



Institute of Actuaries of India

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the Actuary INDIA

THE MAGAZINE OF THE INSTITUTE OF ACTUARIES OF INDIA

October-November 2018 Issue

Vol. X - Issue 10-11

Pages 48 • ₹ 20

INDIAN ACTUARIAL PROFESSION
Serving the Cause of Public Interest



ANNOUNCEMENT

12th Seminar on Current Issues in Health Care Insurance (12th CIHCI)

Advisory Group: Advisory Group on Health Care Insurance

Date: 14th November, 2018

Venue: Hotel Sea Princess, Mumbai

The Seminar would focus on the following topics:-

1. Panel Discussion on Ayushman Bharat
2. IFRS 17 - Health Insurance Perspective
3. Introduction to Mental Illnesses and factors to consider for offering Insurance
4. Panel Discussion on Insurtech, etc.

Presenters: Experienced professionals with number of years of experience in health insurance industry would be participating in this current issues seminar and sharing their experiences and insights with the audience.

Who Should Attend?

- The seminar is open to all who wish to enhance their skills in Health Insurance domain.
- Non-members are welcome to attend.
- Insurance professionals working in Life, General, Standalone Health, Reinsurers, etc. would find the seminar quite relevant

General Points:-

- **Registration Fees (Excluding 18% GST):**
Students & Associate Members: ₹ 2,500/-
Affiliate & Fellow Members: ₹ 5,000/-
Non-Members: ₹ 6,000/-
- **CPD Credit for IAI members:** 6 hrs. Technical - Health Insurance
- **Registration last Date:** 12th November, 2018, Monday; Admission on first come first serve basis
- **Dress Code:** Business Casual
- **Point of contact:** Ambreen@actuariesindia.org
- **Register at:** <http://www.actuariesindia.org/SeminarRegistration.aspx>

15th Seminar on Current Issues in Retirement Benefits (15th CIRB)

Advisory Group: Advisory Group on Pension, Other Employee Benefits and Social Security

Date: 29th & 30th November, 2018

Venue: Hotel Sea Princess, Mumbai

The Seminar would focus on the following topics:-

- Key Note - Macroeconomic factor/state of economy
- APS 27 - practical experience, insights and challenges post implementation
- Managing and Valuation of Exempt Provident Funds
- Panel discussion on PF valuations, Leave valuations, Importance of assumptions
- Attrition Rate Analysis and Impact on Actuarial Valuation
- Technical Quiz - Global Pensions and assumptions
- Proportionality in actuarial valuations
- Capacity building in valuation and reporting of other employee benefits (through use of practical examples)
- Retirement solutions for Indian population - external perspectives
- What may Labour code mean for Social Security and our role as actuaries?
- Mortality improvements the new Assured lives table - impact on Pension/PRMS valuations.
- Role play depicting professional situations and challenges facing benefit actuaries
- Participant's opportunity to shape the practice area. Have desktop breakout groups to discuss how we prioritise/shape the agenda of the AGPEBSS in next two years.

Presenters: We will have a number of eminent guest speakers on macro and strategic topics, as well as experienced actuarial professionals in the Employee Benefits industry would be speaking in this capacity building seminar and sharing their experiences and insights with the audience.

Who Should Attend? - Any current or potential future practitioners in the area of employee benefits. This seminar is useful for not just Fellows/Associates, but also student actuaries who are looking to develop a career in the area of employee benefits in India.

General Points:-

- **Registration Fees (Excluding 18% GST):**
Students & Associate Members: ₹ 3,750/-
Affiliate & Fellow Members: ₹ 7,500/-
Non-Members: ₹ 9,000/-
- **CPD Credit for IAI members:** 12 hrs. Technical - Pensions and Employee Benefits; (As per APS 9 Ver. 3)
- **Registration last Date:** 26th November, 2018; Registration on first come & first serve basis
- **Dress Code:** Business Casual
- **Point of contact:** Ambreen@actuariesindia.org
- **Register at:** <http://www.actuariesindia.org/SeminarRegistration.aspx>

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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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It's an honour for me to write to you as the President of the Institute of Actuaries of India. Many of you would know me; however, for those who may not, I have been associated with insurance and reinsurance sector across India, USA, UK and Singapore over last 28 years. Currently, I am Appointed Actuary for Kotak Life. Prior to this, I have worked in various capacities with ICICI Prudential Life, Swiss Re, GE Financial Assurance Holdings, Inc. and Life Insurance Corporation of India.

I have been part of the IAI Council over the last 4 years in various capacities before taking over as President of IAI. Prior to joining the council, I have been involved in various activities of the profession over last two decades. Recently, as the Chairperson of Wider Field Committee (WFC) which envisioned creating employment opportunities for actuarial personnel, specifically for students, in areas other than traditional insurance and pension areas

Actuarial Profession is rapidly growing in India and globally. I am pleased to share with you that IAI is closely working with IFoA and other Actuarial Institutions globally to grow the profession and be at the top of all developments.

I would like to take this opportunity to refresh our memories about the Vision and Mission of IAI. The Vision of the IAI is to be "a globally well recognized professional organization developing enduring thought leadership in managing uncertainty of future financial outcomes".

The mission of IAI can be covered in 6 bullets below:

- i. To educate/train risk professionals
- ii. To enhance and maintain high professional standards
- iii. To shape Public Policy and Awareness
- iv. To engage with other professional/regulatory/government bodies
- v. To promote/build IAI as a respected brand of risk

management globally

- vi. To promote research to advance actuarial science/application

While a lot of work has been done in past, we need to build upon that really fast and increase our pace to meet the challenges posed by the changing environment. We have to adapt ourselves to review and relook at the strategy to achieve our mission like we do in actuarial control cycle.

The profession needs to evaluate what new skills we need to develop to meet the emerging needs. While we make all efforts to stay relevant by maintaining our skills and credibility in the traditional areas of actuarial practices, we need to addresses the challenges and grab opportunities in emerging areas. Wherever there are risks and uncertainty, actuaries add significant values to identify and add value by advising appropriate action to manage them. Actuaries can play significant role in shaping the future.

In order to give emphasis emerging areas, we have constituted following advisory groups with expert members from respective areas:

- a. Advisory Group on Data Science and Analytics
- b. Advisory Group on IFRS 17 (INDAS 117)
- c. Advisory Group on Banking, Finance and Investments

Given the strength and capability of the members of these advisory groups on emerging areas, I am very confident that we will surely become significant in these non-traditional emerging fields.

Unfortunately, there is trivial awareness about the profession so far the government sector is concerned. We have to play pivotal role to make government aware of how could actuaries add value to the lives of people through advising on government initiatives on health, social security and planning.

I am looking forward to engage with other professional bodies, regulators and government bodies to enhance the reach of the profession.

I would like to thanks each and every council member, advisory group members, IAI Staff and past President for all their support. I also would like to thank all Examiners; Review Examiners who really work hard to ensure the quality and the standard of the examinations are high and ensure credibility of the profession is maintained.

I am confident we together shall accomplish our goals. Finally I wish all student members all the best for their examinations.

Know your President



Congratulations to Sunil Sharma for becoming the President of IAI.

This is a great opportunity for Sunil to carry forward the excellent work that has been done by IAI for several years.

Considering his dynamism, high energy levels, broad outlook, flexibility, openness and willingness to take on challenges, a lot will be expected from him to take the development of the actuarial profession to the next phase of evolution.

May this be the beginning of another dawn with new hope, new dreams and new vision for IAI!

We wish Sunil, Members of the Council, and all stakeholders, the best of success.

-- Mr. Venkatesh Chakravarty --

It gives me great pleasure to write something about Sunil whom I had known for the last almost 20 years.

I first met Sunil in the Northern Zonal office of LIC in New Delhi where he had come to inquire about the actuarial course. We also met at Zonal Training center of LIC of India where we used to pursue the course. Sunil was posted in an LIC branch but he had that spark in him to do this difficult course come what may. He was always (and still is!) very dynamic and was always in a good and cheerful mood. He could sing well (I think he sings now as well!) and whenever we used to have some gathering we would ask him to sing. He was one of the first persons alongwith some of our seniors to leave the secure job of LIC and venture into a private company (GC) in 1998-99 when it was almost unthinkable to take such a step. Many were encouraged by his move. I have fond memories of travelling with him having discussions on various topics. He is involved in some social activities as well.

When the market was not open, I used to look at the handful of the actuarial people in LIC and ponder over who amongst this group will lead the profession at some point of time. After 20 years, at this juncture where the profession is facing various challenges e.g implementation of IFRS 17, creating new jobs, other regulatory responsibilities vested upon us by the regulator and the industry, a person like him who can connect with the young and the old with equal ease is in a perfect position to lead the profession and I am glad that he is. The profession will really grow under his guidance...

Seeing him grow from a very humble position to such a esteemed position is truly heartening.

Best of luck to him.

-- Mr. Rajiv Mukharjee --

I've known Sunil for many years now – as a colleague; client; fellow (no pun intended) actuary; co-author & friend. Sunil has always been passionate about developing the profession in India and will no doubt be a great President of the IAI.



At the 7th GCA in 2005, we co-authored a paper on Experience Studies, a critical function needing training at the time. Through this experience, I saw Sunil's passion and energy to share knowledge and set high standards for the actuarial profession in India. I'm sure this theme will resonate throughout his presidency on a much wider stage. Sunil, congratulations again and I wish you all the best for your term in this important role.

-- Mr. Gavin R. Maistry --

"I know Sunil personally from LIC days. He was among the first few, who has visualised the role of actuaries outside LIC and joined GC capital to get wider experience. He enjoys working with people with diverse background and always grabbed an opportunity to work in diverse countries. He has rich experience of working in life insurance industry in USA, UK, Singapore and India. He is very passionate about actuarial profession and involved in Institute of Actuaries of India activities in different capacities for last many years. Beside Actuarial, he has keen interest risk management and quality control. He loves Indian music and learns Indian classical music. He is also a health conscious and regular participant in long distance running. I am sure he will take Indian actuarial profession to new heights."

-- Rajesh Rajput --

SUNIL SHARMA is known to me right from 1991, year in which I was posted as ADM at LIC Zonal Office, Delhi, on transfer from Mumbai. He was studying to become an actuary and progressing very fast in actuarial studies. He is very talented, friendly, ever smiling, calm, and jovial in nature. A great singer. He has lot of passion for actuarial profession and its development. He is keen that actuarial profession should enter into wider fields, and that the public should benefit from the actuaries. I hope he would deliver his thoughts into action, as he took up the position of President of IAI. My good wishes to him.

-- Mr. K. Subrahmanyam --

It is great to see Sunil Sharma rising above ranks to be the president of the IAI through his hard work and perseverance. My connection with Sunil goes back to LIC days when we used to go to Hardayal Municipal Public Library to study for the actuarial exams after office hours and on the weekends. He is a self-motivated individual, dedicated to the actuarial profession. His commitment and progression in the actuarial field has been exemplary for the aspiring actuaries.

My best wishes to Sunil for the additional responsibility and I am confident that he will certainly make a difference to the profession and the institute."

-- Mr. Sandeep Narang --

My interaction with Mr. Sunil Sharma

It was during the First Global Conference of Actuaries, way back in 1999 when I first met Mr. Sunil and he was one of those who were instrumental in organizing the I GCA. Subsequent to that Sunil and I worked together in GC Capital. While in GC I have seen his efforts in motivating students from ISI Kolkata and Delhi School of Economics to take up Actuarial Studies, creating job opportunities within GC and had also taken up the project to revamp and write the content in the IAI/ASI website. Since then I have seen him in taking up various roles within IAI and always keen to make a difference and contribute to the Profession.

My last discussion with Sunil (before he became President of IAI) was during one of the seminars where we were exchanging thoughts about how we have benefitted from what our Seniors (Senior Actuaries) contributed to the profession and now it is our time to contribute to the profession for our next generation. In fact, this was the discussion that Sunil recalled after he became the President of the Institute and I expect that this will become truth in the coming years.

Wishing him all the best for his tenure as President!

-- Mr. B. N. Rangarajan --

I knew Sunil since Nov-2000. I worked with him for 3 years in GE Capital and 7 years in Kotak Life.

Sunil is very fond of driving and this particular incident gave a glimpse of his personality. We were going to Lonavala for our Annual Offsite. A person driving a two wheeler came in front and was trying to pick a fight with Sunil accusing him of wrong driving. Sunil did not respond to him and waved him off with a smile. Then he told me that people vent out their frustration in various ways. You have to sympathize with them and move on. If you respond to them it will affect your own peace of mind and spoil your day. Sunil is always in control of the situation and very cool headed in dealing with people.

Sunil is a great leader and has the ability to bring the best performance out of everyone. He believes that you have to fix the processes and help people in doing their job.

Sunil is very supportive of actuarial students and ensures that they get adequate time for their studies.

Another habit of Sunil I have noticed is he cares to ask for the name of the person, be it a waiter at the hotel or driver and complement them for their service. It makes them feel very valued and happy.

Sunil has the ability to think and plan for the future. He led the project of designing of IAI website way-back in year 2000 when he was in GE Capital.

Sunil is an excellent singer and own a karaoke system. He likes to sing old Hindi songs. He also likes to travel and likes adventure sports like Paragliding.

-- Mr. R Jayaraman --

Though i know Sunil for many years our interaction started with our Journey in Swiss Re. Sunil and myself were colleagues in Swiss Re India about 13 years ago. We worked together in the same office for about a month or so. On the day when Mumbai was flooded in July 2005, we both left office along with our past president Mr Karunanidhi to reach our homes. Sunil was driving the car. We reached Dadar about 10 PM (we left office at Mahalaxmi about 4PM in the evening). we had dinner at Dadar and started our journey further. Our car got stuck in water at Bandra. Sunil managed to get his car out of that knee deep water level and started the journey further. We had to park the car at Khar as there was no way to move the car and started walking. Sunil offered us to come to his house and stay there till the rain and water recedes. We went to his house at Santacruz about 4AM and his family took care of us for whole day. We had tasty punjabi parathas during the day at his house. After having rest till evening, Karunanidhi and myself started walking to our respective houses on that day evening. I will always remember Sunil and family for their hospitality during that crisis.

I wish him all the best in his current role as President and hope he would guide the profession in the crucial juncture.

-- Mr. G.L.N. Sarma --

I worked with Sunil Sharma in IAI Council for four years (2014-2018) and always had warm cordial relationship inspite of occasional differences of opinion. He always treats senior actuaries with respect and showed eagerness to learn from their experiences and wisdom. He passionately worked for creating job opportunities for actuarial students and actuaries in traditional and non traditional areas. A difficult but absolutely essential task, which I hope will be a key objective of his Presidency. The functioning of IAI needs more democracy, collectivism and professionalism, and I believe Sunil is committed to these concepts. He understands importance of keeping good relationships with Regulators, Govt of India and other stakeholders of Actuarial Profession.

In a lighter vein, sheer by chance I found the singer in him at a GCA event couple of years back. I like actuaries who have other interests in life.

I wish Sunil a great success as IAI President.

Best Wishes,

-- D C Chakraborty --

I had the good fortune of working directly with Sunil for 3 years. He is one of the most visionary leaders I have worked with. His compassionate and kind nature is one of its kind. I was impressed how Sunil, as a leader, was always able to bring together various differing parties to a common consensus. He is able to look far ahead and prepare now to face challenges in the future. Every person in the office looked up to him and valued his good counsel. I am glad that in our profession in India we have exceptional leaders like Sunil who are coming forward to lead us in these times of change and transformation. Thank you Sunil! I am sure the IAI will scale new heights under your guidance and leadership.

-- Ms. Samreen Asif --



When the news of Shri Mukund Govind Diwan being conferred a Life Time Achievement Award by Birla Institute of Management Technology for his services rendered to Insurance was received, a wave of joy passed through his large circle of admirers. We had only recently celebrated his completion of 60 years of Fellowship of the IFOA. His helpful nature, men-management skill and respect towards all and deep understanding of Business principles in the service of society has made him a welcome figure everywhere, be it actuarial seminars or Board rooms of Private or Public Enterprises.

Born on 14th November 1931, and achieving accolades such as M. Sc. (Statistics), University of Bombay (Mumbai), Fellow of the Institute of Actuaries, London, Fellow of the Actuarial Society of India now Institute of Actuaries of India and Fellow of the Insurance Institute of India, he started working in the private sector insurance industry in 1954. These services were then taken over by LIC in 1956 where Shri Diwan has had an illustrious career spanning over 35 years having a vast bouquet of experience as under:

- Working in various departments of an insurance company i.e. Actuarial, Investments, New Business Underwriting, Policyholder's Services, Management Services, Human Resources, and Marketing etc.
- Settlement of excess assets claims of non-Indian insurers when their Indian business was taken over
- Analysis of financial performance of listed Companies for investment of funds
- Underwriting of New Policies
- Preparation of premium tables
- Valuation of Life Insurance Policy liabilities
- One time settlement of Pension liabilities between the Government of India and the Government of UK

- Rendering expert opinion to the Attorney General on restoration of Commuted portion of Pension after 15 years
- Advise on adequacy or otherwise of the compensation payment made by Union Carbide in respect of the Bhopal Gas Tragedy.
- Served on the expert committee on enhancing and funding of Government Pensions

Having served at all levels in LIC, Shri Diwan retired as the chairman of LIC in 1991 and thereafter continued working as a consulting actuary in the areas of Life Insurance, General Insurance and Retirement Benefits. He then joined M/s. K. A. Pandit Consultants & Actuaries as a Partner in April 2000 wherein he has assumed the role of a consulting actuary specialising in the field for Life insurance for many companies across the globe.

Other achievements of Shri Diwan include:

- He served on the Boards of various Companies in the Financial Sector like LIC, GIC, IDBI, UTI, etc.
- He served as a member of the Study Group on Social Security set up by the Labour Ministry, Government of India.
- He served as a member of the Working Group on Social Security set up by the Second National Labour Commission.
- He was the President of The Actuarial Society of India and The Insurance Institute of India. He was also the Chairman of the Governing Board of the National Insurance Academy, Pune, India.
- He was the Honorary Director of Education of the Actuarial Society of India from 1991 to 1999 and has been the Deputy Chairman of the Board of Education of the Insurance Institute of India for over ten years.
- He has served on the Board of Insurance Companies in Kenya, Bahrain and Malaysia and serviced the LIC branches in London, Fiji and Mauritius.
- He has worked on a UNCTAD project on the challenges faced by the Insurance companies in the developing countries in light of opening up of the life insurance industry to global competition.

Education and Mentoring are very close to his heart and thereby he is involved in running B. Sc. And M.Sc. courses in Actuarial Science for the Yeshwantrao Chavan Memorial Open University, Nasik, under the name of DS Actuarial Education Service Pvt. Ltd.

Shri Diwan is a pleasant combination of sharp analytical skills, approachability, wits and a funny bone. His alertness and responsiveness to issues around him coupled with always being ready to provide apt solutions is invaluable. He is a beacon of achievement in our field shining bright and high, thereby inspiring all that hard work, perseverance, logical thinking and a jovial personality can aid in fulfilling all our wants.

1st Capacity Building Seminar on Enterprise Risk Management

Organised by: Advisory Group on Risk Management, IAI
Venue: Hotel Sea Princess, Mumbai **Date:** 10th August 2018

Session : Introduction, covering agenda Setting the tone for the day

Speaker: Mr. Bikash Chaudhary



Mr. Bikash extended a warm welcome to all for the first ever such seminar of its kind. He spoke about the agenda to be followed during the course of the day and spoke about how risk management professionals thrive to seize/capitalise the upside of risk and control, monitor and mitigate the downside within the tolerance/framework of the Company. He also impressed upon the fact that since actuaries can quantify any vision/mission statement, they thereby have an advantage over others to build these quantifications within the financial framework.

Session : Welcome Address

Speaker: Mr. Sanjeeb Kumar



Mr. Sanjeeb greeted and welcomed all and was glad to

announce the uniqueness of this seminar in the fact that professionals from many fields were in attendance i.e. about 30% of the attendees were not members of IAI. He appealed to the audience to be more interactive as a good mix of questions would bring new dimensions. He impressed upon the fact that Risk Management is relevant everywhere and concluded the seminar open for the day.

Session : Introduction to ERM

Speaker: Mr. Sonjai Kumar



Mr. Sonjai started with posing a question as “What is Risk fundamentally?” This question was answered aptly as Risk is the effect on future of uncertainties on the objectives. He spoke about the difference between historical risk management and ERM in the context that silo approaches to tackle risks have paved way to ERM wherein a company is needed to have a good governance structure and the Chief Risk Officer is a custodian of risks and not the owner.

This led to a further definition being clarified that ERM is a risk management process integrated across the Company flowing right through the top of the hierarchy with ownership of Board running through the last employee in the ladder chain. Sonjai thereby explained that accountability at the top/board level, the governance structure/division of responsibilities across the organisation and the role of hierarchy are very important in handling the risks/risk events when we assign appropriate risk owners to each risk. It would be ideal that actual functions are risk owners as they are experts in that field but there could be multiple owners (Lead & Others) as and when needed.

He then discussed the three lines of Defence Model wherein the 1st Line are the Risk Owners i.e. the Business Units. The 2nd Line is the Custodian/Risk and Compliance and the 3rd Line is Audit. A SWOT Analysis of the Risk Management process can also be a good idea but measurement is very important even more than identifying risks as measuring them appropriately i.e. quantitatively or qualitatively can help ascertain financial impacts.

He impressed upon the fact that when managing risks, we have 4 tools in our arsenal. That is we can either Accept, Transfer, Manage/Mitigate or Avoid a Risk. These decisions will be based on our perception of events and links between capital, risk and profit. A risk culture is perhaps the most important and in the speaker's opinion the risk culture would pose troublesome/challenging in the future as integrating a risk culture and fostering the right behaviour would be based on regular reviews and effective communication.

Thereby, Sonjai spoke about the Benefits of ERM and spoke about how ERM is the future as India is moving to a risk based framework in insurance and in other fields also risk governance is paramount.

Session : Risk Management Implementation Process

Speaker: Mr. Shailendra Kothavale



Mr. Shailendra spoke about how Compliance and Risk interact and what can be done to manage any conflict. Under Risk Management we can Identify, Analyse, Manage, Govern and Report as part of strategy setting and enhanced performance. A company's success can be attributed to its ability to anticipate and respond to change and thereby it is very important that Governance, Risk and Compliance speak the same language at the same time.

He also spoke about Execution Risk with respect to the Board and Risk Management Committee Discussions depending on the ongoing monitoring of Key Risk Indicators (KRI's). This monitoring could be automated wherein reports can be generated at a click of a button.

Shailendra noted that a change in regulations drove to change the perception of people with respect to risk. There was also a mind-set change for the Compliance Team with respect to looking at adding value. Every member in the Compliance Team was now needed to be trained to wear a risk control hat and it was seen that risk and compliance are intertwined as their focus is the same. He also remarked that a Risk Culture is key, as it is as strong as the weakest link and more awareness is leading to further engagement and evolution.

He noted that Actuaries and Risk Professionals need to play a collaborative role in ascertaining:

- ♦ Can we be paranoid at all times?
 - ♦ How proactive are we?
 - ♦ Can we identify black swan events?
 - ♦ Are we victims of our own business operating models?
 - ♦ Can we identify the proverbial elephant in the room?
- Can discussions be done? Can we tame it?

Shailendra emphasised the role of mentoring to enhance the understanding of the business as a whole to equip people to deal with business risk.

Session : Application and Challenges

Speaker: Mr. Sonjai Kumar, Mr. Kunal Kathpal

The presenters started the session with discussing the available ERM Tools and their practical challenges. The tools available to us are Risk Appetite, Risk Assessment and Stress and Scenario Testing whereas the challenges faced could be Assessing ERM's Value, Privilege to Risk Information, Defining Risk, Risk Assessment Method, Qualitative Versus Quantitative, Time Horizon, Multiple



Potential Scenarios, RM Ownership, Risk Reporting, Simulations and Stress Tests. We were then introduced to two concepts namely Risk Control Self-Assessment (RCSA) and Key Risk Indicators (KRI). RCSA is the 'Bottom Up' tool used to proactively identify, assess via impact and likelihood, manage and report risks and controls. It is done in 3 stages. The 1st stage is Pre-RCSA which deals with defining materiality framework and review of SOP, Audit Report, Customer Complaints, and Loss Data events. The 2nd stage is During-RCSA where risks are

identified and documented, existing controls are documented and assessed based on design, residual risks are assessed based on existing controls etc. The 3rd stage is Post-RCSA where the effectiveness of the RCSA strategy is assessed and a risk management strategy is put in place for risks outside tolerance. Key Risk Indicators (KRI) is an operational or financial variable that provides a reliable basis for estimating the likelihood and the severity of one or more risk events. KRI should be relevant, non-redundant, measurable, easy to monitor and auditable. Some examples of KRI are, the percentage of all claims received during the preceding 12 calendar months which were flagged as suspicious, the number of policy holder complaints with respect to the work of the claims assessors, the number of customer e-banking accounts which have been compromised specifically through phishing and/or Trojans etc.

The discussion then was shifted to understanding the risk appetite. Risk appetite is the maximum risk the Company can take to achieve its business objectives. Its application (when monitored) works as an early warning signal tool. Appetite could be Quantitative (Capital, Profit, Maximum Losses etc.) or Qualitative (Statement, "Zero tolerance for regulatory and reputational risk"). Risk Appetite can be ascertained using either a top down approach (Company level risk appetite is broken down into smaller pellets across the organisation) or a bottoms up approach (Defining maximum tolerances for each risks under different risks categories which are aggregated). This then leads to the decision making process whereby any business decisions that bring in new risks should not increase the overall risk of the company i.e. should be within its appetite.

Session : Information and Cyber Security Risk

Speaker: Mr. Pawan Chawla



Mr. Pawan started the session by introducing his firm Lucideus and sharing a potent quote in the context of Cyber War i.e. "You may not be interested in War, but War is interested in you."

He then went on to demonstrate information risk by

showing two videos about how a person's data can be manipulated and what the consequences can be on a company due to social engineering. He then touched upon Cyber Risk & Security and the risk assessment for an organisation and security breaches faced due to data sharing with partners. This led to the discussion of the importance of a Cyber Information Security Officer (CISO) and how they strategize, manage, integrate and report the security of an organisation.

Pawan then spoke about the underwriting of cyber risks and the importance of the transfer of cyber risk as cyber risk is currently not included in most current ERM's. Shareholders and customers are kept in the dark while Balance Sheets and Market caps are not protected as likelihood is not too low enough to ignore and the impact is too massive to handle. But there are some challenges in Cyber Risk Transfer such as damage valuation, threat and data breach and likelihood of breach. He then as an example discussed two case studies demonstrating the impact of data breaches and to what extent were losses covered by insurance against such breaches. This demonstrated that either there was inadequate coverage or exclusions in the policy giving limited coverage.

He then explained how systems can be secured via SAFE. A SAFE Score can help assess the vulnerabilities in the system and also flag areas to improvement to protect against data breaches. It is believed that this SAFE Score will drive Cyber Risk Transfer with Machine Learning improvements within itself.

Session : ERM as a business enabler

Speaker: Mr. Roop Kumar



Mr. Roop explained that ERM can be a business enabler via understanding the following:

- How does ERM add Value?

ERM adds value to an organisation by Reducing the Cost of Hazard Risk, Reducing the Deterrence Effects of Hazard Risks, Reducing & Managing Downside Risk,

Intelligent Risk Taking, and Maximizing Profitability, Holistic Risk Management, Legal and Regulatory Requirements and can thereby add value to an economy by Reducing Waste of Resources, Improving Allocation of Productive Resources and Reducing Systemic Risk. There can be a Risk Framework as it prepares the organization to achieve long term goals, effective use of resources, dependable reporting and compliance with regulations/norms/guidelines, such as ISO 31000: 2018 Risk Management Standard and the COSO ERM 2017. These frameworks help in integrating strategy and performance towards coordinated activities to direct and control an organization with regard to risk

♦ Roles & Responsibilities of ERM

ERM is to facilitate Tolerable Uncertainty, Legal and regulatory compliance, Survival, Business continuity, Earnings stability, Profitability and growth and Economy of risk management operations and trade off among goals.

♦ How does 3 Lines of Defence Interact?

First Line: The first level of control environment is the business operations which perform day to day risk management activity.

Second Line: Oversight functions in the Company such as Risk Management, Compliance, Legal and Finance set directions, define policy and provide assurance.

Third Line: Internal and external audit are the third line of defence, offering independent challenge to the levels of assurance provided by business operations and oversight functions.

There is a two way communication between the First and Second Line and the Second and Third Line while all Lines provide inputs to the Board and the Risk and Audit Committee via the custodian i.e. the CRO.

♦ Risk Assurance to the Stakeholders

Risk assurance refers to the level of confidence in the effectiveness of the organization's risk management culture, practices, and procedures both within the organization and with outside stakeholders as high levels of risk assurance result in lower costs to the organization, enhancing its long-term value. It is imperative that the board of directors is certain that key risks have been properly identified, quantified, prioritized, and managed in an effective and cost-efficient manner, Risk reporting systems are providing information up the management chain to the board of directors, as well as down the management chain to the operating units and there is a risk aware culture. Benefits of the assurance are greater confidence in management activities, reinforced culture of risk management and confidence instilled in customers and suppliers.

Session : Survey on ERM - live poll

Speaker: Hemant Mundhra

The Moderator conducted a live poll of multiple choice answers to certain questions to ascertain audience preferences connected to Enterprise Risk Management and these answers based on majority preferences were what fuelled the panel discussion which followed the live poll.

Panel Discussion : On outcome of survey results -

- ♦ CERA certification in India
- ♦ Effectiveness of ERM in the organisation
- ♦ Role of actuaries in ERM

Moderator: Mr. Varun Gupta

Panelists: Mr. Sanjeeb Kumar, Mr. Roop Kumar, Mr. Sanchit Maini, Mr. Sachin Garg, Mr. Nick Blanchflower



The Panel started the discussion sharing their thoughts on Fintech disruptions as motivated by the moderator. This led to thoughts been poured on how certain businesses are capital intensive and thereby could be resilient to changes with respect to incorporating Big Data, Internet of Things, Artificial Intelligence, Blockchain etc. For example, for the telecommunications industry

Jio was an emerging risk 3 years ago which has effectively disrupted the market for other providers. Thereby to deal with such events sometimes adopting a price on the go mantra works but more importantly a sound governance framework, resource allocation and creating awareness in employees is imperative. People can be groomed to be risk aware individuals via various qualifications but for actuaries who would like to acquire this expertise can opt to be CERAs. Thereby IAI has taken steps to promote CERA but it was widely accepted that actuaries are reluctant to work in Risk. Thereby the discussion veered towards the role and importance of a CRO and how to add value as a CRO. Panellists believed that understanding business objectives and presenting problems and their solutions via value adding techniques will help set the tone from the top. Appetite discussions with the CEO and thereby supporting and adding value to the CEO will enable the risk function to be taken seriously and thereby the CRO will get a seat at the table. Some panellists believe that Information Security is a good topic to attract the Board. Also, everyone agreed that ERM consciousness has picked up as trust with the management is important and also due to the new guidelines independent directors are now pushed to listen to the CRO. It is also always worthwhile to ponder as to how you as a CRO will align yourself to the organisational role.

Session : Sharing Experience on implementation of ERM - Case Study

Speaker: Mr. Amol Padhye



Mr. Amol introduced the COSO Framework. The elements of the framework are:

- ♦ Internal Environment
- ♦ Objective Setting
- ♦ Event Identification
- ♦ Risk Assessment
- ♦ Risk Monitoring
- ♦ Control Activities
- ♦ Information & Communication
- ♦ Monitoring

This is done with strategic, operational, reporting and compliance objectives in mind while vertically integrating to subsidiary, business unit, division and entity-level. He then provided a snapshot of how banks adapt the framework. The Control environment for banks can be broken down into Board Level Committees (Risk Policy and Monitoring Committee (RPMC), Credit Approval, Audit, and Fraud Monitoring), Management Level Committees (Asset Liability Committee (ALCO), Investment, Operational Risk Management Committee (ORMC), Internal Capital Adequacy Assessment Policy Review (ICAAP), Basel Credit Risk) and Other Units (Business Units, Risk Management Groups, Finance Control, Audit, Operations, Legal, Compliance, IT, HR, IT Security. After conducting a thorough risk assessment control activities were broken down into preventive (credit, market, liquidity, operational) and detective controls (stress testing and reverse stress testing).

The challenges in implementing the framework were varied and with respect to oversight and governance, organisational view, risk and control definitions, risk and control criteria, reporting and technology and quality assurance and validation leading to an impact of Duplication and overlap results in inefficient use of risk resources, Business units feel an excessive burden, resulting in fatigue and increased costs, Inconsistent reporting to senior management, limiting management, limiting its effectiveness and hindering analysis, Excessive risk and governance and remediation costs, Too much focus and attention paid to low priority issues, Lack of comprehensive, transparent and consistent risk information for decision making. Amol left the audience with a potent question, "How am I planning my capital for the future?"

Conclusion & Vote of Thanks: Mr. Bikash Choudhary

Mr. Bikash concluded the productive day by recapping the salient points made during the day by various speakers. He also took the opportunity to thank all the speakers and the audience for a fruitful day which enabled the all participants to get a keen insight in the world of risk management. He thanked all members of the Advisory Group on Risk Management and noted that this seminar was possible due to the hard work and perseverance of the committee members and also the organisation staff of IAI. He also invited feedback on the event and encouraged participants to suggest topics for such events in future.

Written by

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Organised by: Working Group on Wider Areas of Actuarial Science

Venue: The Pillazio Hotel, Gurgaon

Date: 20th August 2018

Session : The Changing Landscape of Actuarial Profession

Speaker: Mr. Mahidhara Davangere



The session kick started with a brief background about the Data Science and Analytics. The discussion continued with changes happening in the Industry worldwide and the extensive use of Data Analytics in various fields giving an explanation about various risks, changing customer expectations, transition in workforce and the data collection, handling of unstructured data etc.

Mr. Mahidhara emphasized on various points on how Technology and Large volume of data is transforming businesses. This included collection of data from available sources and Big Data (including the software used, research methodologies and expected future growth). He also shared his insights on the importance of understanding the use of Actuarial practices for example in the NAB Online Retail Sales Index and the companies like Uber hiring Actuarial managerial. The importance of statistical techniques and Analytics and the impact of being able to assess various risks accurately over the time was also discussed.

The Actuarial profession has evolved throughout the time with introduction of other roles apart from Actuaries with initiatives taken by Actuarial Institutes across the world was discussed. Further, he discussed

next steps taken to be taken on introducing Actuarial to the world with new approaches, solutions to problems and opportunities to work in wider areas. These included the lower waiting periods and different claims experience as compared to similar retail products. The lack of medical underwriting and inaccessibility of remote locations and hence being unable to assess claims were also few of the key challenges highlighted.

Session : Democratizing Data Intelligence

Speaker: Mr. Subhash Chandra



The session was initiated with the introduction of the extensive use of data in our surrounding and how the consumer trends have changed and the accessibility to large amount of data available widely. Further the presenter elaborated the use of data on different stages from Core Transacting to the end product and even marketing.

The presentation covered various stages of the Democratizing of Data including deriving problems, focussing on the source of data, whether external or internal and a balance to be used, predicting, modelling and monitoring and feedback process. The speaker explained why there is need to democratizing the data and is way helpful in achieving the organisational ultimate goal as the data will be available with minimum business intervention and easy access to those who has need for the data.

The session continued with an interaction of latest technologies such as cloud and using of data for Actuarial workings. The presenter apprised the use of actuarial skills when the data is available so as to get maximum possible useful insights out of it. He emphasized on using real time data via cloud solutions and explained to evolve with big query. He explained how the past data warehouses has changed to latest concepts with virtual servers. The session ended with discussion of various programming languages that should be learned by an Actuarial student or basically by everyone.

Session : Big Data in Insurance

Speaker: Mr. Manoj Kumar Chhatlani



Mr. Manoj initiated the session explaining the way the Insuretech is changing the traditional insurance practices like underwriting of insurance policies and pricing of new products. There are already traditional data sources that are being used for the purpose of data analytics, certain new age sources may also be explored. These include data from fitness wearables, social media, genetic data etc.

He explained the vast use of wearables to price the Life and Health Insurance products such as fitbits watches etc that are being used in kind of personalised pricing. He emphasized on benchmarking according the wide variety of data and use those as a base.

He further explained the role of regulators in coping up with new challenges that are coming up their way like concept of pooling of risk and the traditional model of insurance is fading away with time. He also gave a perspective to the audience on how beneficial it would be to develop meaningful insights of data used.

Moreover, he discussed on the use of Telematics in Non Life Insurance where the premiums will be charged on the basis of the driving parameters like GPS and distance travelled etc and this would prove to be helpful for the segregation and actual allocation of

premiums amongst the insurers. The active participation of Regulators and challenges faced by them and the companies was discussed.

Session : The Art of Data Science

Speaker: Mr. Khushwant Pahwa



The session highlighted the concepts, approach and emerging opportunities surrounding Data Analytics. The discussion was initiated by explaining the applicability of data and statistics to actuarial methods. Data Science, Machine Learning, Analytics, Business Intelligence were explained in the session. **Mr. Khushwant** explained with importance and the impact of having a data in Insurance Industry and in different industries as well. The work of data scientists was briefly explained highlighting the objectives, information sources and the approach when Actuaries already have great substantive expertise in analytical thinking & quantitative skills.

The discussion on 4 V's of Big Data included- Veracity, Volume, Variety and Velocity was explained concisely on how to capture the data. Mr. Khushwant explained that the Big Data is refined to composite various techniques into one and that constitutes Data Science. He further explained that this has been in existence for long but the advances in high performing computing and explosion of Data gave it a boost.

The speaker highlighted the smart data use using a video of TED Tech explaining the future in terms of data driven technology and design. The session was concluded with emphasis on the significance of Integrating multiple functionalities of an Actuary like Statistics, Mathematics, Software, Machine Learning and the importance of Business Acumen to reach to wider fields.

Session : Case study and break-out sessions

Panelists: Mr Mahidhara Davangere, Mr. Khushwant Pahwa, Mr. Manoj Kumar Chhatlani & Mr. Subhash Chandra



Two case study was provided by the panellist related to the Telecom Sector and the Real Estate Sector. The idea was to create a collaborative learning experience for each group which consists of around 6 members. Each group had to formulate a strategy with the Actuarial mindset which could prove to be helpful to the situation created by the case study.

The groups came up with different demand factors, prospects to be considered, segmentation to be followed, challenges faced, their solutions, marketing techniques and the supply techniques to be used. The session was concluded with a detailed discussion around applicability of general Actuarial basics while conducting strategic exercise along with advantages and disadvantages of using such methods keeping in mind the different scenarios.

Session : Panel Discussion- Data Science and emergence of a Multidisciplinary Professional

Panelists: Mr Mahidhara Davangere, Mr. Khushwant Pahwa, Mr. Manoj Kumar Chhatlani & Mr. Subhash Chandra

Mr. Mahidhara Devangere welcomed everyone to join them on the discussion and ask members to put up the questions to make the session an interactive one. He requested Mr. Subhash to explain some of the programming languages which would prove to be useful in Actuarial world.

Mr. Subhash Chandra put in his idea of how cumulatively different languages can benefit a student to attain a job and described the use of statistical programs across industry. He also mentioned the extended culture of Cloud these days and emphasized that it is beneficial to gain knowledge about the industry standard practices.

Mr. Manoj Chhatlani explained that Regulator has been performing a lot of functions using Data Analytics which is creating a safe environment for the consumers and creator of policies and insurance companies for pricing of policies with adherence to guidelines.

Mr. Khushwant Pahwa explained the skills that are sought for the Actuarial already includes the work of the Data Scientist and can be well placed within the scope of Actuarial Science. The recent change in curriculum will bring in wider scope for Actuaries with hands-on on programming skills alongside with statistical will make an unbeatable Actuarial solution industrywide.

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Seminar on Professionalism, Ethics and Conduct

Organised by: Advisory Group on Professionalism, Ethics and Conduct, IAI

Venue: The Pillazio Hotel, Gurgaon

Date: 30th August 2018

Session : Actuary and Professionalism: what's written and what's beyond

Speaker: Mr. Sanjeeb Kumar

Session : Case Study and Practical Examples

Speaker: Mr. Kunj Maheshwari



The session started with a background on what is an actuary and what do actuaries do. It covered the technical and the professional requisites for becoming an actuary and what constitutes actuarial advice. The session then moved towards defining professionalism and its paradigms. The discussion became livelier with what defines professional misconduct. This was followed by a detailed discussion of Professional Conduct Standard (version 3.0) considering some live examples.

Mr. Sanjeeb then covered the breach of the Practice Standard and of the Act and Rules and Regulations covered under Other Guidance. This was followed by a discussion on conflict of interest covering conflicts between two or more clients, between a client and a member or an actuary's firm, between previous clients and an actuary's firm and so on. The last part of the session covered some views on the disclosure requirements for an actuary.

A case study on professionalism was presented after the first session. The case study dealt with an enthusiastic new joiner who is booming with new ideas and cannot wait to make his mark in the team he has started working with. The new joiner has not yet integrated with the team socially and tries to get comfortable with the senior members by opening discussions about work at coffee. During his discussion, he details his idea on a product, only to find later that a similar idea was already presented to the manager and his idea gets late while reaching the manager. The new joiner is shocked and approaches the manager trying to make a point that it was his idea that got stolen and has now been presented as someone else's.

The presentation was followed by an interactive workshop where the audience were split into small groups and each group prepared their responses on some very interesting questions surrounding

professionalism and next course of action. Also, the behaviour of new joiner was questioned and ideas were speculated around the point if it did represent an example of professional misconduct.

The workshop was quite energetic with the audience presenting multiple views around the case study and debating what should be an appropriate behaviour in such a situation. The case study concluded with watching an HR manager's response to the above.

Session : External Perspectives on Professionalism, Ethics and Code of Conduct
(-by External Speaker from other profession)

Speaker: Dr. A K Dewan



The session kick started with the definition of a self-regulated profession and the intent of self-regulation. It threw some light on the components of self-regulation from the point of view of the medical profession. The discussion then moved towards what constitutes deprofessionalization and how medical profession has evolved over the last few decades. He shared some examples to highlight how the ethics have evolved within the medical profession and how a patient is now viewed as a client by many doctors. Lost values in healthcare were discussed by focusing on more recent examples from the healthcare industry. The last part of the session covered codes of conduct in the medical profession and disciplinary actions.

Dr. Dewan concluded the session by emphasizing a very important point that professionalism needs to

come from within, establishing codes of conduct is not going to enforce anything on its own. In his words:

“Oaths don't compel ethical behaviour, but they are human instruments that are crafted to sensitize the reader to moral moments and choices.”

Session : Case Study and Practical Examples

Speaker: Mr. Kunj Maheshwari

Mr. Kunj presented a case study covering an example from the pensions industry. The case study showed a pension actuary who is currently working on a commutation factor and while the factor is still not finalized, the senior management decides to make a presentation to the stakeholders and announce the option.

A few hours before the meeting, the senior management informs the actuary on a call and express their wish to go ahead with the factor. However, they suggest that the actuary announces the option as it would be more appropriate for the stakeholders to listen from the technical expert. The actuary is now in a dilemma as she is aware that the factor does not make much sense in the current scenario and probably would have worked a few years back when markets behaved differently.

However, there is no time and she steps right into the meeting where the senior management tells the stakeholders that they are about to announce the pension commutation factor and their technical expert will take on from here.

The presentation stopped here and again small groups were formed to debate on what she should do in the current scenario.

The session got interesting with different people presenting their views from a technical and a professional perspective.

The session concluded by watching the video further which laid emphasis on how she should balance her commitment to the client and her professional responsibilities.

Session : Overview of the Actuarial Practice Standards applicable to actuaries in India

Speaker: Mr. Puneet Sudan, Mr. Varun Gupta



This session provided an overview of the actuarial standards in India from general and life insurance perspective. The section on general insurance was covered by **Mr. Puneet Sudan** who covered APS 21- Appointed Actuary and General Insurance Business (Version 1.01-Effective-01.01.2012 and APS 33- Peer Review of Appointed Actuary's work in General and Health Insurance / Reinsurance (Version 1.00-Effective-01.12.2017) in detail.

The session on life insurance was covered by Mr. Varun Gupta who discussed a number of Actuarial Practice Standards applicable to a life insurance business in India, including APS1 - Appointed Actuary and Life Insurance Business (Ver. 1.01/ 01 07 2011), APS2 - Additional Guidance for Appointed Actuary and Actuaries involved in Life Insurance (Ver. 1.01/ 01 07 2011), APS3 - Financial Condition Report (Ver. 1.01/ 01 07 2011), APS4 - Peer Review (Ver. 3.0/ 23 01 2013), APS7 - Appointed Actuary (AA) and Principles for determining Margins for Adverse Deviation (MAD) in Life Insurance liabilities and APS10 - Determination of the Embedded Value (EV) of life insurance companies incorporated in India and Regulated by IRDA for the purpose of Initial Public Offering (IPO) (Ver. 1.02/ 28 03 2015).

Session : Upholding standards: an overview of the disciplinary process

Speaker: Mr. Khushwant Pahwa



Mr. Khushwant started the session by highlighting some points on what constitutes professional misconduct for an actuary citing multiple examples, which can lead to a potential disciplinary action. Some of the points were widely discussed, one such being that criticizing another actuary in public amounts to professional misconduct for

which a disciplinary action can be initiated with the Institute of Actuaries of India. The discussion was followed by an overview of the disciplinary process starting from how this would be initiated, what would constitute the concerned parties, method of appealing and closing the case. The session was concluded with everyone in the room agreeing to the fact that we all as individuals need to act with integrity and maintain highest standards of professionalism to make the profession a success.

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Ayushman Bharat – National Health Protection Mission (AB-NHPM)

Moving towards Universal Social Security

The Indian government which was formed in 2014, initiated various schemes aimed at improving the financial and social security of the citizens of the country. Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY), Pradhan Mantri Suraksha Bima Yojana (PMSBY) and Atal Pension Yojana (APY) were launched on 9th May, 2015 to move towards creating a universal social security system. PMJJBY is a government backed scheme aimed at providing life insurance cover to all Indian citizens between the ages of 18 to 50 years at an annual premium of INR 330 with the sum insured benefit of INR 2 lakh on member's death. PMSBY is another government backed scheme aimed at providing accidental insurance cover to all Indian citizens between the ages of 18 to 70 years at a highly affordable annual premium of INR 12. The insurer gets an insurance cover for a sum of INR 2 lakh in case of accidental death or permanent full disability or a sum of INR 1 lakh in case of partial but permanent disability.

In spite of schemes listed above being active in India, the Health sector has immense loopholes requiring immediate attention. It is extremely worrying that nearly 55-60 million Indians are pushed into poverty every year as the citizens incur a high out of pocket expenditure on account of healthcare, especially hospitalization expenses (around 70% out of pocket expenditure is incurred). Major challenges the Indian public health care system is facing are the sheer complexity of financing and managing preventive and promotive care of assuring quality in public sector and of harnessing the resources of private sector with effective regulatory systems.

One of the major policy initiatives of the Indian government has been the launch of **Ayushman Bharat - National Health Protection Mission (AB-NHPM)** for the vulnerable section of the population which, if implemented effectively, will help India progressively achieve the Sustainable Development Goal of 'Universal Health Coverage'. The Universal Health Coverage (UHC) means that all individuals and communities receive the health services they need without suffering financial hardship. It includes the full spectrum of essential, quality health services, from health promotion to prevention, treatment and rehabilitation care.

Ayushman Bharat is launched with the goal of offering the highest possible level of health and well-being for all, at all ages, which will cover over 10 crore poor and vulnerable families (approximately 50 crore

beneficiaries) identified on the basis of the data of Socio-Economic Caste Census (SECC) 2011, providing sum insured benefit up to INR 5 lakh per family per year for secondary and tertiary care hospitalization on floater basis.

Ayushman Bharat will subsume the on-going centrally sponsored schemes - Rashtriya Swasthya Bima Yojana (RSBY) and the Senior Citizen Health Insurance Scheme (SCHIS). The government has allocated INR 1,200 crore for strengthening the existing physical health infrastructure for primary and secondary care through upgrading the health and wellness centers and an additional 50 crore to expand the coverage of secondary and tertiary care services.

AB-NHPM is to be managed as under: -

- 1) Jointly by Central and participating State Governments.
- 2) A council namely, National Health Agency set up at the apex level chaired by Union Health and Family Welfare Minister will implement Ayushman Bharat.
- 3) State Health Agency started by the states to implement the scheme at the State level and to make sure that all required IT and other needed requirements can be fulfilled to provide services.

The Scheme is proposed to be implemented on two different models namely, Insurance Model and Trust Model: -

1) Insurance Model: Under this model, the state will pay premiums to an insurance company and the onus will be on the insurer to administer and pay the claims. The expenditure to be incurred by the Central and the State governments will be dependent on the real-time premium rates prevailing in the markets of the State and the Union Territories where the scheme will be applicable.

Advantages of using this model are: -

- ♦ Experience of working with third party administrators (TPAs).
- ♦ Use of short term surpluses to generate better returns.

Disadvantage of this model is: -

- ♦ Escalation of cost as the time passes through collusions between different entities like insurers, TPAs and health providers.

2) Trust Model: Under this model, each individual state will form its own trust to manage the scheme and claims will be disbursed from a corpus created from central and state government contributions. The expenditure by the Central government will be based on either the actual expenditure or the amount of maximum premium, whichever is less, in a fixed ratio.

Advantages of using this model are: -

- ♦ Not for profit orientation.
- ♦ Conducting awareness function using government administrative authorities at district and sub district level.

Disadvantages of this model are: -

- ♦ Weak governance structure that can fail to achieve professional conduct.
- ♦ Weak capacity to conduct critical functions that depend on quality of hired personnel.

States/Union Territories can opt for either of the two models or an integrated one.

Components of Ayushman Bharat - National Health Protection Mission (AB-NHPM):-

- 1) Setting up of 1.5 lakh 'Health and Wellness Centres' all over the country in order to bring basic healthcare facilities within the reach of the people. These centers will provide Comprehensive Primary Health Care (CPHC) which include child care, maternal care, treating of non-communicable diseases, free medications, and diagnostic facilities.
- 2) National Health Protection Mission (NHPM) is a health insurance coverage to be given to poor and deprived families thereby making it the world's largest government funded health care program. The above-mentioned health and wellness centers will help in spreading the awareness about Ayushman Bharat.

Main differences between Ayushman Bharat - National Health Protection Mission (AB-NHPM) and Rashtriya Swasthya Bima Yojana (RSBY) are:-

Ayushman Bharat - National Health Protection Mission (AB-NHPM)	Rashtriya Swasthya Bima Yojana (RSBY)
Providing cover to poor, deprived rural families and identified occupational category of urban workers' families	Providing cover to below poverty line (BPL) families
Providing sum insured benefit up to INR 5 lakh a year on family floater basis including 3 days pre-hospitalization & 15 days post-hospitalization expenses	Providing sum insured benefit up to INR 30,000 a year on family floater basis, including pre-hospitalization and 5 days post-hospitalization expenses
Any number of family members can be covered	Maximum five members covered in a family
Premiums to be shared between Centre and State in 60:40 ratio	Premiums to be shared between Centre and State in 75:25 ratio
Cashless Hospitalization cover for almost all secondary and most of tertiary care	Cashless Hospitalization cover for primary care
There is no enrolment process as it is an entitlement-based mission	Compulsory registration as a beneficiary to be done by the household head only with the registration fee of INR 30
Aadhar card is not mandatory under this scheme to avail the benefit but valid ID is required	Aadhar card is mandatory under this scheme.

Few shortfalls of RSBY which led to the formation of Ayushman Bharat for the upgradation of Health Protection Scheme are: -

- 1) Many beneficiaries were not aware about the entitlements and on how and when to use the RSBY

card. Use of digital platforms and enrolment as per the SECC 2011 data under Ayushman Bharat has helped spread awareness about the health insurance scheme.

- 2) Under RSBY, private hospitals had denied services for many categories of illness while under Ayushman

Bharat hospitals cannot deny treatment to any individual.

- 3) Under the RSBY scheme, some administrators and hospitals had also resorted to various fraudulent measures including charging informal payments but due to digitalization and identification of beneficiaries as per SECC 2011 data, the chances of frauds would reduce to a great extent.

Features

Other features of Ayushman Bharat - National Health Protection Mission (AB-NHPM) are:-

- 1) One of the principles of AB-NHPM is to promote co-operative federalism and flexibility to states.
- 2) Priority is given to girl child, women and senior citizens.
- 3) Beneficiary covered under the scheme will be allowed to take cashless benefits from any public/private empaneled hospitals across the country.
- 4) Hospitals cannot deny treatment and will not be allowed to charge any additional money from beneficiaries for the treatment.
- 5) Payment for the treatment will be made on a package rate basis defined in advance by the government in order to control the costs.
- 6) There are about 1,350 medical packages included in the scheme by the health ministry. These packages include surgical procedures and medical treatments involving expenses relating to medicines, transport, and diagnostics.
- 7) For multiple surgeries, the first will be covered with the highest package followed by 50% and 25% for the second and third respectively.
- 8) The funds for the implementation of the scheme will be directly transferred by the Central Government to the State Health Agencies by way of an escrow account on a timely basis.
- 9) The central government will create a strong, modular, and extensible IT platform in association with NITI Aayog to assist in paperless, cashless transactions. In every hospital, an 'Ayushman Mitra' will be appointed who will be responsible to guide the patients and the families about the process and to ensure that they get relevant help and to check all the documents to verify eligibility and enrollment to the scheme.

Challenges

- 1) Government faces the challenge of selection of insurance provider which is an extremely complex process which includes the design of tender documents, payment terms, legal agreements, penalties for non-compliance and pre-qualification of bidders through e-tendering process.
- 2) One of the challenges for the government is of allocating optimum funds to cover the population.
- 3) Difference between market price and NHPS price is higher for costly procedures, thereby

limiting the availability of these procedures. It is imperative to follow the right pricing strategy for the scheme to make maximum impact.

- 4) Development of a proper infrastructure to meet the increased demand of medical services by the hospitals over time.
- 5) Active participation needed by the state and also by the private sector hospitals to provide adequate services to the population.
- 6) Monitoring of the program after the implementation of the scheme and also to ensure that each beneficiary gets the advantage on fair terms.
- 7) Integration of technology at each level of healthcare such as health call-centers, tele medicine, etc. for improving the healthcare professionals and skilling programmers. This also includes integration of requisites hardware, software and IT team for all states.
- 8) Insurers' faces challenge that they will be left out because states have the option to select the Trust model that does not require insurers to participate. Where insurers participate, the auction may push premiums to low and unviable levels. There has been a recent report on tender of Nagaland where the lowest bid was less than INR 500 and other bids were more than twice the amount.

Conclusions

The scheme crossed the one-lakh beneficiary mark within a month of its launch on September 23, 2018. In the long run, AB-NHPM aims to enhance patient satisfaction by improving population-level productivity and efficiency, strengthen delivery system of public healthcare, inclusion of out-patient treatment and act as a steward to align the growth of private sector with public health goals. The scheme will cut down the financial strain on the poor and sensitive groups, improvise the current conditions of the poor and provide them with good medical facilities in the form of health insurance, thus achieving the goal of Universal Health Coverage in the true sense.

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Medical Inflation has always been one of the most talked about topic in Healthcare industry recently. Hospitals, Government, Service Providers, Insurance Companies and many other stakeholders consider it for taking various decisions, although neither standard prescribed approach for estimation of Medical Inflation is available nor there is any single method which can be used by all the stakeholders. Every year numerous studies are published that provide their own view on Medical Inflation with different methods used on variety of data, which results in very high range of estimation, which is not very useful for deeper analytical purpose. Actuaries estimate medical inflation, either based on company data or published reports specific to geography which is an important parameter in pricing, valuation and other related areas.

What is Medical Inflation?

Medical Inflation is change in prices of healthcare related products and utilization of services over years. It is not a straightforward calculation, as it will include change in cost of treatment, cost of providing the service (wage or salary cost), with adjustment for demographic changes, medical advancement, social/lifestyle changes and many other related factors. Estimation of Medical Inflation will not only need large volume of historical data for many years but also information about the people who have undergone the treatment or utilized the healthcare services. Further complexity is introduced as most of the cost components are not standardized (at least in Indian context), which leads to more variation in the data, hence complexity in method of estimation of Medical Inflation.

It is debatable that medical inflation should include impact of “utilization of services” or not, as any change in behavior of utilization of health services will also have impact on the medical inflation. The change in utilization can be affected due to various reasons such as availability of new health products & services, changes in general population behavior (e.g. lifestyle changes, increased use of preventive measures), change in the way health services are funded (say government vs private funding proportion), changes in access to healthcare services (e.g. improved healthcare infrastructure reduces waiting time), changes in demographics of the population and so on. Healthcare industry does not operate under traditional rule of demand and supply of services, which means that if supply increases then corresponding demand reduces.

Supply and demand in healthcare works in reverse order, which means if new healthcare services are available, utilization pattern of healthcare services may lead to increase or change in utilization of the services. For instance, a new procedure, which helps in recovering from a condition which was not possible earlier or reduces the recovery time, may lead to increase in the utilization of that particular healthcare service irrespective of the cost of the procedure. Further, higher utilization of new procedure may reduce the cost of the procedure over time. Hence changes in utilization of particular service becomes an important factor while estimating medical inflation.

Traditional method of estimation of Medical Inflation

Medical Inflation can be estimated using various methods, but the choice of method used not only depend on the source of the data, but also granularity of information available in the data. For example, if an actuary is estimating medical inflation using its own company data, the volume of the data will not be very high but the granularity and quality of the data will be very good, hence low level of adjustments will be applied before usage. On the other hand, any study which is based on the publicly available data will be based on large volume of data but may have lower granularity due to which estimation of medical inflation at various levels cannot be performed, hence adjustments and prudence will be applied for usage.

Traditional methods for estimation of Medical Inflation were based on insurance company's own data, in which comparison in the change in cost of treatment and utilization of services over years is performed by taking into consideration various factors such as type of treatment (surgical or medical management), city in which treatment is taken, severity of the disease, gender, age, category of hospital (tertiary care, secondary care or primary care), policy conditions etc. Normalization of large number of factors is not that easy, hence models are developed to analyze the true inflation or trend. Moreover, not all factors which affect the inflation may have been captured in the system. Additionally the captured factors themselves may change due to changes in population mix or over time. Hence there is a need to constantly update the model therefore making the historical estimations of Medical Inflation or data used for estimation less relevant.

Emerging Method to estimate Medical Inflation

Getzen method¹ for estimation of long term Medical Cost Trends was first developed in 2007 for Society of Actuary, which has undergone several updates. Although the method primarily focuses on long term trend in the medical cost, but it can be also used for short term (1 to 5 year) period as well. The method is developed on the basis that main driving force behind Medical Cost trend is economic productivity due to technological advancements. Although medical expenses at individual level are driven by individual's age, disease, income, insurance coverage etc., but at macro level the effect of these factors will be reduced due to large population size. A simplified formula for long run medical cost trend is provided below along with explanation of each term.

% Increase in Medical Cost = $(1 + \text{inflation}) \times (1 + \text{real per capita GDP}) \times (1 + \text{excess increase on medical cost}) - 1$

Inflation: projected inflation for defined period (period for which medical cost trend is to be estimated)

Real per capita GDP growth: real expected growth of GDP per capita basis for defined period

Excess on Increase Medical Cost: Excess of medical cost is on account of technological advancement in the medical procedure and excess growth in income of healthcare professionals as compared to other professions. It is measured as difference in % Medical Cost trend - % income trend over defined period.

Year Limit: it is not expected that Medical cost will grow faster than per capita income growth for very long term. Hence a constraint is applied which limits the growth in medical cost. The constraint is in the form of "GDP+0%" over long term basis for defined base year.

As there could be lot of uncertainty and correlation affect in the factors there will be additional affect which will lead to the increase in Medical Cost. Hence, it will be appropriate to add a prudence margin to the overall estimate.

Getzen method has quite a few limitations as explained below:

- The method takes into consideration external factors which are projected to future period. Information of such factors is available from various public sources, which will mean that results would dependent to selection/choice of such sources. This is to be noted that basis for estimation of these sources could be different, hence it is important to select the source of information carefully and consistent over the years.

- Excess increase in Medical Cost depends on lot of economic factors. It typically increases with growth in economy, increase in spent on Healthcare, demand of Healthcare etc. Over long term period, the increase will stagnate and it will be important to evaluate the period of projection.

Medical Inflation or Medical Index which is better?

National Council of Compensation Insurance (NCCI) was founded in 1923 to foster health Worker's Compensation System in US. NCCI gathers data analyzes industry trend and provides objective insurance rate and loss cost recommendations. NCCI published a technical paper "Medical Price Index for Workers Compensation"² in 2016 which compared various index as proxy to Medical Inflation. A new index called Personal Healthcare Index (PHC) is developed which is a blend of Consumer Price Index (CPI) and Producer Price Index (PPI), with reference to only healthcare related item under both the indexes. CPI is a good way to think from consumer's perspective, while PPI was from supplier or provider perspective. PHC is based on the composition of basket of goods that represent more closely for medical services treating an injured worker. PHC is further chain weighted - which means an approximate year over year changes that reflect an evolving mix of services, especially as people change their utilization of medical and prescription services.

The study showed that both CPI and PPI estimated higher inflation rate as compared to PHC, although PHC has weightage of both CPI and PPI. Due to use of chain weights, PHC estimated lower inflation, which allowed for consideration of change in evolution of mix of services especially alteration in utilization of medical services. It also meant that substitutions are made over time to purchase fewer goods that are experiencing more rapid price growth, which make logical sense from as per economic theory. The most important aspect is that the PHC not only captures the change in the cost of the services or goods, but also captures the utilization of the goods, hence is more closely related to the actual change in medical cost over period.

Can CPI be used as proxy to Medical Inflation?

The Consumer Price Index (CPI) is a measure of change in price level of a basket of consumer goods and services. It is publicly available and hence it can find wide usage if estimate of medical inflation is acceptable. CPI is estimated using complex statistical models, using the representative items of the basket of consumer goods and services and their periodic price change. As CPI is based on fixed basket of consumer goods and services, hence change in price level for specific category of goods/services can also be estimated and used a proxy to the historic inflation for

that category. For example as per information released by Ministry of Statistics & Program Implementation, Government of India, Group Code 6.1.02 represents cost related to Health and goods/services covered under this category is listed below:

Sr. No.	Name of Item	Weight in Index
1	hospital & nursing home charges	0.44057
2	medicine (non-institutional)	4.01148
3	family planning devices	0.00021
4	Spectacles	0.05610
5	other medical expenses (non-institutional)	0.11599
6	doctor's/ surgeon's fee-first consultation (non-institutional)	0.79049
7	X-ray, ECG, pathological test, etc. (non-institutional)	0.47597

Healthcare as single category has weightage of ~ 6% in the overall weight of the CPI index³ for the base year. Medical inflation can be estimated by calculating rate of change of index (for Group Code 6.1.02) as compared to Base year (or any two years).

This approach has few limitations, as described below

- ♦ CPI is based on the population data, while medical inflation for insured population or other stakeholders may be different as compared to census population,
- ♦ There can be few items/services which will not be covered in CPI (due to low weightage), while it may have significant weightage for insurance sector such as medicine and diagnostic charge during stay in hospital, secondary services charges such as ambulance etc.
- ♦ CPI is based on fixed basket of goods, while due to change in utilization pattern weightage of different services in Medical inflation will change over time. This will lead to CPI under estimate the Medical inflation.

Conclusion

It is evident from the above discussion that estimation of Medical Inflation is not simple. Additionally, there are many traditional methods and new methods are also emerging which means that it will be tough to standardize a particular method and even tougher to compare results of different methods and which will further limit their use. Further, there is limited publicly available information available on medical inflation and whichever is available has even limited use. A proxy to true medical inflation is used in insurance industry due to either limitation of data or fast changing variation in experience over time which leads to over/under estimate or force additional prudence in the assumptions. Usage of Medical Index can be immense and will not be limited to insurance field only. It can be used by governments to estimate expected future medical expense, can help hospitals to compare their internal inflation with index and take steps to improve efficiency, as an individual one can estimate long term cost against medical expenses to estimate the corpus required in old age or post retirement etc. A Medical Index can be developed which is based on standardized method or model with consideration of national level statistics along with adequate granularity, can have long term relevance and usage across industries.

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For Actuaries it's vital to have in-depth understanding of interest rate models dynamic for expanding their scope of work beyond the conventional working area like investment banking. Even though this area is covered to some extent in diet CT8 and ST6, in this series of articles under the title "Dynamic and Calibration of Interest Rate Models", we will focus more on the technical and calibration aspects of popular models by considering actual market data.

As interest rate is one of the important factors used in the pricing of any financial and insurance products given the time value associated with it. Most of the products are exposed to interest rate risk with equity based product having least exposure to Interest rate risk. But for any long term product the interest rate risk has significant contribution to the price. Also correct modeling of the stochastic behaviors of interest rates or more specifically, the term structure of the interest rate through time is important for the construction of realistic and reliable valuation models for interest rate derivatives.

Given the pull-to-par nature of bonds which converges to par at maturity, the extension of the Black-Scholes equity option pricing framework is doomed to be difficult for interest rate derivatives. Bond pricing requires instantaneous rate of return on the bond to be modeled using diminishing variance through time to handle pull-to-par behavior. We will see later, attempt to model the prices of interest rate securities as functions of one or a few state variables, using spot interest rate, long-term interest rate, spot forward rate, etc. And in the so called no arbitrage or term structure interest rate models, the consistencies with the observed initial term structures of interest rates and/or volatilities of interest rates are enforced.

Everybody expects that when depositing a certain amount of money in a bank account, it grows (at some rate) as time passes. As lending money must be rewarded somehow, so that receiving a given amount of money tomorrow is not equivalent to receiving exactly the same amount today. Let's now move on introducing some of the definition and concept which would be relevant for the understanding of models in the upcoming series.

Money Market Account:

First we consider the definition of a bank account, or money-market account. A money-market account represents a riskless investment, where profit is accrued continuously at the risk-free rate prevailing in the market

at every instant.

We define $B(t)$ the value of a bank account at time $t \geq 0$. We assume $B(0) = 1$ and that the bank account evolves according to the following differential equation.

$$dB(t) = r_t B(t)dt \quad B(0)=1 \rightarrow (1.1)$$

$$B(t) = e^{\int_0^t r_s ds} \rightarrow (1.2)$$

The above definition tells us that investing a unit amount at time=0, yields at time "t" the value in (1.2) and r_t is the instantaneous rate at which the bank account accrues. This instantaneous rate is usually referred to as **instantaneous spot rate or as short rate**.

A first order expansion in Δt gives

$B(t + \Delta t) = B(t)(1 + r(t) \Delta t)$, which amounts to say that, in any arbitrarily small time interval $[t, t + \Delta t]$,

$$r_t \Delta t = \frac{B(t + \Delta t) - B(t)}{B(t)} \rightarrow (1.3)$$

It is then clear that the bank account grows at each time instant "t", at a rate $r(t)$.

Stochastic Process:

The discount factor $D(t, T)$ between two time instants t and T is the amount at time t that is "equivalent" to one unit of currency payable at time T and is given by

$$D(t, T) = \frac{B(t)}{B(T)} = e^{-\int_t^T r_s ds} \rightarrow (1.4)$$

The probabilistic nature of r_t is important since it affects the nature of the basic asset of our discussion, the bank-account numeraire B . In many pricing applications, especially when applying the Black and Scholes formula in equity or foreign-exchange markets, r is assumed to be a deterministic function of time, so that both the bank account (1.2) and the discount factors (1.4) at any future time are deterministic functions of time. This is usually motivated by assuming that variability of interest rates contributes to the price of equity or FX options by a smaller order of magnitude with respect to the underlying's movements.

However, when dealing with interest-rate products, the main variability that matters is clearly that of the interest rates themselves. It is therefore necessary to drop the deterministic setup and to start modeling the evolution of r in time through a stochastic process. As a

consequence, the bank account (1.2) and the discount factors (1.4) will be stochastic processes, too. In the forth coming series we would be focusing more on the technical details of different stochastic diffusion process of r_t .

Zero-Coupon Bonds and Spot Interest Rates:

A T-maturity zero-coupon bond is a contract that guarantees its holder the payment of one unit (face value) of currency at time T, with no intermediate payments.

So when we need to know the present value of a future-time payment, the zero-coupon-bond price for that future time is the fundamental quantity to deal with. Zero-coupon-bond prices are the basic quantities in interest-rate theory, and all interest rates can be defined in terms of zero-coupon-bond prices. The zero-coupon bond price can be said as the discount factor for time "T" as the maturity of the bond.

Continuous Compounding interest rate:

The continuously-compounded spot interest rate prevailing at time t for the maturity T is denoted by $R(t, T)$ and is the constant rate at which an investment of $P(t, T)$ units of currency at time t accrues continuously to yield a unit amount of currency at maturity T and can be expressed as,

$$R(t, T) = \frac{-\ln P(t, T)}{\tau(t, T)} \rightarrow (1.5)$$

The continuously-compounded interest rate is therefore a constant rate that is consistent with the zero-coupon-bond prices in that

$$e^{R(t, T) \tau(t, T)} P(t, T) = 1$$

From which we can express the bond price in terms of the continuously compounded rate R

$$P(t, T) = e^{-R(t, T) \tau(t, T)} \rightarrow (1.6)$$

Simply-compounded spot interest rate:

The simply compounded spot interest rate prevailing at time t for the maturity T is denoted by $L(t, T)$ and is the constant rate at which an investment has to be made to produce an amount of one unit of currency at maturity, starting from $P(t, T)$ units of currency at time t, when accruing occurs proportionally to the investment time, $\tau(t, T)$.

$$L(t, T) = \frac{1 - P(t, T)}{\tau(t, T) P(t, T)}$$

So that a bond price can be expressed in terms of L

$$P(t, T) = \frac{1}{1 + \tau(t, T) L(t, T)} \rightarrow (1.7)$$

K-times-per-year compounded spot interest rate:

The k-times-per-year compounded spot interest rate prevailing at time t for the maturity T is denoted by $Y^k(t, T)$ and is the constant rate (referred to a one-year period) at which an investment has to be made to produce an amount of one unit of currency at maturity, starting from $P(t, T)$ units of currency at time t, when reinvesting the obtained amounts k times a year.

$$P(t, T) = \frac{1}{\left(1 + \frac{Y^k(t, T)}{k}\right)^{k\tau(t, T)}} \rightarrow (1.8)$$

A fundamental property is that continuously-compounded rates can be obtained as the limit of k-times-per-year compounded rates, where the number of compounding, k tends to infinity.

Zero-coupon curve:

The zero-coupon curve (sometimes also referred to as "yield curve") at time t is the graph of the function.

$$T \rightarrow L(t, T) \quad t < T \leq t + 1$$

$$T \rightarrow Y(t, T) \quad T > t + 1$$

Such a zero-coupon curve is also called the term structure of interest rates at time t. It is a plot at time t of simply-compounded interest rates for all maturities T up to one year and of annually compounded rates for maturities T larger than one year.

Zero-bond curve:

The zero-bond curve at time t is the graph of the function T against $P(t, T)$, $T > t$, which because of the positivity of interest rates, is a Time decreasing function starting from $P(t, t) = 1$. Such a curve is also referred to as **term structure of discount factors**.

Forward Rates:

Forward rates are characterized by three time instants, namely the time t at which the rate is considered, its expiry T and its maturity S, with $t \leq T \leq S$. Forward rates are interest rates that can be locked in today for an investment in a future time period, and are set consistently with the current term structure of discount factors.

Simply-compounded forward interest rate:

The simply-compounded forward interest rate prevailing at time t for the expiry $T > t$ and maturity $S > T$ is denoted by $F(t; T, S)$ and is defined by

$$F(t; T, S) = \frac{1}{\tau(T, S)} \left(\frac{P(t, T)}{P(t, S)} - 1 \right) \rightarrow (1.9)$$

It is that value of the fixed rate in a FRA contract with expiry T and maturity S that gives the FRA a fair value at time t.

The forward rate $F(t; T, S)$ may thus be viewed as an estimate of the future spot rate $L(T, S)$, which is random at time t , based on market conditions at time t . Forward rate $F(t; T, S)$ is the expectation of future spot rate $L(T, S)$ at time t under a risk neutral probability measure.

When the maturity of the forward rate collapses towards its expiry, we have the notion of instantaneous forward rate. The instantaneous forward interest rate prevailing at time t for the maturity $T > t$ is denoted by $f(t, T)$ and is defined as

$$f(t, T) = \lim_{S \rightarrow T^+} F(t; T, S) = - \frac{\partial \ln P(t, T)}{\partial T} \rightarrow (1.10)$$

So that we also have,

$$P(t, T) = \exp \left(- \int_t^T f(t, u) du \right) \rightarrow (1.11)$$

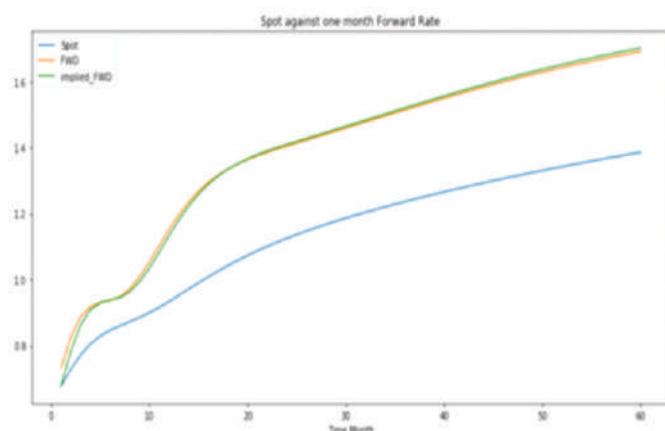
Intuitively, the instantaneous forward interest rate $f(t, T)$ is a forward interest rate at time t whose maturity is very close to its expiry T , say $f(t, T) \approx F(t; T, T + \Delta T)$ with ΔT small.

Instantaneous forward rates are fundamental quantities in HJM and LIBOR model which we would be covering in the later series.

BOE Data:

For our calibration of model and analysis we would be using the Bank of England yield curve (www.bankofengland.co.uk/statistics/yield-curves) data which has rich history and information necessary for our modeling purpose.

Based on the information of spot rate published as on 31st July 2018 we had plotted the spot and bootstrapped forward rate and compared with the BoE forward rate. Both are very similar the difference being attributed the way the forward rates are computed by BoE from the spot rate. We see the forward curve is above the spot rates, as the spot rate is upward sloping and also the turning points in the forward curves are exacerbated than in spot.



Bond price equation:

Like the Black-Scholes PDE, the bond price equation is the key differential equation for pricing any interest derivatives. Let says Interest rate 'r' is governed by a stochastic diffusion process having a drift and diffusion term.

$$dr = u(r, t) dt + w(r, t) dW$$

The functional forms of $u(r, t)$ and $w(r, t)$ determine the behavior of the spot rate r . For the time being we will not specify any particular choices for these functions. Pricing a fixed income instrument presents new technical problems and is harder than pricing an option since there is no underlying asset with which to hedge. The only way to construct a hedged portfolio is by hedging one bond with a bond of a different maturity.

Hence by constructing a portfolio of bond with maturity "T1" and "T2",

$$\pi = Z_1 - \Delta Z_2$$

$$\text{Such that } \Delta = \frac{\frac{\partial Z_1}{\partial r}}{\frac{\partial Z_2}{\partial r}}$$

And using Ito's Lemma we end with the known bond price equation of the form which needs to be solved by specifying the one final and two boundary conditions.

Bond price equation

$$\frac{\partial Z}{\partial t} + \frac{1}{2} w(r, t)^2 \frac{\partial^2 Z}{\partial r^2} + (u(r, t) - \lambda(r, t) w(r, t)) \frac{\partial Z}{\partial r} - rZ = 0 \rightarrow (1.12)$$

For zero-coupon bond the final condition is $V(r, T)=1$ and boundary conditions depends on the form of $U(r, t)$ and $W(r, t)$.

It is easy to incorporate coupon payments into the model. If an amount $K(r, t)dt$ is received in a period dt then Bond Pricing Equation becomes,

$$\frac{\partial Z}{\partial t} + \frac{1}{2} w(r, t)^2 \frac{\partial^2 Z}{\partial r^2} + (u(r, t) - \lambda(r, t) w(r, t)) \frac{\partial Z}{\partial r} - rZ + K(r, t) = 0 \rightarrow (1.13)$$

Comparison with BS PDE:

BS PDE:

$$dS_t = r * S_t dt + \sigma * S_t dZ_t \rightarrow (1.14)$$

$$\frac{\partial V}{\partial t} + \frac{1}{2} \sigma^2 S^2 \frac{\partial^2 V}{\partial S^2} + rS \frac{\partial V}{\partial S} - rV = 0 \rightarrow (1.15)$$

Equation 1.12 is structurally very similar to the Black-Scholes equation (1.15). The only differences between this equation and the Black-Scholes equation are:

- in the coefficients of the gamma and delta terms
- that the variable has another name, r instead of S

Any interest rate derivatives with payoff function $f(S, t)$ that is a solution of the differential equation (1.12) is the theoretical price of a derivatives that could be traded. If a derivative with that price existed, it would not create any arbitrage opportunities. Conversely, if a function $f(S, t)$ does not satisfy the PDE, it cannot be the price of the derivative without creating arbitrage opportunities for traders. Once the diffusion process for $r(t)$ is described and the market price of risk $\lambda(r, t)$ is specified, the value of a bond can be obtained by solving the PDE.

Market Price of Risk:

Market price of risk is the excess return over the risk free portfolio for taking extra risk. Imagine that you hold an unhedged position in one bond with maturity date T . In a time step dt this bond changes in value by as given by Ito's Lemma,

$$dz = \left(\frac{\partial Z}{\partial t} + \frac{1}{2} w(r, t)^2 \frac{\partial^2 Z}{\partial r^2} + u(r, t) \frac{\partial Z}{\partial r} \right) dt + w(r, t) \frac{\partial Z}{\partial r} dW$$

Using the BPE in the above we get,

$$dz = w(r, t) \frac{\partial Z}{\partial r} dW + \left(w\lambda \frac{\partial Z}{\partial r} + rZ \right) dt$$

$$dz - rZ dt = w(r, t) \frac{\partial Z}{\partial r} (\lambda dt + dX)$$

The right hand side has a deterministic term in dt and a random term in dX . The presence of random term, dX shows that this is not a riskless portfolio. The deterministic term may be interpreted as the excess return above the risk-free rate for accepting a certain level of risk. In return for taking the extra risk the portfolio profits by an extra λdt per unit of extra risk, dX . The function λ is therefore called the market price of risk. Market Price of risk has to be same for all bonds to avoid arbitrage and independent of maturity.

Risk-Neutral Growth Rate:

We need the new market-price-of-risk term to be used in the interest rate diffusion process because our modeled variable, r , is not traded.

- If a modeled quantity is traded then the risk-neutral growth rate is r
- If a modeled quantity is not traded then the risk-neutral growth rate is real growth rate - market price of risk * volatility

We have built up the pricing equation for an arbitrary model. That is, we have not specified the risk-neutral drift, $u - \lambda w$, or the volatility, w . Next comes the question how can we choose these functions to give us a good model?

The risk-neutral spot rate evolves according to

$$dr = (u(r, t) - \lambda(r, t) w(r, t)) dt + w(r, t) dW$$

There are two ways to proceed:

- Choose a model that matches reality as closely as possible
- Choose a model which is easy to solve

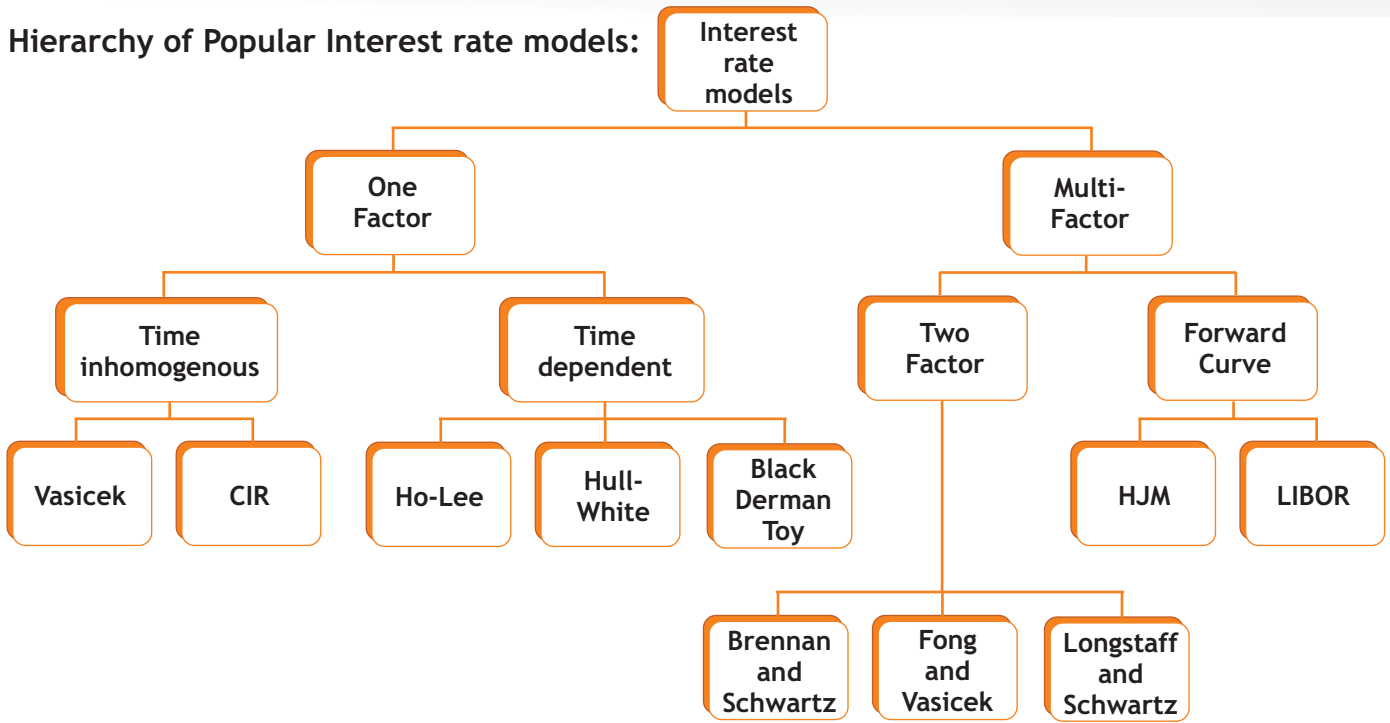
The simple one-factor stochastic spot interest rate models cannot hope to capture the rich yield-curve structure found in practice: from a given spot rate at a given time they will predict the whole yield curve.

Generally speaking, the one source of randomness, the spot rate, may be good at modeling the overall level of the yield curve but it does not necessarily model shifts in the yield curve that are substantially different at different maturities.

For some instruments this may not be important. For example, for instruments that depend on the level of the yield curve it may be sufficient to have one source of randomness, i.e. one factor. More sophisticated products depend on the difference between yields of different maturities and for these products it is important to model the tilting of the yield curve.

The hierarchy flowchart gives list of the popular interest rate models. In this series we now have touched on the basic requirement for next level of details analysis of some of the popular models which we would be covering in the following series.....to be continued.

Hierarchy of Popular Interest rate models:



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**The Actuary India wishes many more years
of healthy life to the fellow members (above 60)
whose Birthday fall in October~November 2018**

**Mr. D K Pandit
Mr. J R Joshi
Mr. K J PRADHAN
Mr. K P Narasimhan
Mr. M L Sodhi
Mr. M G DIWAN
Mr. N K Shinkar
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Mr. Samarao Jaxmanrao Cuddalore
Mr. V Govindan**

IFRS 17 for insurance accounting is one of the most complex international accounting standard till date. Insurance companies have to comply with this new IFRS standard effective 1st Jan 2021, however currently Insurance companies are not equipped to handle the change due to limited time available for implementation, lack of clarity and understanding, difficulty in data collection & analysis and shortage of knowledgeable staff.

Within IFRS 17, the one of most complicated analysis is for short term contracts which involves comparison of various measurement approaches and selecting the one best suited for the contract. This calls for detailed calculations. Also all calculations must be supported by reasonable and supportable information.

In addition to this, large companies operating in multi geographies have to comply with multiple standards such as US GAAP and IFRS so complexity increases multi-fold for them.

This article compares IFRS 17 with US GAAP from the point of view of short term insurance contracts since understanding the similarities and differences between IFRS 17 and US GAAP will help to overcome the challenges faced in creating the financial statement under these standards. The article also delves into how automation and cloud platform can help to provide the optimum and cost effective solution to insurance companies.

Introduction to IFRS 17

In May 2017, a new international accounting standard - IFRS 17 for Insurance accounting was introduced, which would come into effect from Jan 1, 2021 in 100+ jurisdictions. It replaces IFRS 4 and impacts all entities that issue insurance contracts. IFRS 17 sets out a single principle-based standard for the recognition, measurement, presentation and disclosure of all types of insurance contracts.

IFRS 4, was an interim standard that allowed entities to use a wide variety of accounting practices for insurance contracts, reflecting national accounting requirements and variations of those requirements. The differences in accounting treatment across jurisdictions and products made it difficult for investors and analysts to understand and compare insurers' results.

IFRS 17 is expected to standardize wide range of accounting practices permitted under prevailing IFRS. Also the IFRS 17 disclosure requirements (amounts, judgments and risks arising from insurance contracts) are more detailed than currently required under IFRS.

IFRS 17 will cover all varieties of insurance contracts i.e. Life, Non-Life Insurance & Re-insurance including investment contracts with discretionary participation features.

Overview of IFRS 17 Measurement Approaches

To determine the profitability of insurance contracts, IFRS 17 has introduced a new measurement framework called the General Measurement Model (GMM) or Building

Block Approach (BBA).

IFRS 17 also allows for modifications to the general model to meet the unique requirements of different varieties of insurance contracts:-

- ♦ Short term insurance contracts - Premium Allocation Approach (PAA)
- ♦ Insurance Contracts with direct participation features - Variable Fee Approach (VFA)
- ♦ Investment Contracts with discretionary participation rights
- ♦ Reinsurance contracts held

Premium Allocation Approach

PAA is the simplified version of General Measurement approach.

Qualification Criteria

This simplified approach is only allowed under IFRS 17 if:-

- ♦ Coverage period of each contract in the group is 12 months or less
- Or
- ♦ Application of PAA would not have material difference when compared to measurement under general approach

Point to be noted here is that application of PAA approach is optional & not mandatory.

Contracts to which PAA cannot be applied

- ♦ Contracts with Long term coverage like term / whole life insurance,

- ♦ Contracts with embedded derivatives as it results in significant variability in cash flows
- ♦ Contracts on which significant variability in FCF is expected for remaining coverage

PAA: Initial Measurement Formula

$$\text{PAA: Initial measurement of liability} = \text{Premium received at initial recognition} - \text{Insurance acquisition cash flows (unless expended)} + / - \text{Amount from de-recognition at that date of asset/liability recognized for insurance acquisition cash flows}$$

PAA: Subsequent Measurement

$$\text{Subsequent measurement} = \text{Liability for remaining coverage} + \text{Liability for incurred claims}$$

To calculate the “Liability for Remaining coverage”, we need to:-

- A) Add the following components:-
- Premiums received during the period
 - Amortisation of insurance acquisition cash flows expensed off in the period
 - Adjustment for significant financing component
- B) Minus the following components:-
- Insurance Contract revenue recognized for the period
 - Acquisition cash flows (unless expended)
 - Investment component paid or transferred to the liability for incurred claim

Liability for incurred claims

- ♦ Measured methodology same as in General Approach (based on fulfillment cash flows relating to incurred claims)
- ♦ Adjustment for Time value of money not required if those cash flows are expected to be paid / received in one year or less from the date the claims are incurred

Comparison of US GAAP and IFRS 17 - Short term insurance contracts

Comparison of US GAAP and IFRS 17 is necessary because, there are many multi-geography companies who need to comply with both the standards. Understanding the similarities and differences between IFRS 17 and US GAAP will help to overcome the challenges faced in creating the financial statement under these standards.

Let us see how the calculations and the accounting requirements differ between the two standards especially for short term insurance contracts

Area of Difference	IFRS 17	US GAAP for Insurance industry
Scope	IFRS 17 impacts all the entities that issue insurance contracts irrespective whether they are issued by insurance or non-insurance company	US GAAP has laid down insurance industry specific reporting and accounting guidelines. For non-insurance companies, any insurance contract issued is accounted for in accordance with other applicable US GAAP rules.
Level of aggregation	Entity has to divide a portfolio of insurance contracts into a minimum of: (i) a group of contracts onerous at initial recognition, if any, (ii) a group of contracts that at initial recognition have no significant possibility of becoming onerous subsequently, if any and (iii) a group of the remaining contracts in the portfolio, if any. Contracts issued more than one year apart shall not be included in the same group.	US GAAP requires insurance contracts to be grouped according to the entity's mode of acquiring, measuring the profitability and servicing of its insurance contracts to ascertain if a premium deficiency exists. Unlike IFRS 17 currently there is no requirement for year wise grouping.
Non-financial risk adjustment	To address the uncertainty of timing and amount of cash flows that arises from non-financial risk, IFRS 17 requires explicit risk adjustment	US GAAP prescribes a similar rule, called the provision for risk of adverse deviation, but is only used for traditional life long-duration contracts and not for short term contracts

Area of Difference	IFRS 17	US GAAP for Insurance industry
Sharing of Risk	As per IFRS 17, entities need to determine whether the cash flows of a group of insurance contracts affect the cash flows to policyholders of another group of insurance contracts. This is to ascertain whether they lead to policyholders subordinating their claims or cash flows to those of other group of policyholders, as a result reducing the direct exposure of the entity to a collective risk. This element, called the 'mutualisation between contracts', is used in the measurement of the fulfilment cash flows.	The concept of 'mutualisation between contracts' is not included in US GAAP
Onerous contracts	Under IFRS 17, an insurance contract is an onerous contracts: (a) At the date of initial recognition, if the fulfilment cash flows allocated to the contract, any previously recognized acquisition cash flows and any cash flows arising from the contract at the date of initial recognition in total are a net outflow.; or (b) Insurance contract becomes onerous (or more onerous) on subsequent measurement when adjustments to the contractual service margin exceed the amount of the contractual service margin ('CSM'). This excess outflow is not accrued but immediately recognised as loss.	If there is a premium deficiency relating to insurance contracts, a probable loss on insurance contracts exists. US GAAP requires accrual of this net loss provided that the loss can be satisfactorily calculated.
Acquisition costs	As per IFRS 17, insurance acquisition costs are expenses incurred for selling, underwriting and commencing a group of insurance contracts that are directly or indirectly attributable to the concerned group of insurance contracts. Under IFRS 17, entity has a choice of treating the acquisition cost as expense in the year in which it was incurred instead of amortizing such costs.	Under US GAAP only those acquisition costs are considered that are directly attributable to the successful acquisition of new or renewal insurance contracts. These acquisition costs have to be deferred and amortised.
Disclosure requirements	Under IFRS 17, an entity should disclose qualitative and quantitative information about: (a) the amounts recognised in its financial statements for contracts within the scope of IFRS 17; (b) the significant judgments, and changes in those judgments, made when applying IFRS 17; (c) the nature and extent of the risks from contracts within the scope of IFRS 17	Under US GAAP only those acquisition costs are considered that are directly attributable to the successful acquisition of new or renewal insurance contracts. These acquisition costs have to be deferred and amortised.
Revenue recognition	The Premium Allocation Approach (PAA) revenue recognition approach shares some similarities with the current accounting model for short-duration contracts under US GAAP. However, if insurance contracts is for more than 1 year, the entity will have to assess whether discounting of cash flow is required.	Just like PAA, for short-duration contracts, premiums are recognised in proportion to the period of the contract. For certain types of contracts where the risk period differs significantly from the contract period, premiums are recognised as revenue over the contract period in proportion to the amount of insurance protection provided. Point to be noted here is that, discounting is not used for short duration insurance contracts under US GAAP

Benefits and Challenges of Premium Allocation Approach

a. Benefits of PAA

Implementation of IFRS 17's general measurement model (GMM) will pose significant challenges requiring complicated calculations and adjustments. This will include the calculation of expected cash flows, adjusting expected cash flows using a discount rate to take into account the time value of money separately showing non-financial risk adjustment. Additionally there are further requirements for the subsequent measurement and financial statement presentation, which makes GMM very complex.

Unlike GMM, PAA does not require the following computations in eligible contracts*:-

- i) Calculation of CSM
- ii) Estimation of discounted value of cash flows
- iii) Non-financial risk adjustment

*Exception in certain cases are mentioned in "Challenges" section

b. Challenges

i) Calculating Eligibility

An entity may simplify the measurement of a group of insurance contracts using the premium allocation approach only if, at the inception of the group:

- a. the coverage period of each contract in the group is one year or less
- b. the entity reasonably expects that such simplification would produce a measurement of the liability for remaining coverage for the group that would not differ materially from the one that would be produced applying the Building Block Approach; or

Insurance companies that have short term insurance contracts longer than 1 year will try to qualify for the PAA under the second criteria. However, this criterion may not be easy to prove. In many cases, proof may only be achieved through comparison to a calculation under the GMM, which is a cumbersome process and the very purpose of PAA is lost. So the main beneficiaries of the PAA will be issuers of Property and Casualty contracts with coverage period of one year or less.

ii) Contracts becoming Onerous subsequently

Even if an entity solely issues short-duration insurance contracts, it must still have the capability to apply the GMM. This is because, under the PAA, if at any time after the initial recognition the group of insurance contracts under the simplified model become onerous (i.e. loss making), measurement under the PAA is discontinued and replaced with measurement principles consistent with the GMM (with limited exceptions).

iii) Incurred claims liability calculations

While the liability for remaining coverage is simplified, the liability for incurred claims largely follows the principles of the fulfillment cash flows under the GMM. This means that in addition to estimating expected cash outflows from incurred claims, an explicit risk adjustment for non-financial risk must be included in this amount (and disclosed). Discounting of the liability for incurred claims may also be required as discussed below. This aspect of the PAA will prevent insurers from completely freeing themselves from the clutches of GMM. It means that PAA is only a simplification for 50% percent of the insurance contract liability calculation.

iv) Discounting requirements

As a general rule under IFRS, discounting is typically required only when there is a "significant financing component". Consistent with this principle, the PAA allows entities to ignore the impact of discounting in certain instances. For the liability for remaining coverage component (i.e. unearned premiums), discounting is only required when the period between receipt of premiums and related coverage is more than one year. For the liability for incurred claims, discounting is required when the timing between the incurred claim and its ultimate payment is more than one year. If discounting is not required under the PAA, then an entity may choose to ignore the effects of the time value of money. As many P&C contracts have long claim settlement period, some amount of discounting will often be required under the PAA. For many insurers, this will entail additional calculations and accounting adjustments.

Complexity becomes manifold for multi-geography entities who need to comply with both US GAAP and IFRS 17

Automation and Cloud solution

a. Automation

Considering the above challenges there is a need for automation solution to meet the PAA requirements. The automation tool must be capable of

- i. Aggregating insurance contracts into product-wise portfolios
- ii. Dividing portfolios into yearly group of contracts
- iii. Calculating Fulfillment cash flows (FCF) taking into account the Present value of cash inflows, cash outflows over the period of contract, doing risk adjustments.
- iv. Calculating Contractual Service Margin (CSM)
- v. Computation of Onerous contracts
- vi. Recalculating FCF and CSM at every reporting period
- vii. Calculating liability for incurred claims
- viii. Making adjustment for changes in subsequent period

ix. Handling large volume of data

Keeping mind the limited time available for IFRS 17 implementation, global impact, large volume of computation, considerable data management and shortage of IFRS 17 trained resources across the world, automation solution needs to be augmented with a cloud platform.

b. Merits of a Cloud Solution

Some of the advantages of cloud solution is enumerated below:-

- ♦ Business agility
- ♦ Lesser IT Infrastructure and acquisition cost
- ♦ Faster deployment
- ♦ Flexible and compatible platform
- ♦ Enhanced system performance

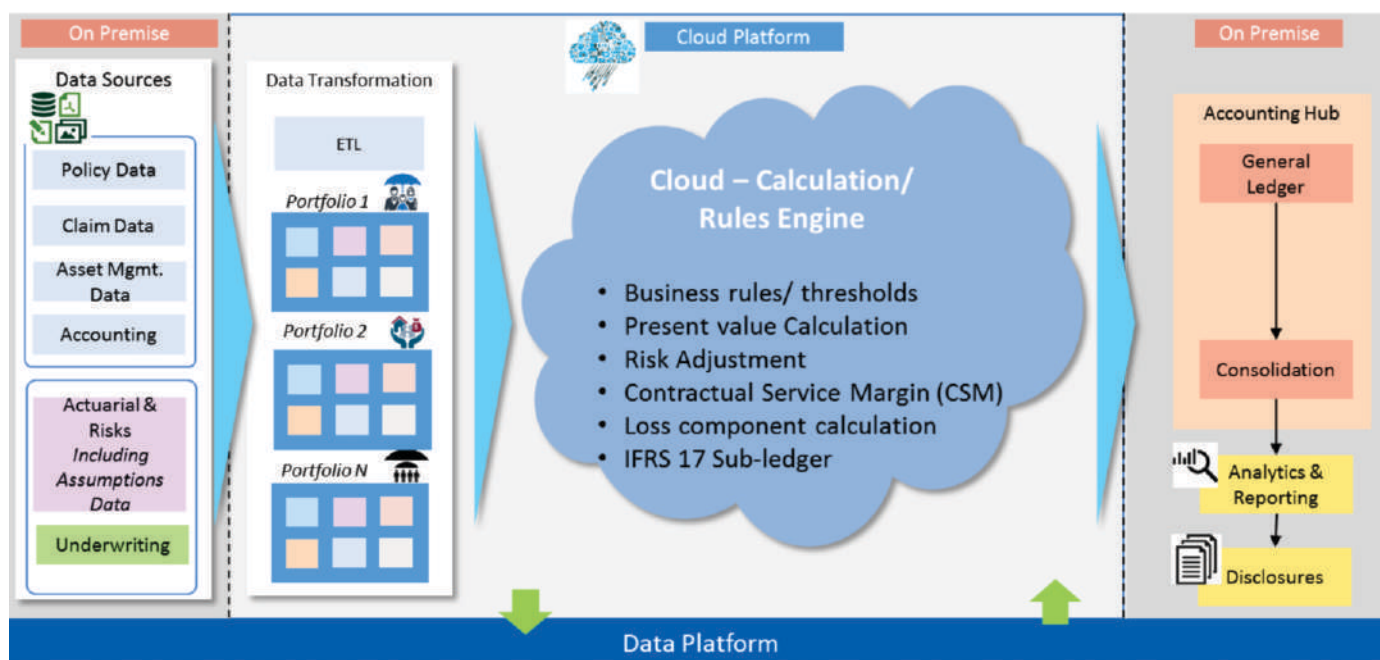
- ♦ Global scalability and presence
- ♦ Pay-per-use solutions

c. Challenges of On-premise Solution

Let us compare it with the challenges of On-premise solution

- ♦ High Cost due to high upfront investment
- ♦ Need to incur associated Hardware and IT cost
- ♦ Since data security is in the hands of organization. Some organizations may not practice proper data security protocols
- ♦ Implementation process is longer
- ♦ Scalability challenges

d. Illustrative Cloud Solution



As seen from the above illustrative diagram, the automation tool will be built into the cloud platform. The automation tool will extract data from multiple Data Sources, do the grouping of insurance contracts and store the grouped data in a data platform. When required it will call the data from Data platform and do the IFRS 17 computation using the Calculation/Rules engine. The output in the form of accounting entries will be forwarded to General Ledger. Automation tool will also support IFRS 17 related Reporting and Disclosures.

Conclusion

From the current scenario detailed above, we can safely conclude that Automation and Cloud solution is definitely the way forward for Bridging the G(a)p between IFRS17 requirement vis-à-vis IFRS 17 compliance as well as IFRS17 compliance vis-à-vis US GAAP compliance.

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“CA Debaditya Gupta is a Chartered Accountant and MBA with over 12 years' experience in the areas of Finance, Insurance, Treasury, AASB, IFRS and US-GAAP. He is currently working in Tata Consultancy Services.”

Active Times (October 14, 2018)

Mumbai—The Institute of Actuaries of India elects Sunil Sharma as its President

The Institute of Actuaries of India elects Sunil Sharma as its President

Mumbai, 10th October, 2018: The Council of The Institute of Actuaries of India (IAI) in its council meeting held on 22nd September, 2018 elected Sunil Sharma as its new President. He will serve a two year term as the President of IAI.

Sunil Sharma is currently the Chief Actuary and the Chief Risk Officer for Kotak Mahindra Life Insurance Company India Ltd (Kotak Life). Sunil Sharma, President of The Institute of Actuaries of India (IAI) said, "I am honoured to have been elected to lead the Indian Actuarial profession. I thank the council members for having placed their trust in me to represent and champion the interests of our members and the vocation. It has been my constant endeavor to grow the profession beyond traditional areas, increase rapport and forge stronger connect with Insurance, Pension and Market regulators. The global demand for actuaries is evolving rapidly. I stand committed to build on the excellent work of my predecessors and ensure that the IAI remains connected with its stakeholders." Over the years, Sunil has served the IAI Council in various capacities. Recently, as the Chairperson of Wider Field Committee (WFC) he envisioned creating employment opportunities for actuarial personnel, specifically for students, in areas other than traditional insurance and pension areas.

He has been the Chief Editor of the IAI publication "the Actuary India" for several years. As an actuarial member, Sunil has been actively associated with the profession close to two decades. He was instrumental in designing and sponsoring the first web portal of the then Actuarial Society of India (ASI).

Online

Startuppost.co.in (October 5, 2018)

The Institute of Actuaries of India elects Sunil Sharma as its President



SkillIndiaPost.com (October 5, 2018)

THE INSTITUTE OF ACTUARIES OF INDIA ELECTS SUNIL SHARMA AS ITS PRESIDENT



Expressnews.asia (October 5, 2018)

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ThisWeekIndia.news (October 5, 2018)

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THIS WEEK INDIA

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With close to 29 years of diversified experience in the insurance and reinsurance sector, Sunil has worked across India, USA, UK and Singapore. Prior to joining Kotak Life, he has worked in various positions with ICI Prudential Life, Swiss Re, GE Financial Assurance Holdings, Inc. and Life Insurance Corporation of India. Sunil is a Fellow Member of Institute of Actuaries of India (FIAI) and Fellow Member of Institute of Actuaries, UK (FIA).

AsiaInsurancePost.com (October 8, 2018)

Sunil Sharma elected as President of IAI

News in Brief

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WinningBizness.com (October 10, 2018)

The Institute of Actuaries of India elects Sunil Sharma as its President

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By admin on October 10, 2018 News

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We find that you have worked at many places, could you briefly tell about your experience?

I have put in a total service of 42 years. First 22 years, I worked with LIC of India, mostly in Hyderabad, next 7 years in Muscat with Oman United Medical & Life Insurance Co., after that 1 year in London with

Scottish Re on part-time basis while pursuing Postgraduate Diploma in Actuarial Management with City University, and last 12 years with Max Life Insurance co. in Gurgaon.

Thus, I am very happy to say that I have work experience both in Public sector and in Private sector Life Insurance Companies, worked in India and abroad and with Direct Life Insurer and Reinsurer.

We also find your interest to complete your actuarial qualification at higher age. What prompts you to?

After my leaving the services of Max Life effective 1 December 2016, I passed two subjects, the latest being ST4. Three more subjects need to be passed to become a Fellow of IAI. I am aged 69 now and my ambition is to become a Fellow of IAI. I feel that advanced age/ old age is not a hindrance for success in examinations. I will do Yogasanas and Pranayam almost regularly for at least an hour to keep myself fit and to maintain good health in order to achieve what I want to.

How and why the way of testing the candidates to be changed?

In the current system of the examinations, to succeed in examinations, among other things, (a) one has to have a very good speed in writing, (b) to some extent one should have command on the language in which the test is written and (c) to study repeatedly and memorize some parts, even after thorough understanding, particularly in Fellowship subjects. As the purpose of conducting the examination is knowledge testing and not a speed in writing test, not a command on the language testing and not a memory testing, to overcome the problems in (a), (b) and (c) above, Institute should consider testing the knowledge of the

candidates by switching from current system of conducting the examinations to Objective Type. By following this, Institute can increase the pass rate without compromising/lowering the standards. When I am studying again the chapters which I understood thoroughly, I will ask myself why I am studying time and again and what I am doing? Now a days, many professional bodies both in India and abroad are conducting examinations in Objective type. I advise the Institute to consider to switch to Objective type of conducting examinations without waiting for IFoA to change and follow them. Let us take the lead.

What you propose to do? And currently what you are doing?

I am an Associate and short of 3 subjects to become a Fellow of IAI. In all the developed countries like UK, USA, Australia etc. and in developing countries like Middle East, Srilanka etc. Associates are allowed to do actuarial practice whereas in India our IAI is not allowing. By virtue of my being an Associate of Institute and Faculty of Actuaries (IFoA) UK, I am allowed by IFoA to do actuarial practice anywhere in the world, but IAI is not allowing Associates to do actuarial practice in India due to some flaw in the Actuaries Act. As a result, I am sitting almost idle (except a few hours of study of Actuarial subject in which I am yet to pass) though I have the necessary skills and energy to do Actuarial work. I hope soon, Institute will take steps to allow Associates to do actuarial practice in India on par with other countries.

Any guidance to younger generation of actuaries / actuarial students?

Planning is easy but implementation is difficulty. All achievers are taskmasters. My sincere advice to youngsters is to plan properly and adhere to it to achieve success. Having taken up the actuarial studies, try to complete without any thought of quitting. One should remember the important saying that 'winners are not people who never fail, but people who never quit'. With hard work and perseverance, nothing is impossible.

Can an Individual may promote the profession on its own, if yes, how?

An Institution is nothing but a group of individuals. If each individual member maintain and observe the highest standards of conduct and integrity and follows the ethics of the Profession, Society will respect the members of that Profession and thus each member can contribute for the promotion of the Profession.



You joined as the Appointed Actuary of Canara HSBC OBC Life Insurance Company. Please share your experiences in the journey to become the AA.

I started my actuarial career with HSBC Life in Southampton, UK in 2003 after having completed my Masters in Actuarial Science from City University, London. During my four year stint with the Company, I was involved in variety of roles from reinsurance to pricing to shareholders reporting. I also attained my actuarial fellowship during this period. Post qualification, I moved to work for the actuarial practice of Deloitte in London and got a chance to work in a wide range of assignments such as statutory audit, M&A, Solvency II etc. across a spectrum of UK life insurers. While working in Deloitte, I got an opportunity to join the HSBC life insurance joint venture in India which was in its startup phase. I decided to take on this opportunity and after having spent almost eight years in the UK, I moved back to India in 2010 and joined Canara HSBC Oriental Bank of Commerce Life Insurance as their Pricing Head. After having spent about 6 years in the

Company's actuarial team, first as the Pricing Head and subsequently as the Head - Corporate Actuarial, I took over the role of the Appointed Actuary. Overall, I feel that my journey to become as AA has been very challenging but at the same time, very interesting as I have had a wide range of experiences which have helped shape up both my technical as well as wider skills.

The role of actuaries in the Indian Insurance market; Past, Present, and Future.

Traditionally the actuarial function in the Indian insurance market may have been considered somewhat of a back office/reporting function. However, given the fast changing nature of the industry and regulatory landscape, the role of the actuaries is become much more strategic in nature where they are required to advise the Company on ways of achieving sustainable and profitable growth in business. Today, actuaries are required to get involved in all the key business decisions with the Senior Management Team and the Board members increasing looking at them to provide inputs on the long term financial impact of such decisions. As the competition in the industry intensifies, it will fall upon the actuaries to come up with innovative solutions to product and distribution problems while managing the risks underlying the business. In order to meet the demands of the new dimensions of their roles, actuaries need to ensure that besides honing their technical skills, they also remain connected to what's happening in their individual companies as well as in the industry across all spheres be it distribution, customer service or technology initiatives.

What is the extent of actuarial resources and services used and utilized in the organization?

The actuarial team is extensively involved in all aspects of financial management and risk management of the organization from the designing and pricing of products to managing financial risks underlying the business once it is on the books. Further, the team continues to be involved in the core BAU activities of financial calculations, regulatory and shareholders' reporting, experience analysis, ALM, par business management, reinsurer engagement, regulator engagement etc.

At a wider level, the actuarial team is involved in

guiding the Sales and Finance Teams on optimizing both the short term and long term business / strategic plans of the Company as well as analyzing distribution partnerships whereby balance between requirements of the distributors as well as the profit margins for the Company is required to be maintained by exploring different combinations of products and portfolio segments. They are also providing inputs on various cross functional projects / initiatives from a regulatory perspective as well as from the perspective of impact of these on both the short term and long term key financial metrics of the Company.

Actuarial students are among the best resources who can be put to any type of job in Insurance companies; how would you plan to employ actuarial resources in other functions than actuarial?

The capabilities and importance of actuarial resources have already been recognized by the organization and as a result, the team is currently not only responsible for carrying the core activities of the actuarial function but are also at the forefront for advising other areas of the business on the financial impact of their decisions, how to manage the risks emanating from the same and how to change their functional strategies to enhance business performance. These range from development of new metrics to measure and monitor the performance of the customer retention team, changes to underwriting and claims philosophy while maintaining a balance between the risks being written as well as the ease of doing business, inputs to the risk function on development of risk appetites and risk mandates vis-à-vis the financial risks being faced by the business, inputs to the investment function on how to optimize the returns for the non-linked funds of the Company etc. Going forward as well, while the actuarial resources will remain primarily part of the actuarial function, nevertheless we plan to ensure that they continue to actively participate in all cross functional initiatives and provide strategic inputs to various areas of the business.

What are the new roles and challenges of the regulator in the Indian Life insurance market?

The Regulator in India has historically played the role of ensuring that the conduct of the insurance companies is aligned to the best interests of the policyholders and the operations of the life companies is carried out keeping the need to keep an appropriate balance between risks and rewards. Given the nascency of the industry, this often meant that the Regulator had to be fairly prescriptive in nature with respect to the guidelines and regulations being issued and also cover practically all aspects of the business ranging from product regulations

to the procedures to be followed for opening / closing of offices. However, with the industry as well as the consumers getting more mature over time, I think the Regulator should look at moving towards a more principles based regime where the focus is kept on ensuring that the principles underlying the operations and management of the insurance companies are aligned to regulatory interests leaving the actual approach in meeting these principles in the hands of the companies themselves. The Regulator also needs to move towards a risk based regulatory approach which rewards companies with more robust risk management framework thereby encouraging industry players to continuously develop and enhance their systems and procedures in this direction. Finally, given the newer challenges being faced by the industry with regards to aspects such as viability of distribution channels, competition from other financial instruments etc., it is important for the Regulator to lead from the front in devising a road map for how it expects the industry to shape up in the future and bring in regulations which facilitate the transition to the same.

Please provide insight into regulatory concerns that are likely to impact the roles of actuaries.

Given the roles played by actuaries in the insurance industry, practically all aspects of regulations affect their working in some way or the other. These could be direct in nature such as regulations affecting the design and pricing of products or other regulations which may have a more indirect impact such as those relating to the changes to the documentation required at the point of sale which in turn may require actuaries to assess changes to risk profile of the customers coming on board thereby refining the current risk management practices around the same. Currently, the Regulator is focusing on a number of areas which are likely to have a direct impact for actuaries. The most significant of these include the upcoming product regulations which may include much wider areas besides products such as change in investment norms for insurers, creating a secondary market for insurance products etc., development of the Indian equivalent of IFRS 17 which is the new accounting standard developed by IASB for insurance companies as well as the development of a risk based capital approach for India (as currently we are using a formula based capital approach).

Solvency and capital adequacy are concerns for regulators. How are current regulatory approaches addressing these issues?

As mentioned earlier, the Indian life insurance industry is still following the formula based capital approach whereas a number of regulatory regimes outside India,

in particular those of the western economies, have moved, partially or fully, on to the risk based capital regime. I believe we, as an industry, also need to move away from the current regime into a regime which allows insurers to hold capital in line with the risks underlying their businesses as well as the strengths of their risk management practices. This is because the formula based regime may not be able to capture these aspects. For instance, all else being equal, in case of two life insurance companies writing same amounts and types of non-linked non-participating savings business, the current regime will require them to hold the same amount of capital even one of them may be backing its liabilities with equities with the other backing these liabilities with fixed interest assets. A risk based regime will remove such anomalies requiring the company backing guaranteed liabilities with equities to keep a higher capital as opposed to the other companies. I am glad that the Indian Regulator is already working on a road map to implement risk based capital in the country and I look forward to the implementing the same as and when it is issued.

What challenges are you looking for as an appointed actuary of Life Insurance Company?

As an Appointed Actuary of a life Insurance company, my role is twofold, one to protect the interests of the policyholders and ensuring that the Company has sufficient assets to meet its commitments to them. The other key aspect is to ensure that the financial health of the Company remains robust and all strategic decisions factor in their long-term impact on the same. Given the increasingly competitive market scenario and regulatory expectations, the first of my main challenges is to meet the demands from the Sales Team / Distribution partners to come up with competitive products with multitude of features while managing the risk / rewards balance for these products / propositions. The other challenge is to continuously meet the regulatory expectation of ensuring that the actuarial function as well as the company as a whole is managed in a robust and well controlled manner and to be very agile to the ever changing regulatory landscape so as to quickly adapt the Company strategy to meet any

changes to the same. Further, as mentioned earlier, the Senior Management Team and the Board members are increasingly looking at the Appointed Actuary and his / her team, to provide inputs on the long term financial impact of strategic decisions and I am looking forward to the challenges with respect to this emerging area of opportunities for the actuarial function.

What are your contributions as chairperson of Advisory Group on Education, particularly on the topic of curriculum 2019?

As the Chairperson of the Advisory Group on Education, there have been four areas of work which we have been concentrating upon:

- ✎ Creating an exemption policy for the Institute of Actuaries of India whereby universities / colleges can approach us seeking exemption from the actuarial papers basis their own courses / subjects;
- ✎ Implementing the move to the 2019 curriculum for the Institute;
- ✎ Developing a comprehensive study support framework for the actuarial students to provide structured assistance to them for their examination preparation; and
- ✎ Conducting relevant seminars / conferences for the actuarial students as well as new entrants into the profession on topics that may aid their actuarial careers such as those on examination techniques, employability skills etc.

We are in various stages of work in each of the above areas with the main focus being on ensuring a smooth transition to the new curriculum applicable from 2019 in line with the adoption of the same by the Institute and Faculty of Actuaries in the UK. This project is being jointly carried out with the Advisory Group on Examination under the guidance of the Education Committee of the Institute.

Thank You!

“New business premium collection by the life insurance industry registered a growth of 6.3% year-on-year, as private insurers saw their market share rise from 48.9% to 51.3%. SBI Life retained its position as market leader amongst private insurers with a share of 10.2% in weighted new business collections by the industry. The industry also saw another period of rejig at top managerial positions including at HDFC Life, Edelweiss Tokio Life and Tata AIA Life.

PNB MetLife has filed draft prospectus with SEBI for the proposed IPO; while in a move to meet minimum public float requirement of 25% for listed entities, BNP Paribas Cardiff has expressed plans to offload some of its stake in SBI Life.

The industry witnessed launch of quite a few Point-of-Sale products as non-linked products continued to dominate in terms of number of new launches. Distribution landscape was abuzz with new tie-ups; while the IRDAI setup a committee to develop a 'regulatory sandbox' and has amended the requirements for PoS products. Following is a summary of the top ten key trends and developments that shaped the life insurance market in India for the period July to September 2018.”

10

Committee setup on 'Regulatory Sandbox' for insurance in India

In wake of the technological innovations being made by insurers and intermediaries, the Authority has established a committee to develop a 'regulatory sandbox' in order to better manage risks, increase efficiency and enhance value for customers. This will involve setting up a conducive environment to experiment with fin-tech solutions which will include studying international practices on the subject, amongst other objectives of the committee. The order details the members constituting the committee along with its terms of reference. The committee is required to submit a report within two months of its formation.

9

The Authority amends requirements related to Point-of-Sale (PoS) products

Following the requirement which mandates that an insurance policy should carry the details of the person selling it, the regulator has discontinued the requirement of prefixing “PoS” before the product name for life, general and health products. Additionally, the Authority has allowed all micro insurance products in life, general and health insurance to be distributed through the PoS to increase insurance penetration. The regulator has further clarified that the sponsoring entity is allowed to recognise health/personal accident policies with maximum sum assured exceeding the prescribed limit for PoS products, on account of no claim bonus accruing to the policyholder, as being sourced by PoS.

8

Positive profits reported by 14 private life insurers for Q1 FY2018-19

As per financial results disclosed by 22 private life insurers, 14 have reported profit at the end of first quarter of FY2018-19, compared to 13 out of 22 insurers making such disclosure in the corresponding period of the previous fiscal. Amongst the 14 insurers that have reported profit, 8 have recorded a positive year-on-year growth compared to the profit figures reported for Q1 FY2017-18. The total profit after tax for private life insurers making such disclosure has decreased by 9.8% from INR12.7 billion in Q1 FY2017-18 to INR11.4 billion, year-on-year.

7

Update on the distribution landscape

Key distribution-related developments as per media reports during the period have been summarised below:

- Bajaj Allianz Life has entered into a corporate agency agreement with the state-owned India Post Payments Bank to leverage services of postmen and 'Grameen Dak Sevaks' for providing insurance solutions.
- DHFL Pramerica Life has partnered with one of the country's oldest urban co-operative banks - SVC Bank.
- Edelweiss Tokio Life has tied up with Fincare Small Finance Bank to market its PoS endowment plan.

- ♦ HDFC Life has partnered with Vijaya Bank to leverage over 2000 branches of the state-owned bank across the country.
- ♦ ICICI Prudential Life has reportedly entered into a bancassurance arrangement with Saraswat Bank.
- ♦ With an aim to strengthen its proprietary sale channels following the end of its exclusive partnership with Axis Bank, Max Life plans to add 145 branches and 36,000 agents each year over the next three years.
- ♦ With an existing strong footprint in general insurance space, Hero Enterprises has secured a broking license to sell life insurance products as well. Reportedly, the insurance business, to be migrated to Hero Broking, is also looking to expand its presence in health insurance space.

6

PNB MetLife files draft papers for IPO

PNB MetLife has filed Draft Red Herring Prospectus with market regulator SEBI for its Initial Public Offer (IPO). The proposed IPO has received an in-principle approval from the insurance regulator, IRDAI. It will comprise sale of 495.9 million shares of face value of INR10 each, constituting 24.6% of the post-offer paid up equity share capital of the company. PNB MetLife is a joint venture between Punjab National Bank (PNB) and MetLife with holdings of 30% and 26% respectively, along with other stakeholders. PNB expects to dilute 4% stake through the IPO while MetLife plans to dilute 6.4%. The other stakeholders would also be offloading their stakes through the IPO.

5

Non-linked products remain dominant as PoS products gain popularity

Life insurance industry has witnessed launch of about 17 new products during the period with the majority of them being non-linked products. PoS products have found traction with insurers as Bajaj Allianz Life and PNB MetLife have launched new PoS products. Moreover, there have been some new launches in the health insurance segment with 'Bajaj Allianz Life Health Care Goal' critical illness plan being the latest entrant. Canara HSBC OBC Life has launched a new unit-linked plan 'Invest4G' which it plans to promote exclusively through digital channels and web aggregators with features such as zero policy administration and premium allocation charges along with return of mortality charges on maturity. LIC has entered into an agreement with Central Depository Services Ltd. (CDSL) to provide a group insurance cover to all eligible 'Demat' holders serviced by CDSL.

In a move to bundle savings with protection, mutual fund houses, such as ICICI Prudential Mutual Fund, Reliance Mutual Fund and Aditya Birla Mutual Fund, are offering free life insurance cover on systematic investment plan (SIP) by investors where the cover is a multiple of the monthly SIP, varying by duration and subject to specified caps.

4

New business premium collections: SBI Life maintains its position as market leader among private insurers

Weighted new business premium (calculated as 100% of regular premium and 10% of single premium) collection for the life insurance industry amounted to INR355.9 billion during April to September 2018 recording a growth of 6.3%, year-on-year. SBI Life retained its position as the largest private insurer capturing a market share of 10.2%, closely followed by ICICI Prudential Life. Private insurers as a whole have shown an increase in market share from 48.9% to 51.3% largely driven by small private insurers showing commendable growth in terms of weighted new business premium collection. In particular, Edelweiss Tokio Life, Bharti AXA Life, DHFL Pramerica Life and Tata AIA Life recorded an impressive growth of more than 50% in their new business collections. State owned LIC recorded a subdued growth rate of 1.4% with its market share declining from 51.1% to 48.7% for the same period last year.

3

Technology-driven initiatives in insurance

Bharti AXA Life launched an option of claim processing and intimation via WhatsApp messenger, becoming the first domestic life insurer to provide its customers with this service. Future Generali Life has launched similar initiative where they provide various services through 'Whatsapp for Service' along with a Chatbot Reva to assist policyholders. ICICI Prudential Life has also introduced an AI-based platform, Chatbot LiGo, to handle customer queries.

Media reports also suggest that Aviva Life has partnered with Amazon's Alexa platform to launch an 'Insurance Made Easy' digital initiative for better customer awareness and experience.

2

Key appointments at HDFC Life, Edelweiss Tokio Life and Tata AIA Life

Ms. Vibha Padalkar has been promoted as the Managing Director (MD) and Chief Executive Officer (CEO) of HDFC Life replacing Mr Amitabh Chaudhary, who will join as the CEO of Axis Bank. Mr Sumit Rai has replaced Mr Deepak

Mittal as the MD & CEO of Edelweiss Tokio Life. Mr Rishi Srivastava has been promoted to be the MD and CEO of Tata AIA Life, succeeding Mr Naveen Tahilyani who is moving to AIA Group head-office in Hong Kong as CEO of Group partnership distribution.

1

Update on potential transactions

Media reports suggest that BNP Paribas Cardif is planning to sell a part of its stake in SBI Life. The move is aimed at ensuring compliance with minimum public shareholding requirement of 25% for listed entities. SBI currently owns

62.1% in SBI Life while BNP Paribas Cardif holds 22%. It is understood that investment banks Kotak Mahindra Capital, Citigroup and its own investment banking arm have been appointed to assist in the process to dilute at least 5% to 6% stake.

In a move towards acquiring 51% stake in IDBI Bank, as reported in the previous update, LIC will pick up an additional equity stake in the bank through a preferential share issue to take its holding from 7.98% currently to up to 14.9%. While the state-owned insurer has the Union Cabinet's approval to acquire 51% in the bank, it will need further regulatory approvals to increase stake beyond 15%, which are awaited.

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Your visiting card will have one more thing with your name. Pride.



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- Communication of key financial risks and measures to mitigate the risks to senior management
- Knowledge of financial markets including derivatives
- Expertise on valuation and accounting of derivatives

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Applicants for both the positions should meet the following requirements:

- Qualified actuary with 5 years PQE, minimum 10 years experience in Life Insurance.
 - Strong analytical, communication and managerial skills are essential.
- Compensation, grade and designation will be based on candidate's seniority and work experience. Both the roles will report into the Appointed Actuary of the organisation.

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Market consolidation

The life insurance market in New Zealand is undergoing consolidation, as Australian banks divest life insurance operations to overseas life insurers. Cigna with 3.0% share of individual in-force premium has agreed to acquire One Path with 8.8% share⁽¹⁾, taking them from 10th to 3rd largest life insurer in New Zealand. Meanwhile, AIA with 5.1% share finalised its purchase of Sovereign with 25.7% share⁽²⁾, taking them from 7th to 1st. There is take-over speculation about five other top-ten life insurers.

Conduct Regulation

The Australian Royal Commission into misconduct in the Banking, Superannuation and Financial Services has issued an interim report⁽³⁾. Providers have been criticised for pressure selling and exclusion on non-underwritten covers sold over the phone to low-income customers. The winds of change are blowing across the Tasman. Life insurers in New Zealand are reviewing their own processes with a customer lens. The New Zealand conduct regulator has indicated concerns about conflicted advice that insurers encourage with overseas trips and other “soft commission” incentives⁽⁴⁾.

Accounting standards and regulation

Reserve Bank released a consultation paper on NZ IFRS16 leases⁽⁵⁾ which is due to come into effect next year. The industry and actuarial profession supports amending solvency standards to overcome a timing mismatch between asset and liability recognition and potential for an adverse solvency requirement.

In due course, RBNZ will look whether to adjust solvency standards in light of reporting changes arising from IFRS17. There is still 3 or 4 years to go before IFRS17 comes into play. The impact on reported capital could be substantial (e.g. if part of Deferred Acquisition Costs can't be carried forward). This should be offset by lower insurance risk capital charge, leaving solvency margins intact (from this particular impact). However, the impact of adding a risk adjustment could be significant for life insurers (but not general insurers who have had risk margins for many years).

New Zealand Society of Actuaries

A workshop for Appointed Actuaries was held on 19

September 2018. The scope and depth of Financial Condition Reports was discussed. Most directors appreciate the actuary going beyond the minimum requirements set out in professional standards. Regulators like to see greater emphasis on premium rate adequacy and policyholder reasonable expectations.

The biennial conference will be held in Queenstown from 28 to 31 October 2018⁽⁶⁾. Although rooms at the venue have sold out, accommodation is available at other nearby Hotels.

A number of professional standards⁽⁷⁾ have been through either a full review or “read through” review during the year and adopted by Council. These are PS20 (Determination of Life Insurance Liabilities), PS25 (Actuaries providing Advice under Friendly Societies and Credit Union Act 1982), PS30 (Valuation of General Insurance Claims) and PS90 (Communication of Professional Advice).

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RNI No. MAHENG/2009/28427
Published on 1st of Every Month

Postal Registration No. NMB/180/20
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