described briefly the challenges being faced by the Banks e.g. evolving guidelines, people, data and IT infrastructure hence there lies opportunities for Actuaries, as Actuaries are proficient in the modelling work and have played a pivotal role in managing the risks for years and hence they can validate the Banks 'risk management framework and advise the banks' suitably.

Project Financing, advisory functions, capital planning and raising are the areas where the Actuaries

possess the expertise and this expertise can be shared with the Banks as there is a growth story yet to be written in the Indian Banking industry as the banking area is perceived to be the fourth largest sector by 2030. He articulated the fact that unlike in foreign banks, there are hardly any Actuaries in Indian Banks. Indian Banks normally deploy CAs, MBAs, FRM, Engineers and MSc Agriculture. The main reason for not hiring Actuaries, he envisaged, is the information gap. Actuaries are not able to find their place in the Banking sector as the Banks do not know that Actuaries exist and they can do wonders in banking sector.

The Take-away from his presentation was that the IAI should be pro-active in creating awareness about the profession taking into account the proliferation of actuarial students, market the profession and Student actuaries should not confine themselves and wait for the traditional areas to employ them rather they should explore themselves in these non-traditional areas and carve out a niche in the Banking Sector.

Session Summary

- ❖ The session helped making people understand areas in banking sector where Actuaries can add value as risk professionals.
- ❖ The session told a riveting area where Actuaries can leave their footprint.

Session: ALM for Employee benefit funds - are we doing enough?

Speaker: Mr. Khushwant Pahwa



Session Highlights

Mr. Khushwant Pahwa started the session by explaining “coincidence of needs”, need of clients to

better manage Employee benefit funds is coinciding with need of the Actuarial professionals to work in wider areas considering increased supply. He enlightened how Actuaries can add value by advising ALM for Gratuity liabilities, providing detailed insights on how to build Investment strategies and what are the components of Gratuity liabilities. He explained the impact of asset liability mismatch on the provisions of Gratuity by a case study on the balance sheet of a company. The impact of change in government security yield on assets and gratuity liabilities were presented in detail. Further, he moved on to present the effect of better asset management where the balance sheet of the same company was demonstrated resulting into lesser adverse impact on P&L. He mentioned, large companies are not very keen on paying attention to this concern though the better ALM will result in stable profits. And, hence it is very important to market our solution really well; working in silos is neither good for the company and nor for the Actuaries. He emphasized that a better ALM not only increases the reported profit and decreases in real cashflows but also reduces the cost of buying additional asset. He mentioned that Actuarial solution for ALM and valuing assets can include cash flow matching, MTM/duration analysis, investment pattern analysis and risk analysis.

Additionally he briefed about role of Actuaries in choosing EPFO or exempted trust, leave liabilities management and valuation of ESOPs.

Session Summary

- ❖ The session helped understand the need of Actuarial advice in Employee benefits ALM.
 - ❖ How Gratuity liability valuations help us understand required asset class for better management of Assets.
 - ❖ Three fold impact of better asset management
- This session concluded by noting “we have to earn wider areas work and market ourselves better, keep an open eye, Employee benefits is just one area and we have potential to explore many more”.

Session: Actuaries in Alternate Assets: a case study on Venture Capital

Speaker: Mr. Mahidhara Davangere V.



Session Highlights

With his rich experience in wider areas, **Mr. Mahidhara Davangere** started his presentation by explaining one of the emerging wider fields for Actuaries i.e. Venture Capital. He told us that Actuarial profession is very old and mentioned that Halley, an Actuary, born in 1656, was famous because of a comet which bears his name, Halley's Comet. How a venture capital industry works explained by him using a flow chart. He quoted the example of the one of the Top 5 venture capitalists in India, "Sequoia Capital", which has invested heavily in India, having an investment of about USD 1 Billion in India in around 117 portfolios. According to him, there is huge growth in the venture capital industry and the growth story is yet to be written.

Later in his presentation, he explained about the challenges faced by the Venture Capitalists and how Actuaries can step in as the best suited professionals to advise the Venture capitalists to manage VC risks e.g. product risk, market adoption risk, market size and timing risk, financing risk, execution risk, management team risk, business model risk, technology risk and last but not the least, exit risk. He explained that like Actuarial Control Cycle, there is a Venture Capital life cycle in the start-ups.

He described the limitations of the decisions solely based on judgments as those decisions may end up paying the VCs with heavy cost of investing in projects and high risk of failure. He quoted the example of UBER Taxi company employs Actuaries in their company to manage the risk associated with the taxi management business as they know who else can do better than Actuaries.

He explained that like any other industry, Venture Capitalists risks can be divided in to two parts one is systematic risk and the second is unsystematic risk and Actuaries can manage those unsystematic risks using their sound knowledge and uniqueness of their skills in dealing with probabilities and excel in modelling and their ability to quantify the risk.

The only thing that the Actuaries need to adopt is the dynamics of new sectors and their risks, he emphasized. Actuaries need to change their mind set that they are meant for Insurance only rather they need to see the areas where the Actuarial principles can apply and market themselves. He also made people aware that the curriculum is being changed to make it closer to Data Scientist but Actuaries are much beyond that and they might need to present themselves as Business Scientist as they not only understand the data but also understand the business as well.

In the initial stage, Actuaries may face hurdle to establish themselves in these areas and they will be facing competitions with the CAs and FRMs but at the end of the day, it is Actuaries who need to win the battle and stand themselves against the odds and rise to the occasion.

Session: Application of Actuarial skills in investment banking

Speaker: Mr. Chinnaraja Pandian



Session Highlights

Mr. Chinnaraja started the session by motivating all student members to come out of insurance sectors & asked them to explore wider sectors. He took an opinion poll on "which area of investment banking an Actuary can work" which of course had a mix response across all possible areas. He then explained various work areas of investment banking and which actuarial paper can we apply for the same. Table will summaries the details. (see table on page 9)

Area of work	Techniques used	Relevant Actuarial Papers
Risk Management: Market, Credit and Operational Risk	Risk measure, Greek, Exposure Analysis, Distribution, Back testing, PCA	CT3,CT4,CT6,CT8 ,ST6
Risk Management: Stress Testing	Time series analysis, scenario prediction, Calibration and accessing risk, Cluster Analysis, PCA	CT6,CT7,ST9
Risk Management: Margin Computation	Analytical, Simulation, Numerical method, SPAN	CT8,ST6,ST9
Risk Management: Regulatory Compliance	Basel, Solvency, Local regulation	Specialised Application level papers
Risk Management: Economic Model	Capital Adequacy, Pillar II, Risk appetite	CT8,ST6
Risk Management: Enterprise Risk Management	Risk aggregation, Risk budgeting, Allocation, Marginal risk	ST9
Trading: Valuation of trade	Analytical, Numerical method, Simulation	CT1,CT6,CT8,ST6
Trading: Arbitrage strategy	Replicating portfolio, Trend and Time series analysis, High frequency trading, Back testing, Technical Analysis	CT6,CT8,ST6
Trading: Structuring	Product design, Hedging, Index Construction	CT8,CA1,ST5,SA6
Trading: Sales	Client risk appetite, Communicating	CT7,CA3
Portfolio Management: Asset Allocation	Performance of assets, fund management, ETF, Mutual Fund	ST5,SA5
Portfolio Management: Diversification	Marginal & Incremental risk, Risk adjusted return	ST5,ST9,SA5
Portfolio Management: Optimization	Portfolio frontier, optimization of asset allocation	CT8,ST5,SA5
Portfolio Management: Benchmarking	Performance Appraisal, Reporting, Peer comparison	ST5,SA5
Model Validation: Model Risk	Performance analysis, Model reserves, Risk Add-on	CT3,CT6,CT8 ,ST6
Model Validation: Model Audit	Goodness of model	CT6,ST9
Model Validation: Regulatory Compliance	Annual model review	
Others: Fundamental analysis	Stock Valuation, ratio analysis, cash flow projection	CT1,CT2
Others: Trading support	Fair price, independent valuation	CT8,ST5
Others: Prediction of economic scenario	Regression, Factor models	CT6,ST9

He briefed how BASEL norms in banking are related to insurance solvency regime and how Actuaries can work in this area including risk management. He listed the professionals recognised in investment banking in order of relevance which was followed by an opinion poll “where the actuarial profession can fit in?” He then explained the evolution of investment banking industry and gave brief insight on how actuarial students have to up-skill themselves by learning Python and should undergo more investment related technical hours. He also made us aware that investment banking industry is developing quickly and hence require the actuarial syllabus to also get updated at the same pace.

Session Summary

- ❖ The session helped in understanding various areas in investment banking where actuarial knowledge can be applied
- ❖ Got a brief on Required skillsets to work in investment profession

The question answer session then concluded on the note that the way institute recognises other professional courses like CFA and FRM, institute should work towards getting a formal recognition for actuarial papers in investment banking.

Session: Emerging role of Actuaries in Finance and Investment - (Panel Discussion)

Moderator: Mr. Mahidhara Davangere V.

Panellists: Mr. Sanjeeb Kumar, Mr. Vivek Shah, Mr. Nidhesh Jain, Mr. Raminder Singh Pal Bagri, Mr. Khushwant Pahwa, Mr. Chinnaraja Pandian



Mr. Mahidhara welcomed everyone to first ever discussion having professionals from IIT IIM CFA along with Actuaries on finance & investments. He asked Vivek shah to brief on what investment banking is. **Mr. Vivek Shah** explained trading, M&A, equity research and capital market are various areas and there will be need in banking industry to understand insurance.

Mr. Mahidhara explained the purpose of discussion is also to open up opportunities in wider areas. Further he asked Mr. Nidhesh Jain about reelection of actuaries in equity research. Nidhesh mentioned, finance and investment domain attracts all fields like engineers and doctors as well. He mentioned the equity's research team works in projecting future cash flows for the company and hence Actuarial skill set can be used. He asked the panelists how actuarial student can enter banking sector. Vivek said if engineers can enter this field actuaries can definitely do. Raja added, the skills that we test in our entrance exam are required to qualify for probable candidate in this industry. He believes our course is enough to get the exposure even if the product we learnt are different than banking. He said the banking industry is not aware about the potential skillsets that they will get by hiring actuarial professionals.

Mr. Mahidhara asked Vivek the hard reality on how actuaries are perceived in investment banking. Vivek precisely mentioned about lack of marketing to boss, colleagues, clients, also brand and mind awareness. The course and approach is made to complicate that high level information is not required.

Moderator asked panelists to talk about where the opportunities are lying. **Mr. Khushwant** mentioned it is everywhere. ALM, Equity research, Mutual funds, etc.

Actuarial course is combination finance, economics, mathematics and statics, thus it is possible to fit in any area. He mentioned it is required to prepare for an interview by gathering available information, understanding the accounts of the company, etc. and you can't just walk-in.

In view of "How institute can help student members to get into wider areas"; President stated that Institute has already started working in this direction by-

1. Helping students up skill by organising training such as language R
2. Marketing of profession and reaching out to wider areas and employers by organising events like employment mela and employment portal
3. Prepared the committee of council members and a working group which is focusing on "Wider Areas of Actuarial Application"

He also promised to accelerate the agenda of increasing awareness of Actuarial profession in other industries like banking and investment. In Actuarial curriculum, half a dozen exams which can help finance & banking as career including accounts, economics and risk management. Khushwant Pahwa compared Actuaries as hardware, Institute of Actuaries as the software and skills that needed to install within them before going on different areas as an App. He emphasized that only passing papers won't work and Actuaries need to prepare themselves as per the need of the hour. When Mahidhara asked Vivek Shah who will he prefer to recruit out of MBA finance, CA, CFA & Actuary? Vivek Shah replied that Answer is already there in the question. He suggested Institute to shortlist the companies and get in touch with them for 1-2 months internship.

Mr. Chinnaraja added that the mindset needs to change like HR will go to IIT for recruitments likewise they should approach Institute.

Mr. Sanjeeb Kumar, President, IAI, assured that he will work in the areas to up skill the Actuarial profession and marketing of the profession.

Mr Raminder also assured that he will look into the opportunities in the banking sector and create awareness about Actuaries within the banking sector.

All the panelists agreed to get the internships for student members. Mr. Shah mentioned that profession is trying to get into investment banking it just the matter of knocking the door harder.

There was a long question and answer session, the highlights of the same were -

1. Students and Institute need to collaborate to get investment banking internship
2. Actuarial professionals need to identify weaknesses
3. Marketing plus filtering better students to join wider profession

4. Use of social media for marketing
5. Also, work towards increase of Actuarial student supply by more awareness

Panel briefly discussed what is happening in developed markets like IFoA has specific board for finance & investment, South Africa has fellowship paper in banking, etc.

The session was concluded by discussing expected future outlook. Chinnaraja mentioned it is bright and it just need right efforts.

Vivek Shah said it's like Tata Sky advertisement - "Puchne main kya jaata hain" so keep open mind and get into wider areas.

Nidhesh Jain said as a student we should be broad minded and future is bright.

Session Summary

- ❖ The session helped to understand how Actuaries have already been working in areas other than Actuarial.
- ❖ Actuarial principles are the same, Actuaries only need to be open to adapt to the dynamic environment and keep them abreast of what's happening around other industries.

About the Authors



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FEEDBACK

Re - Brand the profession to inculcate non- traditional areas. In the term ' Actuary' via aggressive marketing & organise career fairs wherein the institute can mediate between Finance & Investment firms and the student Actuaries fill the information gap by sharing info and opportunities outside insurance via the newsletter, article and social media campaign

Small discussion groups should be waited where smaller groups can initiate and brain storm on wide topics

Would like to know more on consulting areas & expertise required. (Entrepreneur opps.) Going further depending on responses received & efforts of the WG- particular area can be focussed

It was great initiative to invite people from non- Insurance Background. Please invite such people from top management (eg. Board of directors)

The content of the event was appropriate & very helpful. The Institute's encouragement is extremely appreciated. Would look forward to more training sessions in attentive fields. Suggest mentorship programs to be inducted by qualified actuaries to encourage students.

Branding of various levels of qualifications of IAI like chartered, Associate, analyst before fellow. Such platforms to various HR head / division heads organisations to increase awareness of profession with industry. Have an on-going marketing & awareness strategy to profit the profession.

Very good initiative from Institute to enhance actuarial domain/ Knowledge to wider areas like bank investment , bank, etc. this should be continuous process so as to have more access to other areas than insurance

Advisory Group Update on Working Group on Wider Areas of Actuarial Science

The Working Group on Wider Areas of Actuarial Science came into effect on 14th March 2018. The objectives of the working group are 1) to identify areas beyond traditional domain for actuaries to work in India, 2) to identify and create more employment opportunities for actuaries, 3) to contribute more literature and research towards new areas of actuarial application and 4) to help members working in non-traditional areas to gain CPD and other support from the Institute. The Working Group currently comprises of six working members and several volunteers who directly report to the president and also supports the strategies formulated by the Wider Fields Committee. The Wider Area Working Group has identified following key areas to promote actuarial profession in India:

1. Banking, Finance and Investment
2. Data Science and Analytics
3. Resources & Climate Change
4. Enterprise Risk Management
5. Broader Domains within Insurance

In order to promote actuarial profession in the wider areas the Working Group is supporting IAI through following strategic action plans like Marketing within the student community and potential employers of wider areas, developing theoretical knowledge base in chosen areas and giving practical exposure in the form of free internships. Several Seminars and Workshops are being planned in order to create awareness and communicate with existing members regarding the career opportunities in Wider. Very recently, the 1st Seminar on Finance & Investment was held on 18th April 2018 in Mumbai with focused on topics like Banking, Investment Banking, Venture Capital and Asset Liability Management. Similarly seminars related to Data Science & Analytics and Resources & Climate change are scheduled to be held in Bangalore and Delhi in next few months.

The Working Group is assisting IAI in rebranding Actuarial Profession beyond the traditional domains. The knowledge gained by studying the actuarial subjects like Financial Mathematics, Economics, Statistics and Modeling prepares the students to work in various domains which need quantitative and multidimensional thinking. The IAI is taking initiatives to position the Actuarial profession appropriately among the recruiters from different Industries, the Industry leaders and senior Management. As a first step towards moving into the wider fields, efforts are being made in promoting the Actuarial Students and Qualified actuaries to get placed in the risk management division of the Banking Sector. In this regard several initiatives are being taken to tie up with institutions like RBI and National Institute of Banking Management (NIBM). Also the opportunities to avail internship programs in various banks are explored to support the student members.

Going forward a specific section in the Actuary India magazine will be dedicated to articles relating to wider areas. We encourage all the members to share their knowledge by contributing diverse articles to this section. We also encourage a lot of support from the members in the form of volunteering with the Working Group to enable IAI in taking the Actuarial profession to new horizons. You can send your interest in joining as a volunteer to marketing@actuariesindia.org.

Submitted By



Mr. Mahidhara Davangere V.

Chairperson, Working Group on Wider Areas of Actuarial Science



Ms. Anamika Patil had been a part of IAI family as Executive- Education and Training. During her tenure in IAI, she found very sincere, hard working and cooperative with each one. We wish her great success and happiness for her future ahead.

Recently, Institute of Actuaries of India (IAI) conducted its first ever classroom training program on Health Insurance industry by the name of "Health Insurance - Product Design and Pricing Training". The purpose of writing this is to share my experience on the same and what were the hits and misses of the training.

Hits: Name: In my opinion, the name of the program was chosen very wisely, wisely enough to attract many of the working professionals from PAN India attending the session.

Faculty: First of all, I would really like to thank the faculty of the program to make this session very interesting and successful and specially for answering all our questions very patiently (as there were many!). IAI managed to bring some real experts from the industry for this particular session covering the Insurance and Reinsurance professionals from life, health and general insurance industries. You could only judge the experience of the faculty by knowing that there were appointed and chief actuaries present as the trainers.

Cost Effective: The program was priced at just ₹4000/- exclusive of GST which in my opinion is very cost effective & productive for the attendees.

The Program: In my opinion, the program was structured wonderfully with the timely breaks! It was a three days highly interactive program which is yet to follow by two days of Webinar. Brief of the program is as follows:

Day 1:

Topics Covered -

- (i) Overview of Health Insurance Industry
- (ii) Understanding of fixed benefit products (Critical Illness & Hospital Cash) - Retail

Faculty -

Ms. Anuradha Shriram (Appointed Actuary - Aditya Birla Health Insurance)
Mr. Nirav Shah (DVP Actuarial - Aditya Birla Health Insurance)
Mr. Himanshu Manocha (Senior Manager - Aditya Birla Health Insurance)

Description -

First day of the program started with describing the ecosystem of the overall health insurance industry followed by describing the life cycle of the product from design to claim. After this, we were informed about the various types of products available in the market and the needs they serve. The session not just only covered the Health products but also described the role of an actuary (including appointed actuary) and the need of interacting with the other teams within the company.

"Being an Actuary is not just about the numbers, you must possess key business sense along with having good interpersonal skills to be able to communicate

your work"

After the lunch break, the program covered the overview of various Reinsurance arrangements along with few examples on how to calculate the Reinsurer premium rates. At last, the training on first day concluded by describing about the fixed benefit products available in the Health Insurance Industry such as Critical Illness and Hospital cash and a Case Study & assignment was provided on pricing of fixed benefit health insurance product as homework.

Day 2:

Topics Covered -

- (i) Understanding Indemnity Insurance products - Retail (Conventional)

Faculty -

Mr. Jaiwardhan Vij (AVP Actuarial - Bharti AXA General Insurance)
Mr. Anshul Mittal (Senior Manager Actuarial - Apollo Munich Health Insurance)
Mr. Sumit Ramani (Founder - Actuarial Consultants)

Description -

Second day covered both the aspects of theoretical as well as practical. It started with the description on the Indemnity based products in Health Insurance and covered how it is different and more comprehensive

than fixed benefits products. Post this, practical aspects of the Health Insurance pricing was covered using the Excel Model. We were provided with the different data sets for the claim frequency and claim size and were taught on how to make relevancy checks on the data. After data cleaning part was done, it was shown to us how to price using the frequency-severity approach and find the ultimate Burning Cost. It was also shown that how other factors than frequency and severity affect the prices and what is the actual difference between the “Rating” (Price from the model) and “Pricing” (Price actually quoted in the market).

Day 3:

Topics Covered -

- (i) Understanding the Product filing process - F&U only
- (ii) Product Design Competition

Faculty -

Ms. Neha Podar (AVP Actuarial - HDFC Ergo)
Mr Abhijit Pal (Head of Pricing Life & Health - Munich Re India)
Mr. Sumit Ramani (Founder - Actuarial Consultants)

Description -

Third day was related more on us to deliver based on the Case Study that was provided to us on the first day. Session started with the brief description on the product filing procedures. This session covered the guidelines and regulations to follow while filing the Health Insurance product using File & Use procedure, role of the regulatory Authority (IRDAI) and how other teams in insurance space support you for the product. Before Lunch, President of IAI Mr. Sanjeeb Kumar himself addressed us and made us aware of the evolving fields for Actuarial profession and the role of Actuaries in them. Post Lunch, presentations on the Case Study was presented by the various teams in front of the Faculty whose agenda was to represent our learning from the training. At last, we were provided with a homework assignment to complete on pricing before the Webinar.

Misses:

Fresher Students: The major missing from the program were the fresher students who wants to learn about the industry and enter the profession. The program was designed in such a manner to help the fresher gain knowledge in the field and finally be able to land into a job/internship (IAI actually collected freshers' CV and said they will forward it to appointed actuaries of various companies). 80%-85% of people who attended the session already had a job and just attended to enhance their skills and knowledge in the field.

“Learning never ends”

Timing: The training was planned alongside with the first ever seminar on Finance and Investment. Attendees who wanted to learn more on non-traditional areas of Actuarial couldn't attend it due to date clash.

Reach: Training was held in Mumbai where majority of IAI events takes place. IAI could plan on to extend the reach at least in Tier 1 cities either through live video sessions or planning such trainings in multiple cities as it is not feasible for everyone to travel to Mumbai.

Verdict:

There is still 2 days of webinar to follow but already I give this training and initiative a big Thumbs Up. I am in a big hope that IAI will now continue on the same path to provide such trainings to those who wants to learn or enhance their knowledge from the direct interaction with industry experts. Attending such programs also helps you in building your network.

Just few days back, IAI announced a program by name “Student Orientation Program (Life Insurance) and Employment Mela”, program seems interesting enough for those who are in search of their first job or want to have a change. Freshers - Go for it!

Let's support IAI with their new initiatives and help them to grow the profession continually.

About the Author



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“Akshun Geethesh is a Student Member of Institute of Actuaries of India. He is currently working as Actuarial Analyst in Lux Actuaries & Analytics LLP.”

Intern - Actuary

If You Are

- ✧ An enthusiastic college graduate
- ✧ And aspire to make a mark in the actuarial world
- ✧ Enjoy working on data and analyzing trends with pivots, graphs
- ✧ Adept at using excel functions and creating macros to automate actuarial tasks
- ✧ Are fascinated with accuracy and applying actuarial formulae to solve real world problems

THEN WE ARE

- ✧ Reliance Nippon Life Insurance Company, a Company amongst the leading private sector life insurance companies in India
- ✧ Rated amongst the Top 3 Most Trusted Life Insurance Service Brands by Brand Equity's Most Trusted Brands Survey 2017
- ✧ Reliance Nippon Life Insurance Company is a part of Reliance Capital, one of India's leading private sector financial services companies, which ranks among the top private sector financial services and non-banking companies, in terms of net worth

LET'S MOVE FORWARD TOGETHER

- ✧ We are inviting interns to join our actuarial team based in Mumbai
- ✧ Work profile shall involve working in product pricing (both retail & group), system implementation, reinsurance, modelling, business planning, valuation & EV reporting
- ✧ We provide growth opportunities to grow on professional and personal front
- ✧ We provide diverse work environment to provide a well rounded experience
- ✧ Based on work performance and business requirements, candidates would be offered full time roles in the Company at the end of the internship period
- ✧ Please send in your CVs by **10 June 2018** to kiza.ahuja@relianceada.com and sudhir.v.shinde@relianceada.com
- ✧ Join us to jumpstart your actuarial career!



Agriculture Insurance Company Of India Limited

Regd. Office: "Ambadeep Building, (13th floor), 14, Kasturba Gandhi Marg, New Delhi – 110 001

Applications are invited from resident Indian Citizens for the post of **"APPOINTED ACTUARY"** on Contract basis.

1. Total No. of Vacancy - 1

2. Eligibility conditions - As on 01.06.2018

3. Qualifications - The candidate should be a "Fellow" of Institute of Actuaries of India and he/she should satisfy all the requirements of IRDA (Appointed Actuary) Regulations, 2017 & other relevant IRDA regulations with regard to Appointed Actuary issued from time to time.

4. Experience - Preference will be given to candidates with experience in General Insurance Industry.

5. Duties and obligations - As per IRDA (Appointed Actuary) Regulations mentioned above.

6. Selection Procedure - The Selection procedure shall be by personal interview

7. How to Apply - Only Hard Copy of Application on A 4 size paper neatly typed or handwritten in CAPITAL LETTERS, incorporating all relevant information, super scribed at left hand upper corner of the envelop "AIC-APPOINTED ACTUARY", along with self-attested photocopies of all the relevant documents as mentioned in the IRDA Regulations, should be sent to the following address.

Deputy General Manager (HR)
Agriculture Insurance Company of India Ltd.,
HR Department, 21st Floor,
Ambadeep Building, 14 Kasturba Marg,
Connaught Place, New Delhi – 110 001

7. Last Date of receipt of Application - 11.07.2018

For details please visit company's website www.aicofindia.com

Regional rural bank employees to get pension at par with nationalized banks

A Supreme Court verdict on 25.04.2018 paved the way for regional rural bank (RRB) employees draw pension at par with nationalized banks, ending a two-decade long legal battle.

The Supreme Court has dismissed a special leave petition filed by the government in 2012 and directed the government to implement a pension scheme in all RRBs uniformly as available in nationalized banks as per the bipartite settlement in 1993. Supreme Court instructed RRBs to follow judgment within 3 months.

Approximately 25 thousands retired RRB employees and 1 lakhs active employees are set to gain from this verdict. The country has 56 RRBs delivering loans primarily to small and marginal farmers and creating financial access in rural belt.

The employees will be eligible for pension with retrospective effect from November 1991. The rate of basic pension will be 50 percent of the average pay based on 33 years of service. It is worthwhile to note that this pension was introduced in lieu of employers' contribution to the Provident Fund. So, it is likely that new rules which are to be framed as per this judgment, may require retired employees to return Bank's contribution to PF along with interest earned on same.

Supreme Court judgment copy:

http://www.supremecourtindia.nic.in/supremecourt/2012/37496/37496_2012_Order_25-Apr-2018.pdf

Relevant case law of Jodhpur High court: Special Appeal (W) No.2021/2011

<https://indiankanoon.org/doc/66568177/?type=print>

Relevant case law of Karnataka High Court Writ Petition No.20034/2003

<http://judgmenthck.kar.nic.in/judgments/bitstream/123456789/518132/2/WP20034-03-22-03-2011.pdf>

Pradhan Mantri Rojgar Protsahan Yojana (PMRPY)

This Scheme has been designed to incentivize employers for generation of new employment. This scheme has a dual benefit, where, on the one hand, the employer is incentivized for increasing the employment base of workers in the establishment, and on the other hand, a large number of workers will find jobs in such establishments. A direct benefit is that these workers will

have access to social security benefits of the organized sector.

As per this existing scheme (version dated 23.02.2017), Government of India will be paying the 8.33% EPS contribution of the employer for next 3 years. Benefit is eligible only for new employees having wages upto INR 15,000 per month. A new employee is one who has not been working in an EPFO registered establishment on a regular basis prior to 01.04.2016.

For the textile (apparel) sector dealing with the Manufacture of wearing apparel, the Government will also pay the EPF contribution of 3.67%, in addition to payment of the EPS contribution of 8.33% for next 3 years.

In case an establishment eligible for a scheme has a drop/fall in employment from the reference base (existing employees count as at 01.04.2016), the establishment will not be eligible for the scheme in the months where employment is below this reference base.

The Pradhan Mantri Rojgar Protsahan Yojana - Version Dated 23.02.2017

<https://labour.gov.in/sites/default/files/PMRPY%20Revised%20Guidelines%20ver%202-1%20%28%29.pdf>

The finance minister, in his Budget 2018 speech, had announced that the government will now meet the entire 12% employer contribution to EPF. In an office memorandum, dated 12.04.2018, the ministry of labour and employment has amended the guidelines of the PMRPY to this effect. Now Government of India's will pay towards the full employer's contribution (EPF and EPS both) w.e.f. 01.04.2018 for a period of three years to the new employees and existing beneficiaries for their remaining period of three years through EPFO. The terminal date of registration of beneficiary though an establishment is 31.03.2019.

Amendment in PMRPY (April 2018)

https://www.epfindia.gov.in/site_docs/PDFs/Circulars/Y2018-2019/CAIU_Amendment_PMRPY_1854.pdf

Gratuity

As per sub-section (3) of section 4 of the Payment of Gratuity Act, 1972, earlier ceiling on Gratuity was 10 lakhs rupees. As per section 2A female employees are deemed to be in continuous service for maternity leave of twelve week period.

By 7th pay commission, Gratuity limit was increased to 20 lakhs for central government employees w.e.f. 01.01.2016. Office memorandum issued by Department of Public Enterprises, to increase Gratuity Ceiling for executives and non-unionised supervisors of the Central Public Sector Enterprises (CPSEs) from 10 lakhs to 20 lakhs w.e.f. 01.01.2017.

Lok Sabha passed Payment of Gratuity Amendment Act, 2018 on 15th March 2018 which empowered central government to notify changes in sub section 3 of section 4 for Gratuity ceiling and section 2A for maternity leave. Rajya Sabha has also passed this amendment act on 22nd March, 2018. This amendment bill got presidential consent on 28th March, 2018.

As per The Payment of Gratuity (Amendment) Act, 2018 following changes were made:

- ❖ In section 2A of the principal Act, in sub-section (2), in the Explanation, in clause (iv), for the words "twelve weeks", the words "such period as may be notified by the Central Government from time to time" substituted.
- ❖ In section 4 of the principal Act, in sub-section (3), for the words "ten lakh rupees", the words "such amount as may be notified by the Central Government from time to time" substituted.

<http://egazette.nic.in/WriteReadData/2018/184298.pdf> (Gratuity Amendment Act, 2018) [issued on 29th March, 2018]

Ministry of Labour and employment issued a notification on 29th March, 2018 to specify following changes in Gratuity Act:

- ❖ In exercise of the powers conferred by clause (iv) of the Explanation to sub-section (2) of section 2A of the Payment of Gratuity Act, 1972 (39 of 1972), the Central Government hereby specifies for the purposes of the said clause that the total period of maternity leave in the case of a female employee **shall not exceed twenty-six weeks**.
- ❖ In exercise of the powers conferred by sub-section (3) of section 4 of the Payment of Gratuity Act, 1972, the Central Government hereby specifies that the amount of gratuity payable to an employee under the said Act **shall not exceed twenty lakh rupees**.

<http://egazette.nic.in/WriteReadData/2018/184299.pdf> (Increase in Gratuity ceiling and maternity leave period) [issued on 29th March, 2018]

Above changes are effective from 29th March, 2018

This will increase retirement benefit received as Gratuity and bring private sector employees at par with central government employees.

Company's expense will increase as change in ceiling

impact has to be recognised as past service cost in Profit and Loss immediately in case of Ind AS 19 as well as IAS 19. In case of AS 15 also it will be recognised immediately if benefit is vested, which is most likely.

FAQ on accounting treatment of increase in liability due to enhancement of the gratuity ceiling. - (14-05-2018)
<https://resource.cdn.icai.org/50220asb39816.pdf>

As per Income Tax Act, 1961 as per clause (ii) sub section 10 of section, Gratuity is exempt in accordance with the provisions of sub-sections (2) and (3) of section 4 of Gratuity Act, 1972. So, this Tax exemption limit will also be 20 lakhs now.

DA Increase:

For Central Government employees Dearness Allowance (DA) rate has been increased from existing 5% to 7% of basic pay (as per 7th Central Pay Commission) w.e.f. 01.01.2018.

https://doe.gov.in/sites/default/files/DA_order01012018E.pdf

For employees of Central Government and Central Autonomous Bodies continues to draw their pay in the pre-revised pay scales as per 6th Central Pay Commission. Dearness Allowance (DA) rate has been increased from existing 139% to 142% of basic pay w.e.f. 01.01.2018.

<https://doe.gov.in/sites/default/files/DA%206th%20CPC%20eng.pdf>

For employees of Central Government and Central Autonomous Bodies continues to draw their pay in the pre-revised pay scales as per 5th Central Pay Commission. Dearness Allowance (DA) rate has been increased from existing 268% to 274% of basic pay w.e.f. 01.01.2018.

<https://doe.gov.in/sites/default/files/DA%205th%20CPC%20eng.pdf>

Dearness Relief to Central Government pensioners and family pensioners has been increased from existing 139% to 142% of basic pay w.e.f. 01.01.2018.

https://www.epfindia.gov.in/site_docs/PDFs/Circulars/Y2017-2018/DA_relief_pensioners_wef_01012018.pdf

Fixed Term Contract Employees:

Industrial Employment (Standing Orders) Central (Amendment) Rules, 2018 was notified on 16th March, 2018. as per recent amendment for fixed term contract employees "he shall be eligible for all statutory benefits available to a permanent workman proportionately according to the period of service rendered by him even if his period of employment does not extend to the qualifying period of employment required in the statute". This includes employees' provident fund and employees' state insurance benefits, bonus, gratuity and other compensation in case of accidents or death while

at work.

In another benefit to workers, an employer will not be allowed to “convert the posts of the permanent workmen existing in his industrial establishment” as fixed-term employment after notification of these new rules.

Based on this amendment, now fixed term contract employees are eligible for Gratuity even though they have not completed 5 years of qualifying service period.
<https://labour.gov.in/sites/default/files/FTE%20Final%20Notification.pdf>

Employees Deposit Linked Insurance Scheme (EDLI Scheme):

The employer's contributes 0.50% of employee's monthly wages (wage ceiling of INR 15,000 p.m.) as insurance premium to the EDLI scheme every month. In addition, the employer pays 0.01% of wages for meeting expenses of administration of insurance scheme.

As per earlier rules, In case of demise of a subscriber after one year continuous service in the same organization, the nominee used to get 20 times of wages (wage ceiling of INR 15,000 p.m.) with 20% bonus on it. The maximum amount assured works out to be INR 3.60 lakhs.

In September 2015 CBT approved, it will be based on 30 times of wages (wage ceiling of INR 15,000 p.m.) and a bonus of INR 1.50 lakhs hence total INR 6 lakhs sum & removed limit of 1 Year service requirement, which got notified by Government in June 2016.

The assurance benefit to an eligible employee will now stand at a minimum of INR 2.50 lakhs and will be capped at INR 6 lakhs as illustrated above. According to the notification, such provisions will be in force for a period of two years from the date of publication of this Scheme in the Official Gazette, i.e., 15th February, 2018.
https://www.epfindia.gov.in/site_docs/PDFs/Circulars/Y2017-2018/EDLI_Amendment_GSR_Assurance_Benefits_26694.pdf

About the Author



Mr. Kartikey Kandoi



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“Mr. Kartikey Kandoi is a Fellow member of Institute of Actuaries of India and Associate member of ICAI. He is currently working in M/S. K. A. Pandit.”

Annual Membership Renewal Fee for the year 2018–19.

We would like to inform that the last date for payment of Annual Membership Fee is 30th June 2018. In case, you have not renewed your Annual Membership for 2018–19, request you to renew the same on or before 30th June 2018 else your membership will lapse.

The current membership fees are as under:

Class of Membership	Fees in Indian Rupees (INRs.)
Fellows and Affiliates	7,500+(18% GST) = 8850
Associates	2,500+(18% GST) = 2950
Students	1,500

For payment and other details, do visit our website "<http://www.actuariesindia.org>" or contact **Prajakta Bhosle** from Membership Department actsoc@actuariesindia.org.

Mr. Anoop Krishnan CR - Manager, The Federal Bank

1. Dear Mr. Anoop, Institute of Actuaries of India observes that you register and attend various training programmes conducted in-house classroom by IAI, we would like to know what prompts you to attend such classes.

There is a threefold reason to me making it a point to attend the programs conducted by IAI. First and foremost is the quality of the course contents. The courses are well structured and comprehensively covers the breadth and depth of the topic. Rather than typical workshops that are theoretical and slide-based, I found that IAI courses are hands on, and provides experience and insights that are usually gained by working for years in the industry. Second on the list would be the incredible faculties who handle the sessions. Their explanations, and stories from their real life experiences in the line of fire as an Actuary gives us knowledge and inspiration on our learning path. Last on the list would be the vibrancy of the participants, and the value we gain through networking and discussions. Considering that the participants are from various walks of life, the insights that they can provide are invaluable.

2. How many training programmes you attended so far in IAI new venue and how it has helped you in your exams and other areas.

I have attended 4 trainings in the IAI new venue, over the span of the past year. The courses were tailor made to real life scenarios Actuaries face. We get a deep understanding of the course, from a dimension far superior to reading course materials. One example I would like to highlight in this context is when I attended the certificate program in Product design and the pricing of Life Insurance Products. It has non-trivially helped me during my preparations of CT5. The way Mr. Vinod Kumar structured the course was so exemplary that the concepts were deeply coded in us. I'd definitely recommend these courses for anyone attending actuarial exams.

3. You are not from traditional area, where actuaries are mostly employed. Being in the banking sector, how it has helped in your day to day job.

Knowledge and skills are not confined to a sector. Although banking seems to be a sector that is outside the periphery of Actuarial scope, I have felt the contrary. The concept of Risk that we aim to quantify in Actuarial



Science has application in each and every aspect of our life. So, it wouldn't be wrong to say that these concepts directly apply in an industry where each minor decisions can cause differences to the life of the common man. Like I mentioned previously, the experiences of the faculties is one key thing that I take back to my workplace after such courses. These courses has given me a whole new outlook on the way I see the pricing of the banking products and services. The knowledge which I attained from attending the training programmes has helped me to explain the pricing aspects of the products to my team members. This in turn helped them to compare the financial products which we are offering to our clients, and to advise them to select the products which suits them the most.

4. What message you wish to give to fellow student members.

IAI courses has helped me a lot in reshaping my perception of the Actuarial profession. Rather than the knowledge aspect, I was more impressed by the networking aspect.

We had the opportunity to interact with honourable dignitaries like Mr. Dinesh Chandra Khansili (ED, IAI), Mr. Sanjeeb Kumar (President, IAI), who shared glimpses of their experiences, which was an incomparable source of motivation for the actuarial aspirants like me. I'd definitely recommend these courses to anyone pursuing an actuarial career.

Photo Features of Health Insurance – Product Design and Pricing Training on 17th - 19th May 2018; coupled with Webinar on 9th - 10th June 2018



Photo Features of Excel Training for beginners (24th May) and Excel – Level 1 (25th-26th May)



Background

Life expectancy is a statistical measure of the average time someone is expected to live, based on the year of their birth, current age and other demographic factors including their sex. It is used to assess and set a number of important schemes, policies, and many other desirable steps for the betterment of the country that impact on everyday life, for example, setting the state pension age and targeting health policy initiatives etc.

The socioeconomic variables contributing most to the variances in life expectancy are - literacy and percentage of population in agriculture, suggesting that socioeconomic conditions have a greater influence on life expectancy than health conditions. Urbanization has less influence on life expectancy than was anticipated, perhaps because of unhealthy conditions in less developed countries. More emphasis should be placed upon education as increasing literacy may eliminate more factors associated with malnutrition and diseases than further importation of public health measures.

In most countries the trend of continuously decreasing mortality and thereby the corresponding increasing life expectancy has continued for a very long time. When looking at the pension expenditure in the long term, it is essential to ascertain whether this trend will continue as in the past or whether it will slow down or stop. When making long-term projections concerning the cost of a social security scheme, the uncertainty concerning the economic assumptions are well-known but the mortality fluctuation has often been considered to be under control.

Purpose

Growth in the ageing population in the last few years has led to a longevity risk in many developed and developing countries. The paper illustrates the life expectancy between developed as well as developing countries. By comparing life expectancy of USA, UK, India, Nepal & Sri Lanka, we can ascertain which factors have led to improvement in mortality rates and thereby life expectancy of both developed and developing countries. The paper helps to understand how fitting the best estimate curve using the available mortality tables helps to understand life expectancy in each country. Mortality tables are a powerful tool for measuring the probability of life and death of various age groups. It enables us to understand the implication of age-specific mortality rate in terms of average life expectancy.

Data & Analysis

An ideal representation of human mortality would

provide a measure of the rate of death occurring at specified ages over specified periods of time. In the past, analytical methods (such as the Gompertz, Makeham, or logistic curves) satisfied this criterion approximately over a broad range of ages. However, as actual data have become more abundant and reliable, the use of approximate analytical methods have become less necessary and acceptable.

There are two types of life tables used. The period life table represents mortality rates during a specific time period of a certain population. A cohort life table, often referred to as a generation life table, is used to represent the overall mortality rates of a certain population's entire lifetime. They must have had to be born during the same specific time interval. A cohort life table is more frequently used because it is able to make a prediction of any expected changes in mortality rates of a population in the future. This type of table also analyses patterns in mortality rates that can be observed over time.

To calculate the life expectancy, a life table or mortality table is used. A mortality table shows for each age, what is the probability that a person will die before his or her next birthday (qx).

When mortality tables of different ranges are available to there is an unavailability of qx , fitting of the mortality curve is required.

Hence a polynomial curve fitting method was used to predict the unavailable values of qx . Polynomial curve fitting method is a statistic used in the context of statistical models whose main purpose is either the prediction of future outcomes or the testing of hypotheses, on the basis of other related information. It provides a measure of how well observed outcomes are replicated by the model, based on the proportion of total variation of outcomes explained by the model.

$$\hat{q}_x = \hat{b}_0 + \hat{b}_1 x^1 + \hat{b}_2 x^2 \dots + \dots + \dots \hat{b}_n x^n$$

$$\hat{q}_x = \sum_{i=0}^n \hat{b}_i x^i$$

The generalised form the polynomial equation is as under. $\hat{q}_x$

Where, x is the unavailable ages for predicting the respective
 n is the degree of polynomial that best fit the data.

The $\hat{q}_x$ function is a non-linear function of x but a linear function of the unknown regression coefficients.

For fitting the curve to the mortality table for unknown ages, the respective mortality tables have been segmented into upper or lower 30% to 35% of the ages in the mortality tables (approx.) for attaining the best fit of the selected mortality table. For example: in case of LIC 1994-96 which ranges from 14 - 99 age, the upper unknown ages 0-13 the curve has been fitted using the upper 30% of the available mortality and similarly for lower unknown ages 100-115 the curve has been fitted using the lower 30% of the available mortality.

To determine the degree of polynomial, initially a 2nd degree polynomial curve was selected, whereby gradually on increasing the degree the best fitted polynomial curve was determined by comparing the coefficient of determination (R^2), (Adjusted - R^2) and (P - value).

In a similar manner the mortality tables which are put to use for fitting the curve are listed in Annexure-I.

Annexure - I

Sr. No.	Table Name	Also known as	Country
1	Indian Assured Lives Mortality (2006-08) Ultimate	IALM (2006-08)	India
2	Mortality for Assured Lives - LIC (1994-96) (Modified) Ultimate Rates	LIC 1994-96 Mod	India
3	Mortality for Annuitants - LIC (a) (1996-98) Basis: Ultimate Rates	LIC 1996-98 Ult	India
4	AM92 Ultimate Rates with Extension to Juvenile Ages	AM 92	UK
5	AF92 Ultimate Rates with Extension to Juvenile Ages	AF 92	UK
6	Permanent Assurances - Males Combined (AMC00)	AMCOO	UK
7	Permanent Assurances - Males Smokers (AMS00)	AMSOO	UK
8	Permanent Assurances - Males Non-Smokers (AMN00)	AMNOO	UK
9	Permanent Assurances - Females (AFC00)	AFCOO	UK
10	Permanent Assurances - Females Smokers (AFS00)	AFSOO	UK
11	Permanent Assurances - Females Non-Smokers (AFN00)	AFNOO	UK
12	Pensioners (excluding dependants), females, all, lives - S1PFL	S1PFL	UK
13	Pensioners (excluding dependants), females, all, amounts - S1PFA	S1PFA	UK
14	Pensioners (excluding dependants), females, light, amounts - S1PFA_L	S1PFA_L	UK
15	Pensioners (excluding dependants), females, heavy, amounts - S1PFA_H	S1PFA_H	UK
16	Pensioners (excluding dependants), males, all, lives - S1PML	S1PML	UK
17	Pensioners (excluding dependants), males, all, amounts - S1PMA	S1PMA	UK
18	Pensioners (excluding dependants), males, light, amounts - S1PMA_L	S1PMA_L	UK
19	Pensioners (excluding dependants), males, heavy, amounts - S1PMA_H	S1PMA_H	UK
20	2008 VBT-Primary Female Non-Smoker ALB	2008_VBT_FN	USA
21	2008 VBT-Primary Female Smoker ALB	2008_VBT_FS	USA
22	2008 VBT-Primary Male Non-Smoker ALB	2008_VBT_MN	USA
23	2008 VBT-Primary Male Smoker ALB	2008_VBT_MS	USA
24	2015 VBT Female Non-Smoker RR100 ALB	2015_VBT_FN	USA
25	2015 VBT Female Smoker RR100 ALB	2015_VBT_FS	USA
26	2015 VBT Male Non-Smoker RR100 ALB	2015_VBT_MN	USA
27	2015 VBT Male Smoker RR100 ALB	2015_VBT_MS	USA
28	Permanent Assurances, males, combined - A1967-70	A67-70	Sri Lanka
29	Beema Samati - Nepali Assured Lives Mortality, 2009	NALM-09	Nepal

Life Expectancy - India

In the recent statistics released by the Union ministry of health and family welfare, life expectancy in India has improved. The experts have attributed this improvement from the earlier decade to better immunization and nutrition, coupled with prevention and treatment of infectious diseases.

The overall health indicators have also shown significant improvement across the country in the past few years. Many

factors have resulted in the increased life expectancy. India had an agricultural economy towards the end of 20th century. As compared to other countries, majority of people had agriculture as their primary job. Thus they led a healthier life. Also, since the time of independence, famine has reduced and people have a decent supply of nutrition. A steady supply of food has also led to an increase in life expectancy in India.

After two decades of strong economic growth, life expectancy in India still falls short of most developed and developing nations as India still struggles in providing basic medical care to its citizens. A primary cause of this struggle is accessibility. In India, there are millions of people who have limited or no access to healthcare, mostly in rural areas. The increasing cost of care has also deprived citizens of India from getting the appropriate treatment or for that matter any treatment at all.

In India, obesity and chronic illness at middle and old ages is the next big threat to life expectancy improvements which are directly linked to an increased risk of death and morbidity. The life expectancy in India is lower compared to other developed countries as India is facing a lot of issues such as poverty, illiteracy, overpopulation and poor quality of hygiene.

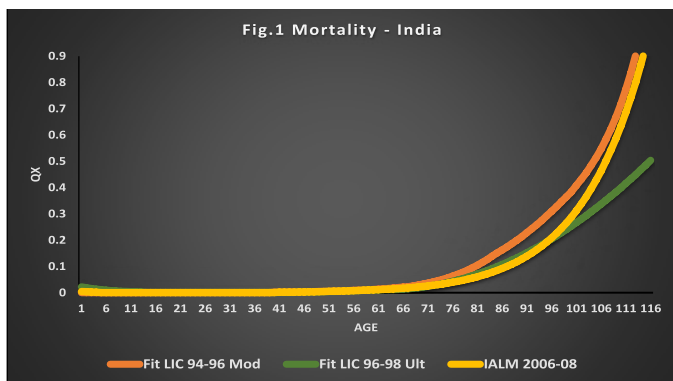


Fig.1 reflects the improvements in mortality rates used over the years in India. LIC 94-96 Mod is the mortality table used by India earlier but currently IALM 2006-08 is used.

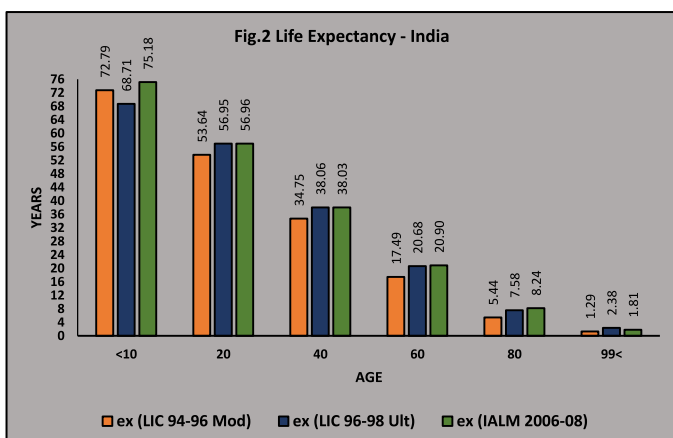


Fig.2 shows how the life expectancy has changed over the

years using different mortality tables. The life expectancy as per LIC 94-96 Mod was 68.31 years for ages less than 10 which has improved substantially to 75.18 years when incorporating the new table, i.e. IALM 2006-08. A similar pattern can be observed for all ages. However, life expectancy in India still falls short of most developed nations.

Life Expectancy - UK

Inequalities in mortality in UK have persisted over many years and recent government efforts to reduce them are yet to yield any significant impact. The gap in health inequalities between and within areas has widened in the last decade, reflecting increasing inequality in wealth and income. Premature mortality is a direct measure of healthcare needs and indicates the burden of ill health on the population, reflecting both the incidence of disease and the ability to treat it. Public health interventions for prevention, early diagnosis, and effective treatment can all reduce the burden of specific disease morbidity and mortality. Smoking still accounts for between one in six and one in ten of all deaths in UK, and accounts for about half of the inequality in death rates between spearhead and non-spearhead areas. It remains the single biggest cause of preventable mortality and morbidity in the world. Nationally and locally there remain sizeable inequalities between and within communities in smoking and in death rates due to smoking.

A new study has discovered that the rate of increase of life expectancy has almost halved since 2010. This is a major cause for concern. Even though there is a steady increase, the increase has now more or less been grounded to a halt. Government policies to reduce public expenditure since 2010 can be considered as a cause in slowing the increasing life expectancy in UK. Such policies can have adverse impacts on the life of the elderly.

Moving forward, for life expectancy in United Kingdom, mortality table AM 92 & AM 90, "00" series and "01" series are considered.

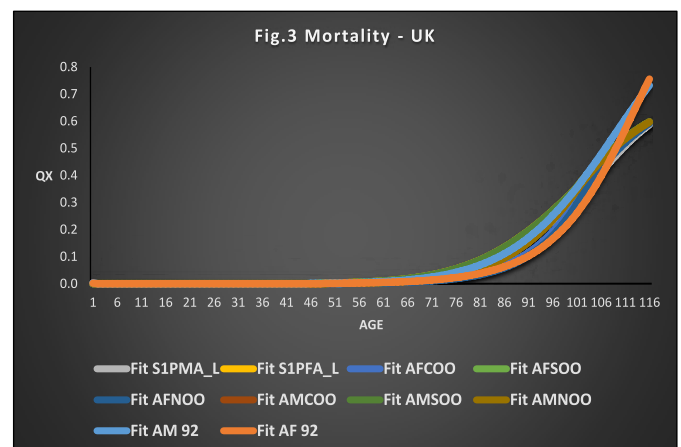


Fig.3 shows the mortality curve for AM 92, AF 92, "00" series and "01" series for the ages 0 to 115 which is used in UK in past few decades.

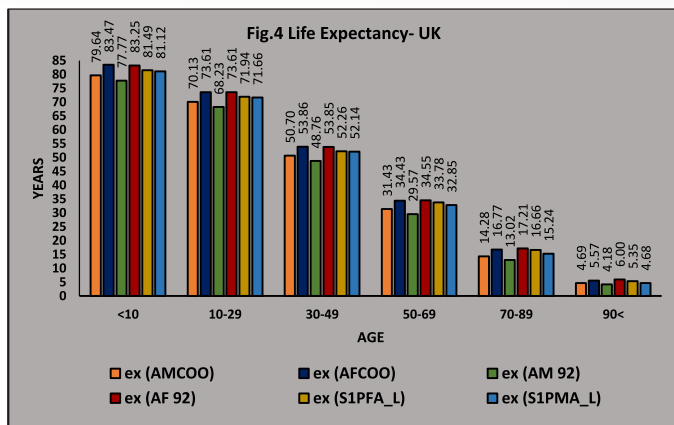


Fig.4 shows the graph of the life expectancy, considering assured mortality of AM 92, AF 92, “00” series and “01” series mortality table for both male and female. It can be observed that the life expectancy for female is higher than the life expectancy of male in all the categories viz. assured mortality 92, “00” series and “01” series mortality table.

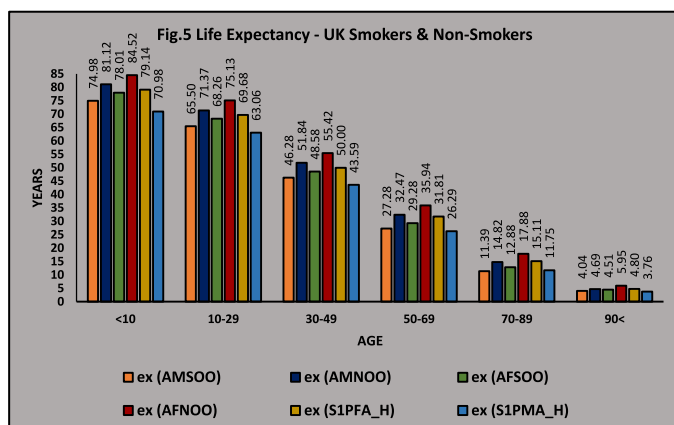


Fig.5 shows the graph of the life expectancy, considering combined mortality table of “00” series and Lives mortality of pensioners from “01” series. It can be observed that the life expectancy for female is higher than the life expectancy of male in all the categories viz. assured mortality “00” series and “01” series mortality table.

Life Expectancy - USA

In the 20th Century, life expectancy in the United States was less than 50 years but by the century's end it was approaching 80 years. As per the report by WHO (2000-2015), life expectancy in USA is 79.3 years.

A number of scientific discoveries and societal changes led to the dramatic increase in life expectancy. The developments that contributed to this increase are as under:

- ❖ Access to primary medical care for the general population
- ❖ Improved healthcare provided to mothers and babies

- ❖ Availability of immunizations
- ❖ Improvements in motor vehicle safety
- ❖ Clean water supply and waste removal
- ❖ Safer and more nutritious foods
- ❖ Rapid rate of growth in the general standard of living.

USA has a higher life expectancy compared to India as it has risen as a super power and thus provides a better standard of living.

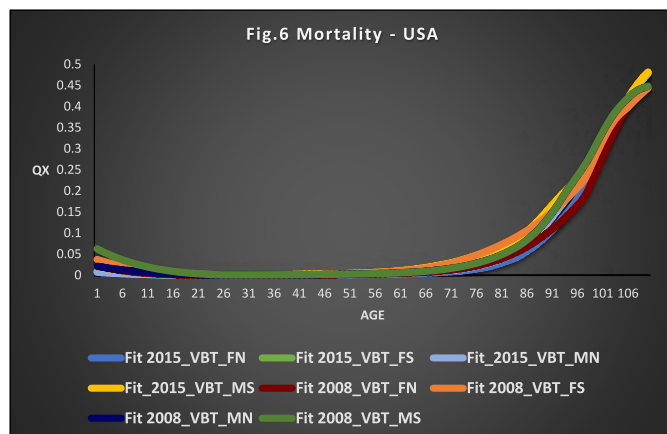


Fig.6 shows the mortality curve of USA over the years. Earlier, USA used 2008 Valuation Basic Table for male and female smokers and non-smokers. The mortality table currently used is the 2015 Valuation Basic Table for male and female smokers and non-smokers

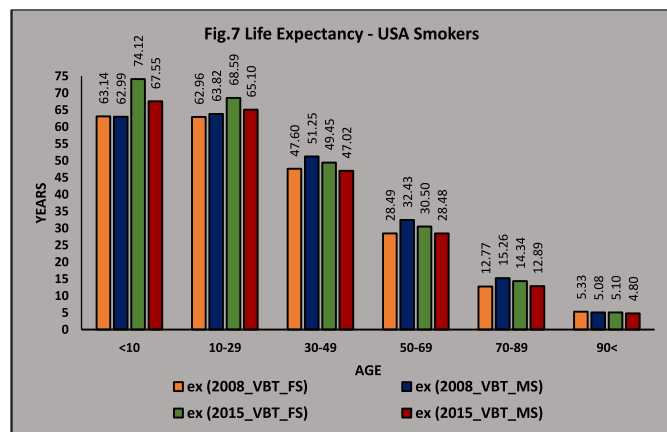


Fig.7 shows the life expectancy in USA for smokers 2008 & 2015. It shows that for female smokers the life expectancy has improved from 63.14 years to 74.12 years for ages less than 10 & for males it has improved from 62.99 years to 67.55 years for ages less than 10. Similar patterns can be observed for female non-smoker and male non-smoker for all ages. It is clear that the life expectancy for female is higher than that of male.

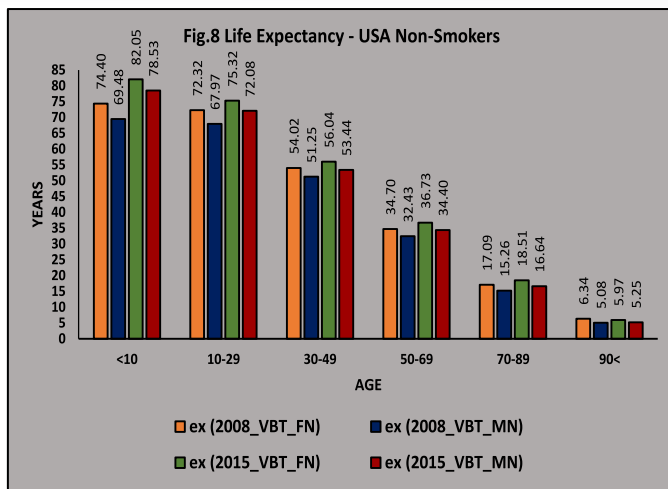


Fig.8 shows the life expectancy in USA for non-smokers 2008 & 2015. It shows that for female non-smokers the life expectancy has improved from 74.40 years to 82.05 years in ages less than 10 & for male it has improved from 69.48 years to 78.53 years in ages less than 10.

The bar graphs in fig.7 & fig.8 clearly show that there has been a substantial increase in life expectancy from 2008 to 2015 life tables for both smokers and non-smokers of both genders.

Life Expectancy - Sri Lanka

An analysis from the healthcare sector in Sri Lanka shows that the Sri Lankans enjoy a good life expectancy and according to the World Health Ranking, Sri Lanka ranks 70 of 172 countries under observation.

The reason for the improvement in life expectancy is that around 84% of the population has access to safe drinking water. There is a significant increase in the number of state-run hospitals. Also private sector has come up with private hospitals having highly advanced medical facilities and increased number of doctors and nurses. The government had aimed to create a healthier nation that contributes to its economic, social, mental and spiritual development. The health system is expected to be a patient-focused system that provides services closer to the client. It is a system which ensures easy access to modern health care services and supports a high quality of life.

According to the World Health Organisation, the country's health indicators show a steady improvement over recent decades, particularly in maternal and infant mortality, and life expectancy. The improvement of these indicators is predominately attributed to the maternal and child healthcare programme implemented nationally as an integral component of the state healthcare system.

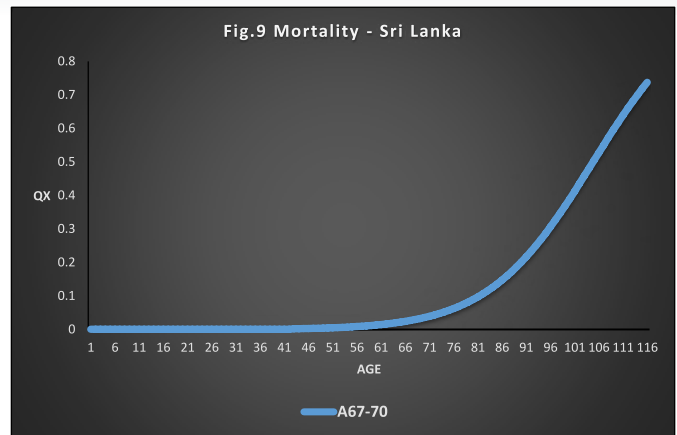
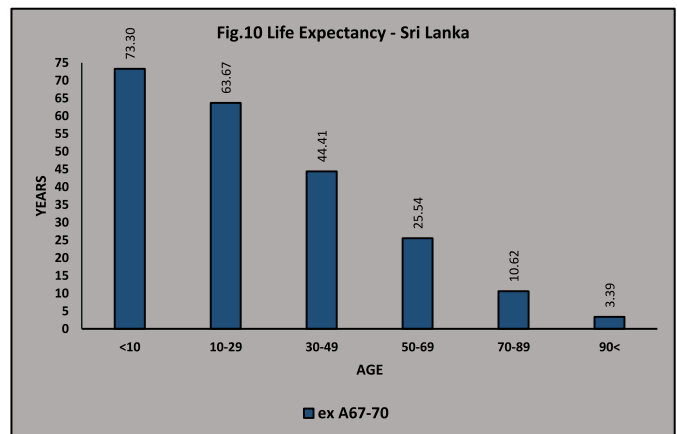


Fig.9 shows the curve for A67-70 mortality rates of Sri Lanka.



It should be noted that Sri Lanka does not have its own population specific mortality table and they since reliance is placed on the United Kingdom mortality table A67-70, Fig.10 shows the life expectancy in Sri Lanka which is about 73.30 years for ages less than 10 is lower than the life expectancy for India i.e. 75.18 years for ages less than 10.

Life Expectancy - Nepal

Latest research published in Nepali Times shows that there has been a drop in maternal and child mortality which has led to a dramatic increase in the average life expectancy of its citizens. In 1990, three diseases that took most lives in Nepal, namely, diarrheal diseases, pneumonia and tuberculosis whereas in 2013, they were ischemic heart disease, stroke and chronic obstructive pulmonary disease. This shows clearly that mortality due to life-style related conditions are rapidly increasing in recent times.

On the other hand, Nepal saw marked declines in mortality from a number of infectious diseases that used to take a large toll on the country. The increase in the health budget aided Nepal as the number of deaths due to diarrhoea, tuberculosis and pneumonia have reduced since 2015. In the last two decades, due to the increase in per capita income, Nepali's can buy healthier food and

afford medical care. This means that the proportion of elderly people in the country has gone up. Other factors that contributed to higher life expectancy of women compared to men include better access to health care, education, nutrition, immunisation and improved public health services and women literacy.

Nepal has gained considerable progress in preventing child and maternal mortality and the toll claimed by infectious diseases is falling. Improved living conditions, socio-economic development, and targeted health interventions seem to have brought these changes. While embracing the health similar to middle-income countries, Nepal faces unprecedented challenges of quickly gaining momentum to the preventative aspects of life-style related conditions such as cardiovascular diseases and diabetes. Improved rehabilitation, geriatric care and mental health care are big challenges for improving life expectancy in Nepal.

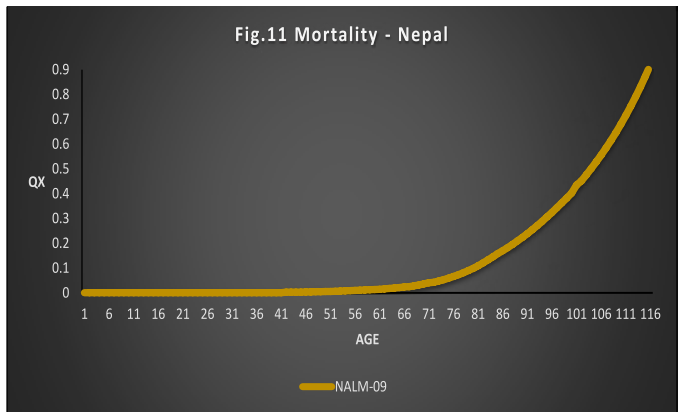


Fig.11 shows the mortality curve for NALM-09 mortality rates in Nepal. Nepal uses only NALM-09 since inception and has made no improvements to the same.

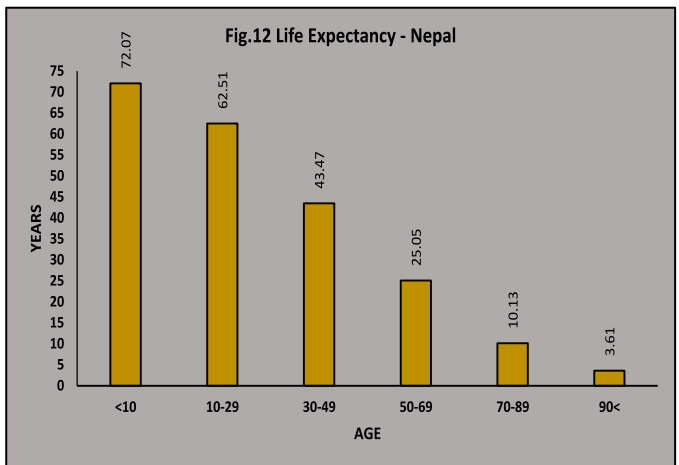


Fig.12 shows the graph of the life expectancy in Nepal. It is observed that the life expectancy in Nepal is 72.07 years for years less than 10, which is lower than the life expectancy for India i.e. 75.18 years for years less than 10.

Conclusion

Over the past few decades, it has been observed that people across the world have achieved impressive progress in health that has led to increases in life expectancy in most countries.

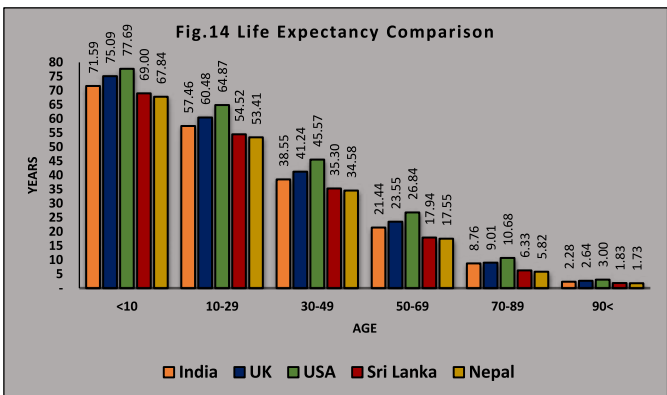
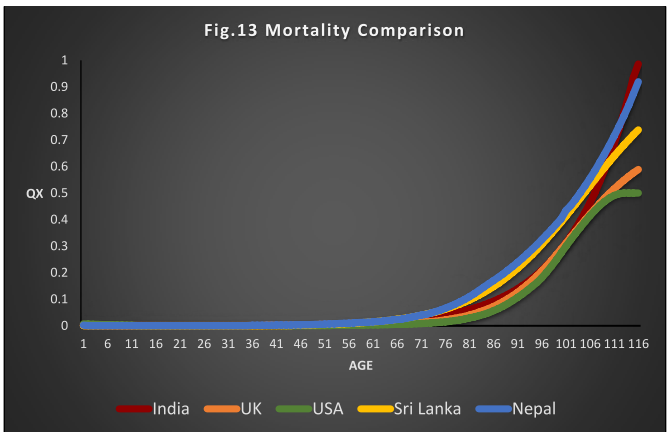


Fig.13 shows the curve for latest available mortality rates used in India, UK, USA, Sri Lanka & Nepal. Fig.14 illustrates the average life expectancy in years by using the latest mortality rates used in the respective countries mentioned in Fig.13. It can be observed that USA has the highest life expectancy as compared to the other countries under study, whereas Nepal has the lowest life expectancy.

Recommendations

Life expectancy in developed countries has been growing faster than projected although in some developing countries it is increasing steadily. As a result of this increasing life expectancy, the costs of social security schemes has been increasing. Even though there are reasons of increase in such costs other than longevity, the question is how we can adjust the current social security schemes with the increasing life expectancy.

The traditional way of adjusting such changes would be increasing the set retirement age. This can be done either by changing the retirement age once and then decide if an additional increase is required or by agreeing a plan to successively increase it. The problem with increasing the retirement age would be the uncertainty

related to changes in mortality rates. As seen in the past decades, the mortality rates have improved more than expected. If there is a future expectation of a steady decrease in mortality rates, the retirement age will need to be adjusted further.

Another method could be to adjust the schemes to increasing life expectancy by a factor. The factor, which is useful for both defined benefit as well as defined contribution schemes, can be found by using actuarial statistics. The actuarial statistics would include defining the probable present value of a pension at retirement age as the value of a lump sum sufficient to finance the future pension expenses, taking into account the life expectancy and a supposed yield from investing the lump sum.

An adjustment factor i.e. longevity factor should actually take into account past, present and future changes in mortality rates. But as the mortality is falling rapidly, it is difficult to project reliable estimates of life expectancy. In practise, the longevity factor is based on statistics which would always define the past along with the assumption that the longevity factor follows the actual mortality rates with some lag.

Ageing of the population has become an economic as well as social obstacle across the globe. In India, according to

Population Census 2011, there are nearly 104 million elderly people (aged 60 years or above) and the number is expected to rise further. These elderly people are not in good health and also do not have sufficient income to support themselves. The emerging demographic and socio-economic scenario of India indicates that the situation might worsen in the future. Hence, it is believed that the government should encourage self-help saving when an individual is part of the working population. Strong policy actions can help face the challenges of old age security schemes. The government should popularise social security schemes and construct schemes that are easy to toll in. They should offer adequate, affordable and viable old age security schemes for the elderly population, which is growing drastically year on year. Early voluntary retirement or forced retirement due to lack of jobs or skills is a further burden on social security schemes. Therefore there is a need for new and innovative products.

The population pyramid is becoming narrower due to increased life expectancy and decreasing fertility. Social security schemes are a human right. Hence, to enhance the efficacy of the social security schemes, the government along with insurers, financiers, statisticians, health care providers and NGO's should collaborate and develop social security schemes that are robust and easily accessible to all.

Thank You!

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“The authors work as part of the Employee Benefits team of M/s. K. A. Pandit Consultants & Actuaries.”

While going through this article, keep the Excel File "CASHFLOW-ENDOWMENT" open. The **hyper link** to this file is given below. Click on this Link, keeping the "Ctrl" key pressed. The Excel File will get downloaded from the Web Site. But you **may not be able** to navigate within the Excel Sheets. On top of the Excel Sheet displayed, you will **find a box with the Caption, "Open With" and a downward arrow. Click on the arrow and choose the Option "Google Sheets"**. The Excel File will open again and you would be able to navigate within the file.

The Excel file, "CASHFLOW-ENDOWMENT", is in MS Office format. Till now, this format was being accepted in the Google Blog. It appears that now the format has to be either Adobe or Google Sheet. So, the file "CASHFLOW-ENDOWMENT" has to be first converted to Google Sheet format.

<https://drive.google.com/file/d/1RnpAMlcoyoNoVKXAZiGiXRfVXvTYDqir/view?usp=sharing>

Cash Flow - Explanation

Excel File: CashFlow-Endowment

Screen: Case-A

A1) Basic Assumptions

Cell B10 - Age at entry
Cell C10 - Policy term
Cell D10 - Annual premium (per 1000 sum assured)
Cell E10 - Sum-assured (₹1,000)
Cell F10 - Bonus rate per thousand sum-assured
The above five fields should not be changed.

Cell G10 - Yield on investments
Cell H10 - Rate of inflation

A2) Actual Experience during first year

Marketing expense Nil
Agency commission 5%
Administrative expense, Rs.6 per policy
(It has been assumed that the average sum-assured is ₹100,000 and the administrative expense is ₹600 per policy. So, the administrative expense per policy, per 1,000 sum assured is ₹6)

A3) Actual Experience after first year

Agency commission 5%
Administrative expense ₹6 per policy

A4) It has been assumed that there will be no lapses or surrenders and the only ways by which a policy can become an exit are by death claim or maturity claim.

A5) Mortality Rate down: Actual mortality experience will generally be less than what is assumed in the premium basis. Here, it has been assumed that actual experience will be the same as that in the premium basis; i.e. it will be less than that assumed in the premium basis by 0%

A6) Other assumptions

Cell T10 - Rate of Tax 14.1625%;
Cell U10 - Shareholders' Share of surplus 5%
Cell V10 - Service Tax 0%

A7) Valuation Basis

It has been assumed that the valuation basis will be the same as actual experience. That is, the valuation basis will be the same as the premium basis. So,
Cell AA10 - Discount rate, same as yield on investment, 6%
Cell AB10 - Premium based expense, 5%
Cell AC10 - Per Policy expense, ₹ 6
Cell AD10 - Rate of inflation, taken as 0%
Cell AE10 - Mortality rate-up: Generally, in the valuation basis, the rate of mortality will be taken to be 10% to 25% more than the actual experience, in order to provide for margins against adverse experience. Here, mortality rate-up has been taken as 0%.

A8) The contents of columns B to U are explained below.

a) Column B gives the policy years. The Cell B16 = 1, first policy year.

b) Column C gives the survival factor. At the beginning of first year (Cell C16) the survival factor is 1. It has been assumed that there will be no lapses or surrenders and a policy can become an exit either by death or maturity claims only. The entry age has been taken as 35 and so, the probability of death during the first year will be q35, the rate of mortality at age 35, as per cash flow rate (i.e. column Y). Column W gives the age, Column X gives the actual mortality rate and Column Y gives the rated down mortality rate. Since rating down has been taken as 0%, the rated down mortality rates will be the same as the actual mortality rates. The mortality rate corresponding to age 35 is Cell Y51 = 0.001387. So, the probability of death claim occurring during first year is 0.001387 and, the probability of death claim not occurring is $(1 - 0.001387 = 0.998613)$.

♦ So, survival factor at the beginning of year 2 will be,
[Survival factor at the beginning of year1 x (1 - Probability of death claim occurring during year1)]
 $= 1 \times (1 - 0.001387) = 0.998613$.

That is, the probability of the policyholder aged 35, surviving upto the beginning of second year = 0.998613

- ◆ Similarly, Survival Factor at the beginning of Year 3 will be,
(Survival factor at the beginning of year2 x Probability of death claim not occurring during year2)
= $0.998613 \times (1 - q_{36})$
= $0.998613 \times (1 - 0.001482) = 0.998613 \times 0.998518$
= 0.997133

That is, the probability of the policyholder aged 35, surviving upto the beginning of third year = 0.997133

- ◆ The Survival factors at the beginning of each year can be determined in similar way.
If one is comfortable with the idea of Fractional "Number of persons", the Survival factors can also be viewed as the "Number of persons living at the beginning of each year". This approach will make further working simpler.

c) Gives the fund at the beginning of each policy year. The fund at the beginning of first year, before receiving any premium, will be zero (Cell D16)

d) Column E gives the premium received at the beginning of each year. The annual premium is given as ₹ 48.25. The premium received at the beginning of each year will be equal to, (Number of persons living at the beginning of the year x Annual Premium). So,
E16 = $1.000000 \times 48.25 = 48.250$
E17 = $0.998613 \times 48.25 = 48.183$
E18 = $0.997133 \times 48.25 = 48.112$
... etc.

e) Column F gives Marketing Expense, which would be incurred only in the first year. Since marketing expense has been taken as 0% of premium (see Cell I10), all Cells in Column F are zero.

f) Column G gives Agency commission paid. First year commission (Cell J10), Second & Third year commissions (Cell L10) and subsequent years' commissions (Cell M10) are all given as 5%. So, Cells in Column G will be 5% of the corresponding Cells in Column E.

g) Column H gives Administrative expenses. Cell K10 gives the per policy expense during first year as ₹ 6. This, multiplied by the number of persons at the beginning of the year (Cell C16) will give the expense in the first year. Renewal expense is given in (Cell N10) as ₹ 6 per policy. This will increase by 0% (Cell H10) each year due to inflation. So, the administrative expense during second year will be,

(Number of persons at the beginning of 2nd year x 6 x (1.00))
= $0.998613 \times 6 \times 1.00 = 5.99$
During third year $0.997133 \times 6 \times (1.00)^2$... etc

To study the effect of inflation, the reader can enter some number, say 3, in Cell H10, and see how the expenses change.

h) Column I gives total expenses, (Marketing Expense + Agency Commission + Administrative Expense)

i) Column J gives the Investment income. This is equal to, Yield on investment multiplied by, [Unappropriated Surplus as at the end of previous year (U15) + Fund at the beginning of the year (D16) + Premium Income during the year (E16) - Total Expense during the year (I16)]. **The term Unappropriated Surplus will be explained in the Note under item (s).** It is also assumed that the premium income will be received and all expenses incurred at the beginning of the year.

In the first year, U15 = 0, D16 = 0, E16 = 48.25 and I16 = 8.41. It has also been assumed that the yield on investment will be 6% (Cell G10). So, investment income during first year will be,
 $6\% \text{ of } (0 + 0 + 48.25 - 8.41) = 6\% \text{ of } 39.84 = ₹ 2.39$

It has also been assumed that all claims will be paid at the end of the year and so, will not affect the investment income. This assumption is based on the actuarial formula used in the valuation of liability.

j) Column K gives amount of claim paid in the case of death claims. The amount payable in case of death claim is, (Sum assured + Vested Bonus + Interim Bonus).

In the first year, the vested bonus will be zero and the interim bonus will be one year's bonus. So, the total bonus payable will be one year's bonus.

The probability of death claim arising is the mortality rate at age 35, i.e. $q_{35} = 0.001387$. (Cell Y51)

Sum assured is ₹ 1,000 (cell E10). One year's bonus is 20 per 1,000 sum assured (cell F10)

So, the **Expected** amount of death claim payable in the first year is,
Probability of death in the first year x (Amount of claim)
= Probability of death in the first year x (1000 + 20)
= $0.001387 \times 1020 = ₹ 1.41$ (to the second decimal)

In the second year, vested bonus will be one year's bonus and the interim bonus will be one year's bonus. So, the total bonus payable will be two year's bonus.

The probability of death claim arising is the mortality rate at age 36, i.e. $q_{36} = 0.001482$. (Cell Y52)
Sum assured is ₹ 1,000 (cell E10). Two year's bonus $2 \times 20 = ₹ 40$

So, the **Expected** amount of death claim payable in second year is,

Probability of death in the second year x (Amount of claim)

$$= \text{Probability of death in second year} \times (1000 + (2 \times 20)) \\ = 0.001482 \times 1040 = ₹ 1.54 \text{ (to the second decimal)}$$

In general, in the t^{th} year, the Expected amount of death claim payable will be,

$$\text{Probability of death in the } t^{\text{th}} \text{ year} \times (\text{Amount of claim}) \\ = \text{Probability of death in } t^{\text{th}} \text{ year} \times (1000 + (t \times 20))$$

k) Column L gives Survival Benefits paid. In this case there are no survival benefits and so, all cells in this column are zero.

l) Column M gives the Interim Fund. This will be equal to, Fund at the beginning of the year + Premium Income - Expenses + Investment Income - Death claim paid - Survival Benefit paid.

In the first year, this will be,

$$(0 + 48.25 - 8.41 + 2.39 - 1.41 - 0) = ₹ 40.82$$

In the Excel Sheet, this is shown as ₹40.81

This small difference is due to the fact that, in Excel, higher number of decimal positions is used in calculations; though in the display only two decimal positions are shown.

m) Column N gives the Liability before allocation of bonus. Liability calculation has been done in Column AA. The actuarial students can follow the method of calculating the liability. Others can take the result as it is.

The result arrived at in Cell AA16 (i.e. ₹ 32.049) represents liability under one policy. Since the number of policies in force at the end of first year (i.e. beginning of second year) is 0.998613 (see Cell C17) the liability at the end of first year will be, $(0.998613 \times 32.049 = 32.00)$. This value has been transferred to Column N. If the liability were negative, it would be taken as zero. The reason for the liability becoming negative in some cases has been explained under **XXX**

n) Column O gives the Valuation Surplus. This is equal to Interim Fund Less Policy Liability before allocation of bonus. In the first year, this is equal to $(40.81 - 32.00 = ₹8.81)$. This will be negative when the Interim Fund is less than the policy Liability. Because of high first year expenses, in some cases it may be found that, the interim fund at the end of the year is insufficient to meet the liability. This can happen in the case policies for small sums assured.

o) Column P gives Tax. This is equal to 14.1625% of Surplus. When surplus is negative, tax payable will be zero.

p) Column Q gives Shareholders' dividend. This is 5% of

the balance surplus after tax. If the surplus were negative, shareholders' dividend will be zero.

q) Column R gives the Fund at end. This will be equal to, (Interim Fund - Tax - Shareholders' dividend)

r) Column S gives the Liability after allocation of bonus. The value of New Bonus is given in Column AB. The actuarial students can follow the method of calculating the value of new bonus. Others can take the result as it is.

What is given in Cell AB16 is the value of new bonus, **per policy**, at the end of first year and is equal to 6.845. The number of policies at the end of first year (i.e. beginning of second year) is 0.998613 (Cell C17). So, the value of new bonus at the end of first year = $(0.998613 \times 6.845 = 6.8355)$; i.e. 6.84, to the nearer second decimal.

Liability after allocation of bonus

$$= \text{Liability before allocation of bonus} + \text{Value of new bonus}$$

$$= 32.00 + 6.84 = ₹ 38.84$$

s) Column T, Excess/Shortfall. This is equal to, (Fund at end - Liability after allocation of bonus = $39.19 - 38.84 = ₹ 0.35$).

If Fund at end is less than the liability, it is shortfall.

Note

It is necessary at this stage to take a relook at Column D, "Fund at the beginning of the year". It may be noted that the Fund at the beginning of second year is not equal to Fund at the end of first year, but is equal to the Liability (after allocation of bonus) as at the end of first year. The excess of fund at the end of first year over the liability at the end of first year has been transferred to the field "Un-appropriated Surplus". Instead, if it is kept in the Fund itself, it will again emerge as Surplus at the end of second year and get taxed again. Dividend to shareholders too will get paid again. This will occur year after year. In order to prevent such repeated payment of tax and dividend to shareholders on the same surplus, the Excess is moved to a separate field.

This aspect is peculiar to the Indian life insurance industry since, in India, the taxation of a life insurance company is based on valuation surplus. In most countries, it is based on Investment income less expenses. In such cases, it is not necessary to transfer any excess surplus to "Un-appropriated Surplus"

Occasionally, the Fund at end may be less than the liability and, in such cases the amount transferred to Un-appropriated Surplus will be negative.

t) Column U, "Cumulative Un-appropriated Surplus" The Cumulative Un-appropriated Surplus at the end of first year will be equal to the Un-appropriated Surplus in the

first year. The Cumulative Un-appropriated Surplus at the end of second year will be equal to the Sum of the Un-appropriated Surpluses in the first and second years. At the end of third year it will be equal to Sum of Un-appropriated Surpluses in the first, second and third years, and so on. If it is a shortfall, it will get subtracted instead of being added. The amount in "Cumulative Unappropriated Surplus" is like Free Reserve and can be used for demonstrating Solvency Margin.

Example 1

34) Consider first the simplest case where,

- ◆ Both premium based and per policy expenses remain uniform throughout the term of the policy
- ◆ With no additional expenses in the first year and
- ◆ No increase in future expenses due to inflation

Premium Basis: (Screen: Premium-Calcul-A)

- ◆ Rate of Interest – 6.00%
- ◆ Rate of Inflation – Nil
- ◆ Service Tax – 0%
- ◆ Mortality – LIC (1994 - 96) without rating up
- ◆ Premium Based Expenses
First Year – 5.0% ; Second & Third Years – 5.0% ;
Renewal – 5.0%
- ◆ Per Policy expenses
First year – ₹ 600 Renewal – ₹ 600
Expected Average Sum Assured – ₹ 100,000/=
So, policy expenses per thousand sum assured = ₹ 6/= for both first year and renewal.
- ◆ Income tax = $12.5\% \times 1.10 \times 1.03 = 14.1625\%$, where surcharge is 10% and education cess is 3%
- ◆ Shareholders' share of surplus – 5%
- ◆ Bonus loading – 20% sum assured.
When rated up for tax and shareholders' share of surplus,
Bonus loading = $20 / [(1 - 0.141625) \times (1 - 0.05)] = 24.5261\%$ sum assured.

35) On the above basis, the premium for an Endowment Assurance plan for a term of 20 years and age at entry 35 will be ₹ 48.215 .[Refer to the Screen "Premium-Calcul-A" of the Excel File, "CashFlow-Endowment"]. **Let us take it as ₹ 48.25**

36) Note: It may be noted that, in the screen Premium-Calcul-A, the Cell G10 gives the bonus loading as 20 per thousand (20%) and Cell H10 contains Adjusted loading (or Rated up loading) viz.24.53. That is, rated up for tax and shareholder's share. In India, tax is @14.1625% of valuation surplus and shareholders share (in the case of LIC of India) is 5%.

- So, 14.1625% of 24.5261 is 3.4735. Balance surplus after tax is 21.0526.
- Shareholders' share = 5% of 21.0526 = 1.0526. Surplus allocated to policyholders is (21.0526 - 1.0526 = 20).
- So, if B is bonus loading the adjusted (or rated up)

loading is given by,

$$B / [(1 - \text{rate of tax}) \times (1 - \text{rate of shareholders' share})]$$

- In those regimes where tax is not a percentage of valuation surplus, the rated up bonus loading will be, $[B / (1 - \text{rate of shareholders' share})]$

Question 2: During the first policy year of a policy, the actual experience is the same as that assumed in the premium basis. That is, the yield on investment, mortality (claim experience) and expenses are the same as that assumed in the premium basis. There are also no exits other than by death claim. At the end of the first policy year, the liability is valued by Gross Premium method (i.e. Bonus Reserve Valuation), using the same basis as the premium basis. Will any surplus emerge in the valuation?

Since the experience during the first year is the same as that assumed in the premium basis and the valuation basis used is also the same as that of the premium basis, the initial reaction will be to say that no surplus will emerge. But, in a bonus reserve valuation (**known now a days (wrongly) as gross premium valuation**), one of the components of the liability is the "Value of Future Bonus".

While estimating the liability as at the end of first year, the formula for the value future bonus involves only the present value of bonuses to be declared from the second policy year onwards and does not include the bonus to be declared at the end of first policy year. That is, the liability is underestimated to the extent of the value of the bonus (rated up for tax and shareholders' share of surplus) to be declared at the end of first policy year. However, the annual premium includes bonus loading of ₹ 20%, rated up for tax and shareholders' share of surplus. The value of this bonus loading should therefore emerge as surplus.

So, the answer is, Surplus will emerge and the amount of surplus will be equal to the rated up value (adjusted value) of new bonus in respect of the survivors as at the end of first policy year. In the case of death claims, if any, interim bonus would have been paid.

[Refer to the Screen "Case-A" of the Excel File, "CashFlow-Endowment"].

Question 3

[Refer to the Screen "Case-A" of the Excel File, "CashFlow-Endowment"].

The actual surplus emerging at the end of first policy year (Cell O16 of the Excel Sheet) is **8.81**. The value of new bonus as at the end of first year is 6.845 (Column AB, Cell Ab16).

The rated up (for tax and shareholders' share of surplus) value of new bonus is, $6.845 / \{(1 - \text{rate of tax}) \times (1 - \text{rate of shareholders' share})\}$
 $= 6.845 / \{(1 - 0.141625) \times (1 - 0.05)\} = \mathbf{8.39}$

This is the value of new bonus per person.
The number of survivors as at the end of first year (i.e. beginning of second year) is 0.998613

So, the expected surplus as at the end of first policy year
 $= 0.998613 \times \text{value of new bonus per person}$
 $= 0.998613 \times 8.39 = 8.38$

Why this difference (i.e. excess surplus) of $(8.81 - 8.38 = 0.43)$?

We had taken the annual premium as ₹ 48.25, instead of ₹ 48.215. If this is made equal to ₹ 48.215 (that is, if 48.215 is entered in Cell D10), the surplus (Cell O16) becomes 8.39; almost equal to the expected value. This will show the importance of accuracy in premium rates. In actual practice however, due to smoothing, rounding off, high sum assured rebates and mode rebates, the actual premium charged will invariably be less than, and occasionally greater than, the required premium rates. This will result in some variation in surplus that emerges, which cannot be explained in the analysis of surplus, and so will have to be classified under the class "Miscellaneous Surplus".

Now restore Cell D10 to its original value 48.25.

For actuarial students

*****Question 4:** Does the formula used for determining the value of future bonus correctly represent the actual practice?

The answer is "No". What is the variation?

Now, look at the **formula for future bonus**. At age 36, for an outstanding term of 19, it is,
 (Rated up bonus loading) $\times \{[C_{36} + 2C_{37} + 3C_{38} + \dots + 19C_{54} + 19D_{55}] / D_{36}\}$.

If "b" is the bonus declared at the end of first year, it means that an amount of "b" is to be paid whenever a death claim arises or on survival upto the end of the policy term. The value of this bonus allotted at the end of first year has two components, viz.

$b' \times [C_{36} + C_{37} + C_{38} + \dots + C_{54}] / D_{36}$ and $b' \times [D_{55} / D_{36}]$

Where $b' = b / \{(1 - \text{rate of tax}) \times (1 - \text{rate of shareholders' share})\}$, which is known as rated up bonus. The difference between b' and b represents the value of tax and shareholders' share of surplus.

The first factor above represents the value of bonus payable in case of death before end of the term and the second, the value of bonus payable on maturity.

- ◆ So, as per the formula used, the tax and shareholders' share of surplus are payable only while settling a death claim or maturity claim, on the bonus portion of the claim amount.
- ◆ In actual practice however, the tax and shareholders'

share of surplus are based on the valuation surplus at the end of each year.

- ◆ It would mean that the actual outflow of cash will be higher than the expected cash outflow (as per the formula used) except at the time of maturity (or surrender). The impact of the excess cash outflow will be to marginally reduce the future investment income and also affect marginally the emergence of surplus in future.

The above is not the only instance where the formula used for estimating liability varies from actual practice. In the formula, it has been implicitly assumed that premiums will be received and all expenses incurred at the beginning of each year and that, claims will be paid at the end of each year. It will not be so, in actual practice.

So, the actual surplus will never tally with the expected surplus. But, the difference should not be very significant and such differences will go under the Class "Miscellaneous Surplus".

Example 2

37) Let us introduce one variation in Example 1 and derive the premium rates. Assume that additional expenses will be incurred in the first year both in respect of premium based and per policy expenses. This is a more realistic assumption

38) Now Refer to the Screen "Premium-Calc-B" of the Excel File, "CashFlow-Endowment". It has been assumed that in the first year, the premium based expense is 55% and the per policy expenses, ₹ 17. There is no other difference with reference to the Example discussed earlier. The premium based expense has been taken to be 5% from the second year onwards.

39) On the above basis, the premium for an Endowment Assurance plan for a term of 20 years, at age at entry 35, will be ₹ 51.45

Question 5: During the first policy year of a policy, the actual experience is the same as that assumed in the premium basis. That is, the yield on investment, mortality (claim experience) and expenses are the same as those assumed in the premium basis. There are also no exits other than through death claim. At the end of the first policy year, the liability is estimated by Gross Premium method (i.e. Bonus Reserve Valuation). The valuation basis used in respect of rate of interest, renewal expenses (both premium based and per policy) and mortality rate are the same as those of premium basis. Will any surplus emerge in the valuation?

As under Example 1, it would be natural to expect surplus to emerge and the amount of surplus to be equal to the rated up value (adjusted value) of new bonus in

respect of the survivors as at the end of first year.

Now, Refer to the Screen "Case-B" of the Excel File, "CashFlow-Endowment".

The surplus is only **5.11** (Cell O16) and the value of new bonus (Cell AB16), rated up for tax and shareholders' share and multiplied by number of survivors at the end of first year is, as seen earlier,
 $[6.84 / [(1 - 0.141625) \times (1 - 0.05)]] \times 0.998613 = 8.376$
i.e. **8.38**

The shortfall in actual surplus is, $8.38 - 5.11 = 3.27$
How to explain this difference?

The difference arises since, while estimating liability at the end of first year, negative liability has been eliminated. The real liability (See Cell AA16) is **-3.28**. Multiplying this by the number of survivors at the end of the year, the liability becomes,
 $-(0.998613 \times 3.28) = -3.27$

So, the difference between the Interim Fund (i.e. the fund before determining surplus Cell M16) and liability is,
 $5.11 - (-3.27) = 8.38$, which is the same as the value of new bonus.

So, the answer is "As long as the actual experience is the same as the assumptions involved in the premium basis and, as at the end of the first policy year, the liability is valued by Gross Premium method (i.e. Bonus Reserve Valuation), using the same basis as the premium basis, Surplus will emerge at the end of first year. The amount of this surplus will be equal to the adjusted (i.e. rated up for tax and shareholders' share) value of new bonus in respect of the survivors as at the end of first year, provided that negative liability is not made equal to zero".

Note: Valuation Surplus is defined as (Revenue Surplus - Increase in Liability)

Revenue Surplus = (Premium Income + Investment Income) - (Expenses + Claim outgo) = $(51.45 + 0.37) - \{(7.72 + 20.58 + 17.00) + 1.41\}$ (See Screen Case-B)
 $= 51.82 - 46.71 = 5.11$

Liability at the beginning of first year, just before the first premium is paid, is equal to zero

Liability at the end of first year, before allocation of bonus = **(-3.27)**

Increase in Liability = liability at end - Liability at beginning
 $= (-3.27) - 0 = (-3.27)$

So, Valuation Surplus = Revenue Surplus - Increase in Liability
 $= 5.11 - (-3.27) = 8.38$

When the liability is negative, if we arbitrarily make it zero, Liability at end of first year, before allocation of bonus, becomes 0. So, increase in liability during first year will be,
 $= 0 - 0 = 0$

Valuation Surplus will then become $5.11 - 0 = 5.11$

So, when the liability is negative, if we take it as zero, the valuation surplus gets reduced from 8.38 to 5.11 (a decrease of 3.27)

Suppose the liability at the end of second year, before allocation of bonus is L. Increase in Liability during second year will therefore be, $(L - (-3.27)) = (L + 3.27)$. If the Revenue Surplus in the second year is R, the valuation surplus in the second year will be, $R - (L + 3.27) = R - L - 3.27$.

When we zeroise the negative liability, the increase in liability during second year will be, $(L - 0) = L$. If the Revenue Surplus in the second year is R, the valuation surplus in the second year will be, $(R - L)$.

So, when we zeroise negative liability in the first year, the valuation surplus will get reduced in that year, but will get increased in the following year.

40) When a life insurance company receives a premium under a policy, it agrees to undertake a liability. Keeping a negative liability is equivalent to treating a liability as an asset. As per regulatory requirement (in India) however, a policy cannot be treated as an asset and the negative liabilities have to be eliminated and treated as zero liabilities. The surplus will consequently get reduced to that extent.

41) In India, the life insurance companies are taxed on the basis of valuation surplus. When the elimination of negative liability results in reduction of valuation surplus, the tax payable too gets reduced. The Revenue Authorities may object to such reduction in tax payable by, what they consider as artificial methods and, in their view, elimination of negative liabilities is highly artificial. How to meet this objection?

42) The above is not just a theoretical possibility but has actually occurred. The justification for the elimination of negative liability has been discussed under paragraph 58.

43) So, the total negative liability eliminated becomes an important component in the analysis of surplus.

Question 6: Under Example 1, negative liability was not encountered. Then why is it that negative liability is occurring under Example 2?

Answer : Under Case-A, no additional expenses were

incurred in the first year and the annual premium per thousand sum assured was, ₹48.25 .The cash flow(interim fund) at the end of Year1 was ₹40.81 . In the second case, the first year expenses are substantially higher than those in subsequent years and the annual premium is only ₹ 51.45. The difference in premium is thus only ₹3.20.

The cash flow at the end of Year1, at ₹ 5.11, is less by ₹35.70. This shortfall due to additional first year expenses is being recovered from the policyholder in equal instalments of ₹ 3.20 per year over the entire policy term.

(Generally, some additional expenses are incurred also in the 2nd and 3rd years. These additional expenses too, get spread over the entire term of the policy).

The liability at the end of first year is the difference between Expected Value of (future benefits payable to the policyholder + future expenses) and, The Expected Value of future premium income

While the value of future benefits is the same as those under Case-A, the value of future premiums is higher than those under Case-A. So, the liability at the end of first year will be lower under Case-B and, under certain conditions, can even be negative.

When a policy lapses, the additional expenses incurred in the first year remain uncollected and the life insurance company suffers a loss. When, about 20% of the policies

lapse without paying even one year's premium, the unrecovered first year expenses will be quite high. When about 50% of the policies lapse before the date of maturity, the extent of loss suffered by the company can be imagined. Only to recover such losses, no paid-up value is given and the premiums paid are forfeited, when a policy lapses before payment of atleast three full years' premiums. Such losses affect the profitability of the company and reduce the bonus paid to the policyholders.

What may happen when the total amount of premiums forfeited in the case of policies lapsing before payment of premiums for full three years is greater than the additional expenses incurred during the first year in respect of these policies? The difference will emerge as surplus. 14.1625% of this surplus goes to Government as tax. 5% of the balance goes to shareholders (the Government of India, in the case of LIC of India) and the balance goes to remaining policyholders in the form of bonus.

(To be continued)

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“ Mr. R Ramakrishnan is a Fellow member of the Institute of Actuaries of India. He is retired in October 1993 as the Chief Actuary of LIC of India, in the cadre of Executive director.”

The Actuary India wishes many more years of healthy life to the fellow members whose Birthday fall in June 2018

**MR DIONYS EMIL BOECKE
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Draft Regulations on Employee Contribution Funds

Pakistan has an estimated population of 207 million (2017). The median age of the population is 23 years, with 55% of the population between age-band of 15-64 years. As per the official statistics, the estimated labor force of Pakistan stands at 57.2 million out of which 43% individuals work in the agricultural sector, 20% in industrial sector and 37% in the services sector.

Retirement benefit schemes in Pakistan can be broadly bifurcated into following four categories:

1. Government and Public - Sector Pension Schemes
2. Private Sector Pension and Voluntary Pension Schemes
3. Private Sector Gratuity and Provident Fund Schemes
4. Employees Old Age Benefits Institution (Social Security Scheme)

Retirement benefits are governed by the Securities and Exchange Commission of Pakistan (SECP) since 2005. Only a few regulations have so far been issued by SECP, including rules for investment in listed securities.

More recently, draft Employee Contribution Funds (Investment in Listed Securities) Regulations have been issued by SECP. The draft regulations are applicable on all provident funds, contributory pension schemes, and any other contributory retirement fund of a company. Once notified, these regulations will repeal the earlier regulations issued by SECP specific to Provident Funds only.

Salient features of the draft regulations are as under:

1. The regulations bring into purview all contributory retirement schemes. Previous regulations pertained only to provident funds, with the general understanding that they were applicable on other funded schemes as well. The regulations require all companies to bring into conformity investments in all contributory retirement schemes with these regulations, within one year of notification.
2. The fund or trust is required to obtain onetime written permission from employees for allowing investments out of their contributory fund.
3. The fund or trust is allowed to invest in the following instruments:
 - a. bonds,
 - b. redeemable capital,
 - c. debt securities or instruments issued by a statutory body,
 - d. securities listed on Pakistan Stock Exchange, including:
 - i. shares of companies,
 - ii. bonds,
 - iii. redeemable capital,
 - iv. debt securities,
 - v. equity securities, and
 - e. collective investment schemes
4. The regulations define investment limits based on the type of instrument. The limits are specific to overall fund size, limit within an industrial sector, limit within an entity / asset management company / equity collective scheme / IPO of equities.
5. The fund or trust is only allowed investments in equity and equity collective, where the listed company / collective instrument fulfils the criteria based on:
 - a. minimum profitable operational record,
 - b. average dividend payout,
 - c. minimum free float, and
 - d. shareholders equity not being negative.
6. The fund or trust is only allowed investments in bonds, redeemable capital, debt securities, listed debt securities of a company, collective investment schemes and money market collective instruments, where the security / scheme has a minimum define credit rating.
7. The regulations also provide stringent criteria for investments in IPOs.
8. The regulations require that the fund or trust should be managed by the qualified individuals having requisite skills, knowledge and experience in the capital market.
9. Furthermore, the fund or trust is required to develop and maintain appropriate investment policies explaining investment limit, investment avenues and risk appetite including business allocation among the brokers.
10. The fund or trust is required to invest in liquid

securities, whereby the following activities are prohibited:

- a. day trading,
- b. investment in future markets (except spread transactions) and
- c. investment in securities either through borrowing or through leverage.

11. The regulations require the fund or trust to submit financial information to SECP on a six monthly basis.

Conclusion

The draft regulations bring about two important changes, namely inclusion of all employee contribution funds under the purview of regulations and secondly the

requirement to have qualified individuals to manage these funds. Along with having a very stringent and prescriptive investment limits, these two changes are expected to bring about more protection of the employee contribution funds.

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STUDENT COLUMN

Interview: Student Support Scheme

Q1. How did you come to know about the Student Support Scheme?

Ans: I came to know about the Student Support Scheme on the official website of Institute of Actuaries of India.

Q2. How has the Student Support Scheme helped you?

Ans: It has given me financial support when it was needed the most.

Q3. For what duration were you availing the 3S benefits?

Ans: I availed the benefit of student support scheme since December 2013 to December 2015.

Q4. Other than financially, how do you think the Student Support Scheme has helped you?

Ans: It has given me an opportunity to grow as an Actuary.

Q5. How many hours of study did you devote to pass the CT level subjects?

Ans: It is very difficult to say a fixed study hours to pass a

CT Subject. It depends on which CT subject are we appearing and which academic background we belongs to. However, at least 250 dedicated study hours are required to clear the subject.

Q6. What advice/message would you like to convey to the other students who are availing the benefits under the Student Support Scheme?

Ans: This is a best opportunity provided by the institute to whoever are willing to pursue actuarial profession and have limited financial support. Those students can take this opportunity and can build their career with hard work, dedication and focused mind.

Q7. Any other suggestions you wish to give?

Ans: Promote actuarial profession amongst young students and expand the reach of the profession apart from the Insurance industries.

Submitted by



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“Mr. Milind Narkhede is a student of the Institute of Actuaries of India.”

Prize money for students scoring Highest Marks in March 2018 Examination

The Prize fund for highest marks is instituted by contribution given by various donors to Institute of Actuaries of India.
This Prize fund has been constituted for student scoring highest marks in March/September Examinations.
The Award consists of prize money of ₹ 5000/-

SR. NO	SUB	SUBJECT NAME	PRIZE FUND	CANDIDATE NAME	MEMBERSHIP ID	PLACE
1	CT1	Financial Mathematics	Shri R. Krishnaswamy Memorial Prize Fund	Aditya Khandelwal	34534	Pune
2	CT2	Finance and Financial Reporting	Shree Atma Ram, Shri Chhaju Ram & Smt Parvati Devi Memorial Scholarship Endowment	Harnoor Lalit Jham	35277	Nagpur
3	CT3	Probability and Mathematical Statistics	Shri H V Krishnamurthy Prize Fund	Ritum Goyal	34977	Jaipur
4	CT4	Models	Shri R. Krishnaswamy Prize Fund	Meghna Agarwal	32076	Kolkata
5	CT5	General Insurance, Life and Health Contingencies	Smt. Vidhya Wati and Smt. Santosh Kumari Memorial Scholarship Endowment	Meghna Agarwal	32076	Kolkata
6	CT6	Statistical Methods	-	Hritika Gupta	33870	Delhi
7	CT7	Business Economics	Prof R M Joshi Prize Fund	Shivangee Agarwal	34669	Kolkata
8	CT8	Financial Economics	Prof G S Diwan Centenary Commemoration Prize	Soumil Jain	30349	Delhi
9	CA1	Actuarial Risk Management	The Future Actuary Prize Fund	Mohit Goel	25881	Gurgaon
	CA2	Model Documentation, Analysis and Reporting - (January 2018)	-	Anubhooti Atul Jain	25256	Mumbai
	CA3	Communications - (January 2018)	J R Joshi Prize	Lakshmi Ramaswamy	7520	Mumbai
10	ST1	Health and Care Insurance	G S Diwan 100th Birth Anniversary Memorial Education Fund	Jaya Gupta	25976	Bangalore
11	ST2	Life Insurance	Late Shri Janardan Pundalik Nerurkar Prize Fund	Anuja Girish Agarwal	34729	Bangalore
12	ST4	Pensions and Other Employee Benefits	Shri K A Pandit Memorial Prize Fund	Neelesh Tripathi	25362	Indore
13	ST5	Finance and Investment A	Mr. Kamal Kumar Noranglal Podar Prize Fund	Venkatesh Murugan Konar	25585	Mumbai
14	ST6	Finance and Investment B	Late D Basu Prize Fund	Nikhil Todi	30635	Kolkata
15	ST7	General Insurance - Reserving and Capital Modelling	Mr. Peter Akers Prize Fund	Anubhooti Atul Jain	25256	Mumbai
16	ST8	General Insurance : Pricing	-	No Candidates Passed	-	-
17	SA1	Health and Care Insurance	G S Diwan 100th Birth Anniversary Memorial Education Fund	Neha Taneja	6387	United Kingdom
18	SA2	Life Insurance	Prof G S Diwan's Memorial Prize Fund	Anand Prakash	4783	Bangalore
19	SA3	General Insurance	Late Shri K P Sarma Memorial Prize for the Meritorious in General Insurance	Rohit Ajgaonkar	594	Mumbai
20	SA4	Pension and Other Employee Benefits	Canada Life Scholarship Endowment Fund	No Candidates Passed	-	-
21	SA5	Finance	-	Jimmy Jacob	10394	Mumbai
22	SA6	Investment	Prof G S Diwan Memorial Scholarship Fund	Rushabh Abhinav Shah	10095	Mumbai

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