RISK ASSESSMENT AND QUANTIFICATION OF WEALTHSURANCE EQUITY GROWTH FUND OF IDBI FEDERAL LIFE INSURANCE

Abhishek Halder

Indian Institute of Management, Ahmedabad, India

ABSTRACT

The objective of risk management is not to prohibit or prevent risk taking activity, but to ensure that the risks are consciously taken with full knowledge, clear purpose and thorough understanding so that it can be measured and mitigated. It also prevents an institution from suffering unacceptable loss causing it to fail or materially damage its competitive position. Balancing risk and return is not an easy task as risk is subjective and not quantifiable whereas return is objective and measurable. This paper includes both qualitative and quantitative research. The former uses a survey, face-to-face discussions and telephonic interviews on study sample which helped to decipher the demographics and the financial needs of the clientele. The latter uses empirical data sources to gauge the risks associated with a unit-linked insurance plan (ULIP), wealthsurance equity growth fund of IDBI federal life insurance based on risk parameters. A regression analysis is performed on the 5 year monthly historical data of portfolio returns of wealthsurance equity growth fund of IDBI federal life insurance and market returns. The findings suggest that the portfolio returns are almost independent of market returns thereby involving a high amount of risk for the fund managers to take to provide better returns. To conclude, if insurance industry has to do well in India, it has to reconfigure and change the way it has done business over the last 20years.

Key word: Risk, Return, Portfolio, Unit-Linked Insurance Plan, Equity growth fund.
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1. INTRODUCTION

In D.S. Hamsell words, insurance is defined "as a social device providing financial compensation for the effects of misfortune, the payment being made from the accumulated contributions of all parties participating in the scheme". Today, only one business, which offers all walks of life, is insurance business. Owing to growing complexity of life, trade and commerce, individual and business firms and turning to insurance to manage various risks. Every individual in this world is subject to unforeseen uncertainties which may make him and his family vulnerable. Insurance gives individuals an opportunity to continue their daily routine affairs so that a certain cost (premiums) is substituted for an uncertain cost (potentially

disastrous loss of unacceptable magnitude). The objective of risk management is to reduce different risks related to a preselected domain to the level accepted by society. In ideal risk management, a prioritization process is followed whereby the risks with the greatest loss and the greatest probability of occurring are handled first, and risks with lower probability of occurrence and lower loss are handled in descending order. In practice the process can be very difficult, and balancing between risks with a high probability of occurrence but lower loss versus a risk with high loss but lower probability of occurrence can often be mishandled. An ideal risk management minimizes spending while maximizing the reduction of the negative effects of risks. Therefore, risk management is a structured approach to managing uncertainty related to a threat, a sequence of human activities including: risk assessment, development of strategies to manage it, and mitigation of risks using managerial resources.

The demand for insurance products is set to accelerate as India's robust economy is expected to sustain the growth in the insurance premiums. Higher personal disposable incomes would result in higher household savings instruments like insurance and pension policies. In comparison with its position in October 2016, till February 2017, insurance sector witnessed growth at about 23%. The number of middle-class households is estimated to increase more than fourfold to 148 million by 2030 from 32 million in 2010. The rising per capita income and rural incomes will lead to increased spending on medical and healthcare services. IDBI Federal Life Insurance is one of India's fastest growing life insurance companies and offers a diverse range of solutions for wealth management, protection and retirement needs to individual and corporate customers. It is a joint-venture of IDBI Bank, India's premier development and commercial bank, Federal Bank, one of India's leading private sector banks and Age as, a multinational insurance giant based out of Europe. Having commenced operations in 2008, IDBI Federal was able to achieve breakeven within just 5 years. Except SBI life, no other company in the life insurance segment has achieved this feat. As on March 31, 2017, the company has issued nearly 10.29 lakh policies with a sum assured of over Rs. 58,653.76 crore. IDBI Federal Life Insurance has total assets under management (AUM) of 6,090 crore and a robust capital base of over 800 crores, as on March 31, 2017. Some of the products of IDBI Federal Life Insurance are listed below:

Table 1 Insurance products of IDBI Federal life insurance

Endowment Plans	Unit-Linked Insurance Plans
Incomesurance Guaranteed Money Back Plan	Wealthsurance Growth Insurance
Childsurance Savings Protection Plan	Wealthsurance Future Star Plan
Lifesurance Savings Insurance Plan	Wealth Gain Insurance Plan

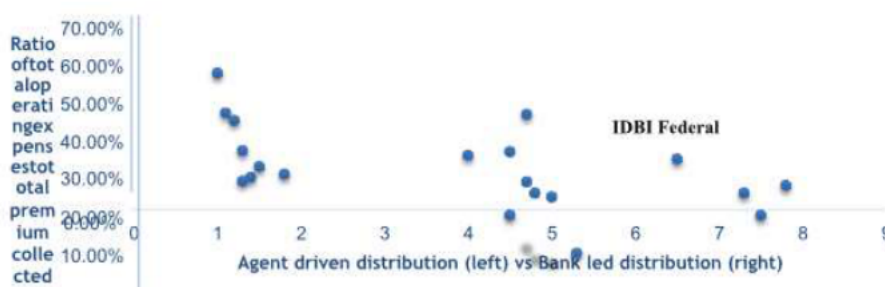## 1.1. Expense ratios for private life insurers for FY 2015-16

Figure 1 Position of IDBI Federal relative to other private life insurers in terms of Expense ratios for FY 2015-16

The extensive reach of our customer service charter is built on a robust network of distribution channels. Banc assurance channel continued to be the largest distribution channel, contributing over 70% of new business, during the year. With the launch of the 'Step Up' transformation programme, IDBI Federal took major step during the year to increase the productivity of Lead Generators (LG) and in deepening our relationships with Bancassurance partners. Agency channel contributed 10%, while the contribution of other channels (Alternate/Online/Group) stood at 20%. Agency channel has significantly helped augment the Bancassurance presence. With customized offerings for a diversified customer base, the company is also progressively scaling up consumer engagement through a growing pan-India presence of Direct Sales Force (DSF) channel. Below table gives us an idea about how new business premium income has been sourced from:

Table 2 Channels of distribution for new business

	2008-09	**2009-10**	**2010-11**	**2011-12**	**2012-13**	**2013-14**
Individual Agents	65%	61%	54%	47%	46%	41%
Banks	8%	8%	10%	11%	11%	9%
Corporate agents - others	4%	4%	3%	2%	2%	1%
Brokers	1%	1%	1%	1%	1%	1%
Direct selling	21%	26%	32%	39%	40%	48%

The above figures clearly indicate that individual agents' market share (life insurance) has declined in the period 2009-2014, while there has been a surge in the popularity of the direct channel / online aggregators. But at the individual level, the majority of the life insurance policies are sold through individual insurance agents followed by banks.

IDBI Federal is using IT to empower its customers. Several initiatives aimed at scaling up our customer satisfaction levels were launched. Mobile application for customers, intuitive IVRS service, E-Deposit slips, self-service option on customer portal, improved customer login process to name a few. Customer delight is at the centre of all these initiatives, which have enabled to improve the ease of doing business with IDBI Federal.

IDBI Federal Life insurance has continued its phenomenal growth path over the last 3 years. In the financial year 2015-16, individual new business premium grew 40.34%. Its market shares among private players rose to 1.44% from 1.39%. The company has achieved 75% persistency for 13th month which is among the best in the industry. The operating cost to gross premium stood at 18.7%. Total premium rose by 16% whereas the renewal premium grew by 11%. Continuing the legacy, IDBI Federal has recorded the highest growth (27%) of premiums collected in the life insurance industry in the financial year 2016-17 and has moved up by 2 places to 11th rank in new business (individual life).

Table 3 Milestones in the journey of IDBI Federal Life Insurance

2006	IDBI Bank, Federal Bank and Belgian-Dutch insurance major Fortis Insurance International NV signed a MoU to start a life insurance company
2008	IDBI Fortis Life Insurance Co. Ltd, which started its operations in March 2008
2008	IDBI Federal becomes one of the fastest growing new life insurers to collect premium worth Rs.100crores
2009	IDBI Fortis announces Rs.250 cr capital infusion
2009	Nimbus ropes in IDBI Fortis as title sponsor of India-Sri Lanka series
2009	'IDBI Fortis' Boss-ka-Boss receives PRCI Award
2009	IDBI Fortis receives bronze Dragon at PMAA 2009
2010	IDBI Fortis now renamed as IDBI Federal Life Insurance Company
2011	IDBI Federal launches Retiressurance Guaranteed Pension Plan

2012	IDBI Federal makes its online debut
2013	IDBI Federal in association with Phoenix Foundation organizes a trek for the physically challenged
2013	IDBI Federal break-even in Five years; posts maiden profit of Rs.9.24 cr

2. LITERATURE REVIEW

Risk is defined as an uncertainty pertaining to the occurrence of event which might produce a loss. In other words, Risk has been defined as the possibility of occurrence of an unfavourable deviation from the expected. These losses are measured in financial parameters and such management of risks involves decision making under uncertainty. For The analysis and assessment of risks, it is vital to know about the factors that contribute to the occurrence of the loss or the extent of the loss. Two such factors are 'Perils' and 'Hazards'. Perils are the immediate cause of the loss which causes the deviation from the expected events. They can be natural, man-made or economic perils.

Natural Perils are unexpected natural phenomena, which cause untold misery, loss of life and property. Volcanic eruptions, landslides, cyclones, draughts, storms, floods, fire due to lightning, unseasonal rainfall and prolonged dry spells, hailstorms are some examples of natural risks that can cause losses. These perils are also called 'act of God perils', and mankind can do very little to stop them; he can only learn to live with them and devise means to mitigate losses by lessening their impact.

Man-made perils are an outcome of our society and are the violent actions and unethical practices of people, which result in deviation from the expected. Thefts, Riots,Strikes, malicious damage, road accidents, vandalism, industrial accidents are some examples of man-made perils. These perils can be avoided by following stringent rules and regulations which serve as a deterrent for man to cause such unexpected and undesirable events.

Economic perils are the causes of risks that are economic in nature. Fluctuations in the general economy can cause unfavourable deviation from the expectations and create risks for both Industries firms as well as individuals. Few examples of this type of risk are depression, inflation, local fluctuations and the instability of Industrial firms.

Hazards are the underlying factors behind the perils which increase the probability of occurrence of loss. It is a condition which lies behind the occurrence of an unexpected event or loss and can increase its frequency, severity or both. Hazards can be physical, moral and morale.

Physical Hazards are related to the physical aspects of the property. These may influence the probability that the property may be damaged or may increase or decrease the losses incurred due to a particular risk. For example, location of a building affects its vulnerability to losses due to fire, floods, earthquakes etc.

Moral Hazard affects the chances of occurrence of loss thereby increasing the risk. Whenever persons of doubtful integrity buy an Insurance policy, the risk increases because loss tends towards certainty. To avail Insurance benefit, a dishonest person may set his own house or property on fire. Similarly, an unscrupulous trader may arrange for a robbery in his own store to get the benefits.

Morale Hazard is an attitude of lack of concern about the outcome of his actions. It should not be confused with moral hazard which involves dishonesty. An example of morale hazard is a person who is careless and throws cigarettes around, least bothered that his action may cause fire. Bad house-keeping is another example of a morale hazard as this also increases the chances of loss occurring.

There is a difference between, say, the risk of losing money one has invested and the risk of being hit by a car while jogging. This difference leads to the classification of risks as either speculative or pure risks.

A **speculative risk** is a risk that accompanies the possibility of earning a profit. Most business decisions, such as the decision to market a new product, involve speculative risks. If the new product succeeds in the marketplace, there are profits; if it fails, there are losses. Similarly, when a person gambles or he buys shares there is a chance that he may lose or win or that the share prices may go up and he gains or the share market crashes and he loses. These are speculative risks.

A **pure risk** is a risk that involves only the possibility of loss, with no potential for gain. It is a universal fact that if one has to live in this risk-prone world, one has to expose himself to the pure risks. Pure risks are a part of the environment and are all pervading. The possibility of damage due to hurricane, fire, or automobile accident is a pure risk because there is no gain if such damage does not occur.

Pure risk exposures can be broadly classified as follows:

Personal Risk: Risks such as loss of income, mental or physical suffering etc. which have a direct impact on people. Therefore, the risk of premature death, sickness, disability, unemployment and even dependent old age come under the category of personal risk.

Property Risk: Risks that pertain to the possibility of loss to an asset such as damage to a building due to fire, damage to a vehicle in an accident, theft of vehicle etc.

Liability Risk: Risk of becoming legally bound to compensate or to pay for damage to the person or property of others.

Insurance is a tool for managing risk. The cost of the expected loss (which is the same as the cost of the risk) is the product of two factors: i) The probability that the peril being insured against may happen, leading to the loss ii) The impact or the amount of loss that may be suffered as a result.

The cost of risk is directly proportional to the probability and impact. However, if the impact is high and the probability of occurrence is small, the cost of the risk would be low.

The core business of insurance is managing and carrying risk – transferring risk from policyholders to insurers through the underwriting process. But the insurer's other risks – market, credit, operational, liquidity risk and so on – must also be managed effectively. All of these risks should be managed through an enterprise-wide framework that allows the insurer to identify, measure, manage, report and monitor risks, and then adjust the company's risk profile in line with its business objectives and risk appetite. Enterprise risk management (ERM) is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives. There is a direct relationship between objectives, which are what an entity strives to achieve, and enterprise risk management components, which represent what is needed to achieve them. This depiction portrays the ability to focus on the entirety of an entity's enterprise risk management, or by objectives category, component, entity unit, or any subset there of.

Under the ERM framework, the following risks are covered:
- InvestmentRisk
- CreditRisk
- Liquidityrisk
- OperationalRisk

Investment (Market or Financial) risk: Risk due to movements in the level of financial variables such as interest rates, FOREX rates, stock prices etc. The main components of market risks are:

- Interest- rate risk: Losses due to change in Interest- rates
- Equity and property risk: Losses due to drop in equity prices.
- Currency risk: Losses due to adverse movements in foreign exchange rates.

Credit Risk: Risks due to default by and change in the credit rating of those to whom the company has an exposure. Ex-Re-insurance companies, Companies in which we have invested funds. The main components of credit risks are:

- Business credit risk: Failure of are insurer.
- Invested asset credit risk: Non-performance of invested assets.

2.1. Quantification:

2.1.1. Leverage Analysis

Leverage ratio measures the extent to which a company utilizes its debt to finance the assets. A company with significantly more debt than equity is considered to be highly leveraged. The financial leverage measures the ability of insurance companies to manage their conditions related with unexpected losses of market. Leverage ratio is also an indication of a company's long-term solvency. In order to increase the leverage of the company, the company should have more insurance policies, policies of reinsurance and make use of debt.

Liquidity risk: Risk that Cash Sources (Cash inflows from Insurance products— Premiums and Deposits, Asset Cash flows, Asset sales etc.) are insufficient to meet Cash Needs (Product cash outflows, Operating cash outflows, contingent cash needs).

2.2. Quantification:

2.2.1. Liquidity Stress Scenario analysis:

This ensures sufficient liquidity in the asset portfolio to provide for timely payment of potential cash demands under both normal and extreme business conditions. Scenarios can be changing interest rates, liquidity needs from insurance claims, loss of a key distributional channel.

2.2.2. Liquidity Analysis

Current ratio is a financial ratio that measures whether a company has the adequate resources to pay off short-term debt obligations as they fall due. The higher the current ratio is, the more capable the company is to pay its obligations. A current ratio of 2:1 is usually considered the benchmark. A ratio less than one suggest that the company may not have sufficient resources to settle its short-term debt.

2.2.3. Solvency analysis

Solvency ratio is the ability of a company to meet its long-term fixed expenses and to accomplish long-term expansion and growth. A solvency ratio of greater than 20% is considered financially healthy. The higher the ratio, the better equipped a company is to pay off its debts and survive in the long term. It has to be maintained by all the Insurance Companies in India whether it is Private or Public sector. As per the IRDA (Assets, Liabilities, and Solvency Margin of Insurers) Rules 2000, both life and general insurance companies need to maintain solvency margins.

Asset-Liability Management Risk: Risk arising due to mismatch on account of duration of Assets (bonds) and duration of Liabilities i.e. the mismatch of interest rate sensitivity to assets and liabilities leading to impact on company's surplus

2.3. Quantification:

2.3.1. Profitability Analysis

Return on assets (ROA) is a profitability ratio which measures how far a company is profitable in relation to its total assets. ROA tells the investor how well a company uses its assets to generate income. It is a key indicator of the overall productivity of the company, and shows the percentage of profit, company earns in relative to its total resources. A negative ROA suggests that a company is not properly utilizing its capital, and may have disputed management. A company with negative ROA means it is investing a high amount of capital into its production and simultaneously receiving little income. The company can have a high return on assets even if it is bearing low profit margin.
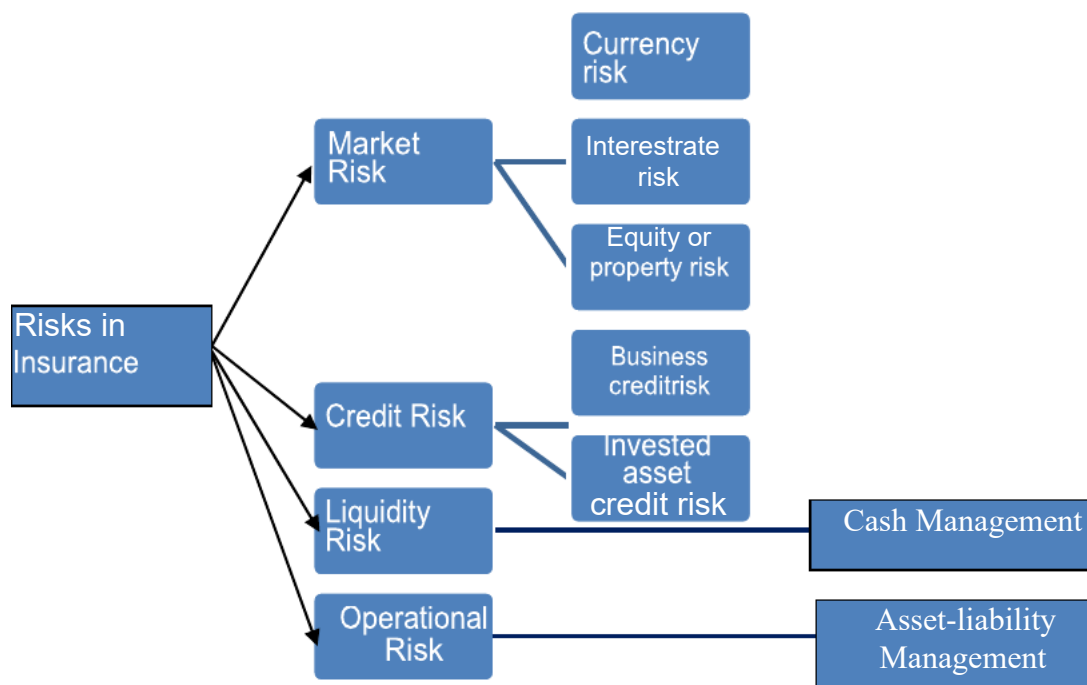
Figure 3 Different risks in insurance

Insurers will accept responsibility for risks that meet at least the following conditions:

2.3.2. Losses must not be under the control of the insured

Losses caused by fire, wind, or accident generally are insurable, but gambling losses are not. Nor will an insurer pay a claim for damage intentionally caused by the insured person. For example, a person who sets fire to an insured building cannot collect on a fire insurance policy.

2.3.3. The insured hazard must be geographically widespread

The insurance company must be able to write many policies covering the same specific hazard throughout a wide geographic area. This condition allows the insurer to minimize its own risk; the risk that it will have to pay huge sums of money to clients within a particular geographic area in the event of a catastrophe caused, for example, by a cyclone or an earthquake.

2.3.4. The probability of a loss should be predictable

Insurance companies cannot tell which particular clients will suffer losses. However, their actuaries must be able to determine, statistically, what fraction of their clients will suffer each type of loss. They can do so, for insurable risks, by examining records of losses for past years. They can then base their premiums, at least in part, on the number and value of the losses that are expected to occur.

2.3.5. Losses must be measurable

Insured property must have a value that is measurable because insurance firms reimburse losses with money. Moreover, premiums are based partly on the measured value of the insured property. As a result of this condition, insurers will not insure an item for its emotional or sentimental value but only for its actual monetary value.

2.3.6. The policyholder must have an insurable interest

The individual or firm that purchases an insurance policy must be the one that would suffer from a loss. Generally, individuals are considered to have an insurable interest in their family members. Therefore, a person can insure the life of a spouse, a child, or a parent. Corporations may purchase "key executive" insurance covering certain corporate officers. The proceeds from this insurance help offset the loss of the services of these key people if they die or become incapacitated.

Life insurance companies provide a service of pooling independent homogeneous risks. The process by which insured lives are separated into different homogeneous groups for premium rating purposes, according to the risk they present, is called risk classification. Risk Classification involves identification of risk factors specific to an individual that might influence the likely risk of that individual.

3. RESEARCH METHODOLOGY

The most significant aspect of this study is to provide an analysis of risk involved in insurance as a mechanism for enhancing the efficiency and effectiveness of decisions regarding the management of investments in insurance products that are normally associated with the high financial risks when compared with other risky financial assets. As such, the finding and results of this research study would equip managers with the right approach and knowledge for proactive risk measures so that they are able to implement the acquired insight in their adopted strategy for managing funds, and to improve outcomes for insurance management. Risk modeling tools provide them with the most suitable strategy for desirable positive impact on the insurance firm's profitability and ensuring the reliability of funds entrusted by investors on the firms.

This research takes the form and structure of a descriptive study whose purpose is to provide a review of the conditions under which insurance is provided. Empirical descriptive studies normallyseektoestablishanddevelopageneralizedunderstandingofthephenomenaunder study for purposes of establishing theoretical propositions, and exploring ground for validating existing theoretical assumptions and claims. This study suits the case in which secondary data sources become the primary source for investigating a limited aspect of the given study problem.

The research design of this study is based on a composite of theoretical as well as empirical study. Theoretical derivations and analysis are generated from data gathered from the analysis of qualitative survey, interviews and discussions, whereas data for empirical evidence analysis accrues from a regression analysis to predict the return of the portfolio fund using Nifty50 as the benchmark return. Such a study design enables the researcher to intensify focus on the

comparative aspects of the available data in order to establish a generalized, reliable and valid understanding of the problem that forms the basis of the research findings.

The data for the research was sourced from primary research as well as secondary sources of information. The primary research data included questionnaire survey, telephonic interviews and face-to-face discussions on the need of insurance and risk-return dynamics associated with it. The secondary sources of data included the company website, India brand equity foundation reports, value research magazine, deloitte and PwC reports on insurance risks and its emerging trends along with extracting information from online portals like morning star and yahoo finance.

The study will seek to answer the following research questions:
- What are the items identified as risk factors for provision of insurance?
- What is the risk-return proposition of wealthsurance equity growth fund of IDBI Federal?

Qualitative research on assessing risk as a primary underwriter was to analyze the complete background and profile of the clientele while figuring out the need and providing appropriate financial solutions. A structured questionnaire survey was conducted using online and offline modes. Repeated telephonic interviews and face-to-face discussions were conducted with the prospective customers. The primary focus was to assess and gauge the medical history, financial capability, educational qualification and occupation in addition to the nutritional habits and genetic anomalies prevailing in them before the financial solutions are provided to them by the insurer.

Quantitative research included extraction of historical data from portals like morning star, yahoo finance and money control for hypothesis testing of regression model to find out the relation between risk and return in IDBI Federal's wealthsurance equity growth fund. The fund's alpha, beta, and R-squared statistics by running least-squares regression of the fund's excess return over a risk-free rate compared with the excess returns of the index that has been selected as the index for the fund's broad asset class. It also included leverage analysis, solvency analysis, liquidity analysis, profitability analysis and scenario analysis for the equity growth fund so that the investment, credit, liquidity and operational risk assessment can be performed for the fund for improving firm's profitability.

4. DATA ANALYSIS AND INTERPRETATIONS

A survey was conducted using a study sample of 65 persons to gauge the attitude and usage of life insurance among people of different ages, income levels and family background. The questions asked were all close-ended requiring the respondents to choose among the options provided. The following were the survey results:
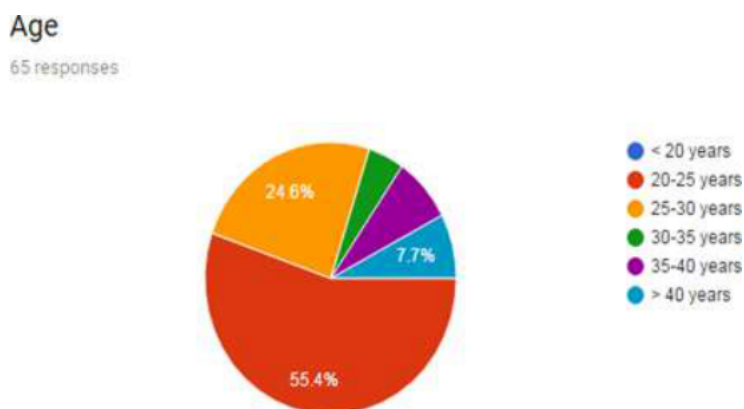

Figure 4

More than half of the respondents were from the age group of 20-25 years whereas a quarter of them were of age 25-30 years. Only 20% of the respondents of the survey were more than 30 years age.
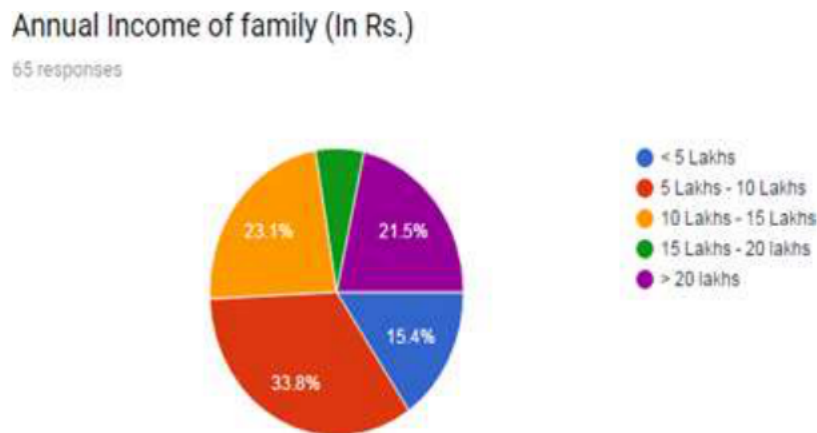
Annual Income of family (In Rs.)
65 responses

- < 5 Lakhs
- 5 Lakhs - 10 Lakhs
- 10 Lakhs - 15 Lakhs
- 15 Lakhs - 20 lakhs
- > 20 lakhs

Figure 5

The responses demonstrated a variety of income levels with about half of them earning less than 10 lakhs annually. People earring 10-15 lakhs and more than 15 lakhs each comprised of almost quarter of the total number of respondents.

What are your financial goals
65 responses
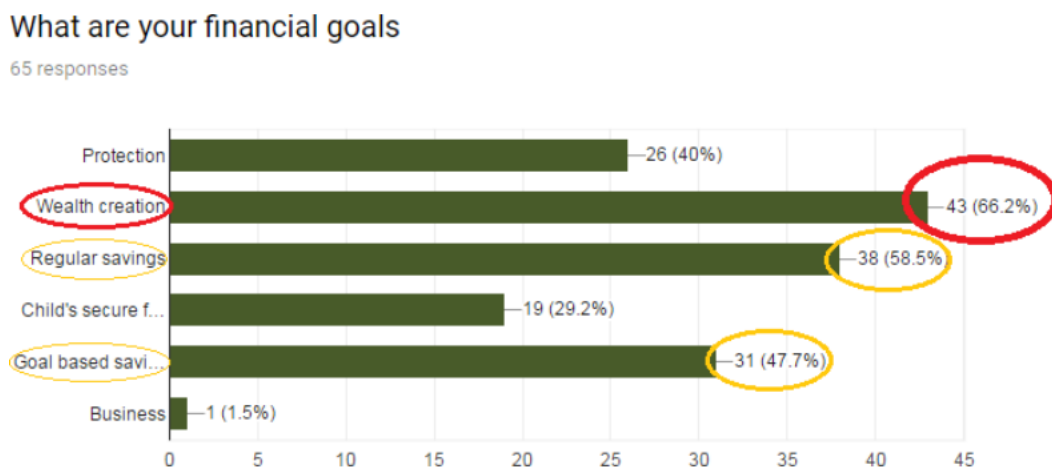
Figure 6

Majority of the respondents (about two-thirds) vouched for wealth creation as their financial goal. It was closely followed by regular savings. Just under half of the respondents also responded in favour of goal based savings.

While planning for these goals, what would you need as the financial solution?

65 responses
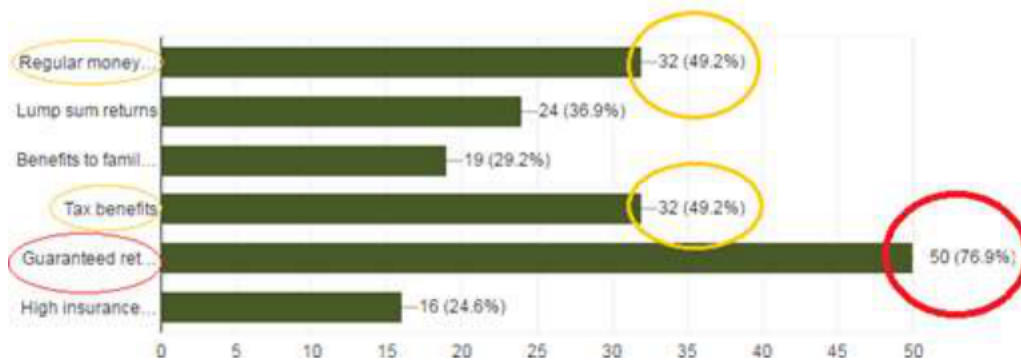
Figure 7

The study sample responses clearly demonstrated the increased demand for guaranteed returns with over 75% of the respondents voting in its favour as financial solution. It was followed by equal popularity of regular money back solution and tax benefits among the respondents of the survey.

Do you already have a life insurance cover?

65 responses
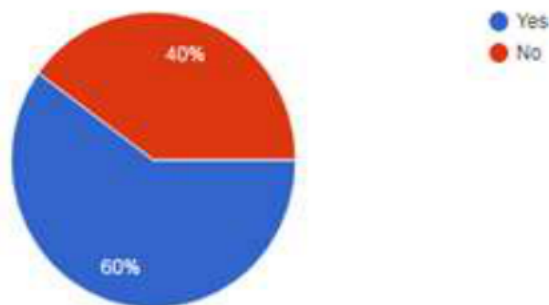
Figure 8

If yes, how much of an insurance cover you already have?

49 responses
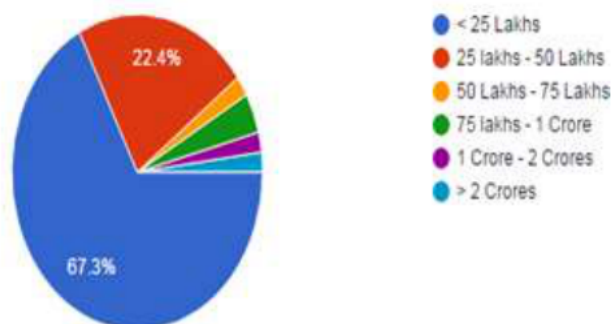
Figure 9

The survey found that 60% of the respondents had an insurance cover already. But, the cover was not sufficient enough to cover their human life value in the event of a miss- happening as about two-thirds of the respondents had a cover of less than 25 lakhs.
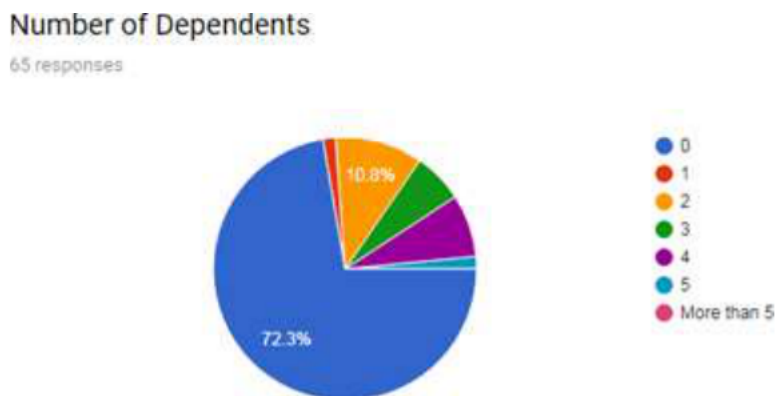
Figure 10

More than 70% of the respondents did not have any direct dependents. The financial needs for the remaining 30% of the respondents were associated with the requirements of the direct dependents too.

The financial need analysis was followed by tapping the customers on phone to know about their risk appetite and match asset classes. Personal visits and face-to-face discussions were initiated in case of approachable prospects. The medical underwriting involved judging any kind of medical ailment in the insured or his/her family, medical history of the family and the insured and susceptibility to critical diseases and aliments. The following figure shows the typical medical underwriting questions that were asked from the prospects:

Figure 11 Medical underwriting questions asked for risk identification

The financial underwriting of the proposer was done to find out the financial capability of the person to stay invested in the plan for its term by looking into the annual income, PAN Card details, bank transaction details and the filing of regular tax returns (in case of higher premium amount). Besides, occupational details seek the person to categorize his nature of work as purely

administrative, mostly administrative, skilled manual or unskilled manual job. In addition to this, common habits related to nutrition and lifestyle of the person is also assessed to prevent any kind of hazard. The following figure shows the typical questions asked to the prospects regarding this aspect:

Figure 12 Information on finances, habits, occupation and lifestyle asked for risk identification

Based on the primary underwriting, the risk profiles of different prospects are mapped to the broad asset class of the invested portfolio. The table below depicts the risk appetite of the individual in qualitative terms that matches the composition of the appropriate portfolio:

Table 4 Risk-return profile based on asset class

Broad Asset Class	Risk-Return profile
Equity growth fund	High risk , chances of higher returns
Income fund	Low to medium risk appetite, chances of lesser returns
Midcap fund	Medium to high risk appetite, chances of above average returns
Bond fund	Low risk appetite, chances of lower returns
Allocator fund	Moderate risk, chances of moderate return

Life underwriting presents its own unique set of modeling challenges which have made it a less obvious candidate for predictive analytics. To illustrate these challenges, it is useful to compare auto underwriting with life underwriting. Predictive modeling has achieved remarkable success in auto insurance whereas it's recent entry in life insurance. A predictive

model provides a mapping of all these factors combined into the expected cost of insuring the customer. Producing this map has several prerequisites:

- A clearly defined target variable, i.e. what the model is trying to predict
- The availability of a suitably rich data set, in which at least some predictive variables correlated with the target, can be identified
- A large number of observations upon which to build the model, allowing the abiding relationships to surface and be separated from random noise
- An application by which model results are translated into business actions

Table 5. Pre-requisites for predictive model

	Auto Insurer	Life Insurer
Target Variable	Claims over six-month contract	Mortality experience over life of product (10, 20+ years)
Modeling Data	Underwriting requirements supplemented by third-party data	Underwriting requirements supplemented by third-party data
Frequency of Loss	Approximately 10 percent of drivers make claims annually	Typically, fewer than 1 first year death per 1,000 new policies issued
Business Action	Underwriting Decision	Underwriting Decision

To analyze the risk parameters associated with the unit-linked plan of IDBI Federal namely Wealthsurance Equity Growth Fund, the historical monthly data spanning a period of last 5 years were taken into account. The returns of the portfolio over the period into consideration were calculated. Subsequently, the benchmark was chosen as the Nifty50 Index. After extracting the data of the benchmark index, its return percentages over the period Jan 2012 – Jan 2017 were also calculated. The following table depicts these calculations:

Table 6 Returns of portfolio and Returns of benchmark

Month- Year	IDBI fed equity growth	Return of portfolio	Nifty50 Index	Return of benchmark
Jan-12	12.656		5385.2	
Feb-12	13.148	3.89%	5295.55	-1.66%
Mar-12	13.014	-1.02%	5248.15	-0.90%
Apr-12	12.963	-0.39%	4924.25	-6.17%
May-12	12.225	-5.69%	5278.9	7.20%
Jun-12	13.142	7.50%	5229	-0.95%
Jul-12	13.088	-0.41%	5258.5	0.56%
Aug-12	13.058	-0.23%	5703.3	8.46%
Sep-12	14.306	9.56%	5619.7	-1.47%
Oct-12	14.163	-1.00%	5879.85	4.63%
Nov-12	14.793	4.45%	5905.1	0.43%
Dec-12	14.888	0.64%	6034.75	2.20%
Jan-13	15.125	1.59%	5693.05	-5.66%
Feb-13	14.213	-6.03%	5682.55	-0.18%
Mar-13	14.017	-1.38%	5930.2	4.36%
Apr-13	14.622	4.32%	5985.95	0.94%
May-13	14.686	0.44%	5842.2	-2.40%
Jun-13	14.31	-2.56%	5742	-1.72%
Jul-13	13.875	-3.04%	5471.8	-4.71%
Aug-13	13.25	-4.50%	5735.3	4.82%
Sep-13	14.053	6.06%	6299.15	9.83%
Oct-13	15.644	11.32%	6176.1	-1.95%
Nov-13	15.604	-0.26%	6304	2.07%

Dec-13	16.056	2.90%	6089.5	-3.40%
Jan-14	15.488	-3.54%	6276.95	3.08%
Feb-14	15.941	2.92%	6704.2	6.81%
Mar-14	17.121	7.40%	6696.4	-0.12%
Apr-14	17.344	1.30%	7229.95	7.97%
May-14	19.209	10.75%	7611.35	5.28%
Jun-14	20.523	6.84%	7721.3	1.44%
Jul-14	20.694	0.83%	7954.35	3.02%
Aug-14	20.678	-0.08%	7964.8	0.13%
Sep-14	20.808	0.63%	8322.2	4.49%
Oct-14	20.938	0.62%	8588.25	3.20%
Nov-14	21.068	0.62%	8282.7	-3.56%
Dec-14	21.198	0.62%	8808.9	6.35%
Jan-15	21.328	0.61%	8844.6	0.41%
Feb-15	21.458	0.61%	8491	-4.00%
Mar-15	21.589	0.61%	8181.5	-3.65%
Apr-15	21.719	0.60%	8433.65	3.08%
May-15	21.928	0.96%	8368.5	-0.77%
Jun-15	22.058	0.59%	8532.85	1.96%
Jul-15	22.121	0.29%	7948.95	-6.84%
Aug-15	20.724	-6.32%	7948.9	0.00%
Sep-15	20.563	-0.78%	8065.8	1.47%
Oct-15	20.766	0.99%	7935.25	-1.62%
Nov-15	20.39	-1.81%	7946.35	0.14%
Dec-15	20.326	-0.31%	7436.15	-6.42%
Jan-16	19.491	-4.11%	6987.05	-6.04%
Feb-16	18.206	-6.59%	7738.4	10.75%
Mar-16	19.776	8.62%	7849.8	1.44%
Apr-16	20.032	1.29%	8160.1	3.95%
May-16	19.987	-0.22%	8287.75	1.56%
Jun-16	20.975	4.94%	8638.5	4.23%
Jul-16	21.873	4.28%	8786.2	1.71%
Aug-16	22.387	2.35%	8611.15	-1.99%
Sep-16	22.081	-1.37%	8638	0.31%
Oct-16	22.469	1.76%	8224.5	-4.79%
Nov-16	21.374	-4.87%	8185.8	-0.47%
Dec-16	21.094	-1.31%	8561.3	4.59%
Jan-17	22.685	7.54%	8879.6	3.72%
Mean		1.06%		0.92%

The risk-free rate has been calculated using the 10-year Indian government bond rate which was found to be 7.8% annually. For the monthly data analysis, monthly risk free rate was calculated as:

r_f = 7.8% /12 = 0.65% or 0.0065

The covariance of the returns of the portfolio with that of the Nifty was calculated in Excel using COVAR function *(=COVAR (C3:C62, E3:E62))*, which came out to be negligibly negative. Similarly, the variance and standard deviation of the portfolio was calculated using VAR *(=VAR (C3:C62))* and STDEV *(=STDEV (C3:C62))* functions.

The Beta coefficient of the portfolio was found to be negative. It was calculated as: β = Covariance (portfolio return, market return)/Variance of portfolio return

= - 0.00002/0.002

= - 0.015

The Sharpe Ratio was calculated using the formula:

Sharpe Ratio = (return of portfolio – risk free return)/standard deviation of the portfolio

= (0.0106 – 0.0065)/0.041

= 0.101

 The Trenor ratio was calculated using the formula:

Trenor Ratio = (return of the portfolio – risk free return)/ Beta coefficient of the portfolio

= (0.0106 – 0.0065) / (-0.015)

= -0.278

Further, the Jenson Alpha was calculated using the Modern Portfolio Theory(MPT), which is an application of the Capital Asset Pricing Model(CAPM). The Jenson Alpha is given by:

$\alpha = r_p - \{ r_f + \beta * (r_m - r_f) \}$

= 0.0106 – {0.0065 + (-0.015) * (0.0092 – 0.0065)}

= 0.004

Information Ratio is calculated as the ratio of returns of the portfolio above the returns of Nifty to the volatility of those returns. The information ratio (IR) measures a portfolio manager's ability to generate excess returns relative to a benchmark but also attempts to identify the consistency of the investor.

Where,

$$\text{Information Ratio} = \frac{(R_p - R_i)}{S_{p-i}}$$

$S_{p-i}$is the tracking error (standard deviation of the difference between returns of the portfolio and the returns of the index)

Tracking error is given as:

$$TE = \sqrt{\frac{\sum_{t=1}^{n}(R_r - R_s)^2}{N-1}}$$

Where:
TE = Tracking Error
R_p = Return of Manager or Fund
R_s = Return of Benchmark
N = Number of Return Periods

Tracking Error = SQRT (0.2012, (60-1)

= 0.058 or 5.8%

Information ratio = (0.0106 – 0.0092)/0.058

 = 0.024

Marketcaptureratiowascalculatedbycomputingthepercentageofreturnstheportfolio   is generating with respect to the market returns. It is given bythe formula:

Market capture ratio = (Portfolio Return/Market Return) *100

= (0.0106/0.0092) *100

= 115.22

Batting Average tells the number of times the manager of the fund has outperformed the market. It is computed by dividing the number of days (or months, quarters, etc.) in which the manager beats or matches the Nifty Index by the total number of days (or months, quarters, etc.) in the period of question and multiplying that factor by 100.

Batting Average = (28/60) *100 = 46.67%

Therefore, from the calculations we get the following values of the risk parameters:

Table 7 Results

Co-variance	-0.00002
Variance	0.002
Standard deviation	0.041
Beta	-0.015
Jenson Alpha	0.004
Correlation	-0.015
Sharpe Ratio	0.101
Trenor Ratio	-0.278
Information Ratio	0.024
Tracking Error	0.058
Market capture ratio	115.22
Batting Average	46.67%

Ascatterdiagramwithportfolioreturnandmarketreturnisplottedbelow.Thelineofbest fitishigh lighted as a purple line, which is represented by the linear relationship:

$$y = \alpha + \beta x = 0.004 + (-0.015) x$$
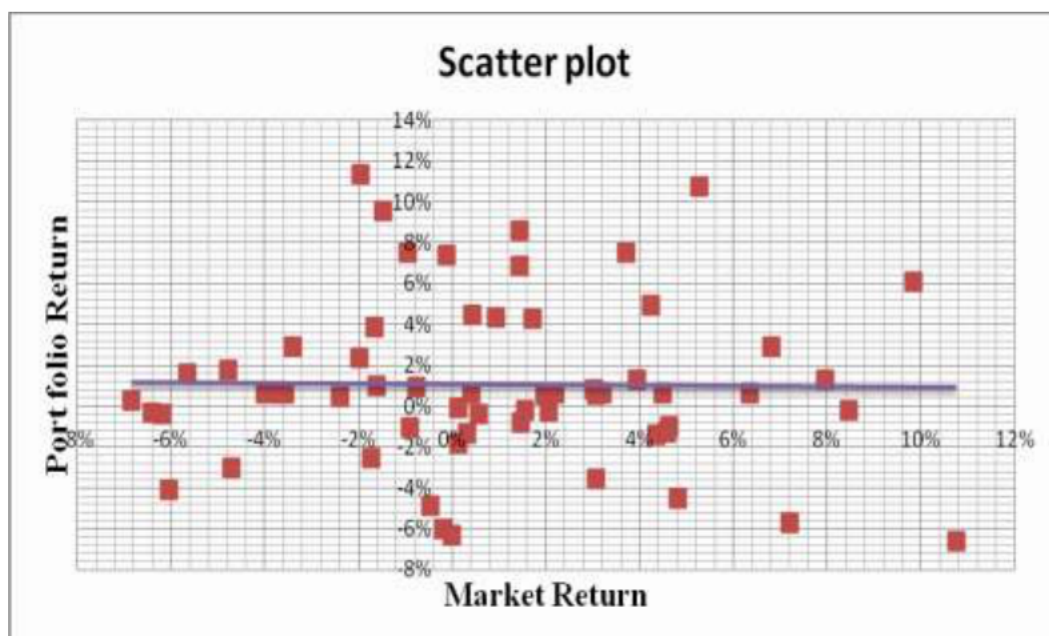
Figure 13 Scatter plot of market return vs portfolio return

Solvency Ratio requirement for the insurance companies in India is 150% of their gross liabilities. IDBI Federal Life Insurance has been consistently maintaining a high solvency which signifies that the firm is in a robust position to cover up all its risks.

Actual solvency details vis-a vis the required margin

Item	2016	2015	2014
Available solvency margin Rs. crores	624.76	609.3	453.4
Required solvency margin Rs. crores	153.78	120.3	96.1
Solvency ratio	406%	507%	472%
Required solvency ratio	150%	150%	150%

Figure 14: Solvency details

The liquidity position of the company tells that the company is a cash rich firm with its current liabilities about one-tenth of its cash and bank balances.

A regression analysis was also performed on the 5 year monthly historical data of portfolio returns of equity growth fund of IDBI Federal and market returns. Below is the summary:

Table 7 Regression results

Regression Statistics				
Multiple R	0.0148838			
R Square	0.0002215			
Adjusted R	-0.017016			
Square				
Standard Error	0.0411313			
Observation	60			
ANOVA				
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	2.1742E-05	2.17E-05	0.0128 51	0.910133142
Residual	58	0.098123864	0.001692		
Total	59	0.098145606			

5. RESULTS & INTERPRETATIONS

The questionnaire survey found that the demand for wealth creation products with guaranteed returns is on a rise. The following are few other interpretations of the survey:

- Although about 50% of the households had an annual income of more than Rs. 10 lakhs, two-thirds of the respondents are not sufficiently covered as per their human life value.

- 80% of the respondents were from the age group of 20-30 years but it is alarming to knowthat40%oftherespondentsdonothavealifecoveryet.

- The subtle fact that 60% of respondents already had a life cover and only 30% of respondents had direct dependents indicates that gone are the days when sense of responsibility used to trigger buying insurance. Today, insurance has become an investment in oneself to give beneficial returns in future (as survival benefit) or protection (in case ofmiss-happenings)

- Two-thirds of the families spend more than Rs. 50,000 monthly and about 50% of the respondents save more than Rs. 10,000 monthly. With rising incomes, people will tend to spend more and this presents a favourable opportunity for insurance.

The face-to-face discussions and telephonic interviews conducted found that there is suspicion of loss with regard to insurance products among the clientele. This lack of confidence in transferring the risks to the insurer may be because of heard opinions as word- of-mouth from friends and relatives or due to limited know-how about the insurance mechanism.Thefirstconcernoftheinsuredistoaskthereturnhe'llbegettingatvarious stages of the term under different situations. Secondly, the immediate question in most of the cases is the amount of risk involved. Discussions also resulted in assessing the risk profiles of the prospects and appropriately explaining the products and asset classes suitable to him/her. While underwriting, many were curious about the claim settlement ratio of IDBI Federal but the primary underwriter's primary task is informing prospects about avoiding misrepresentationorfalseinformationsothatundueriskfinancingdoesnottakeplace.

Beta coefficient calculated by regressing the portfolio returns against the returns of the benchmark Nifty50 Index. The value of -0.015 signifies the systematic risk or the market risk

associated with the returns of the portfolio of equity growth fund of IDBI Federal. In this case the beta is negative, indicating that with increase in market returns by 1 unit there is a marginal drop in portfolio return by 0.015units.

The Jenson Alpha is calculated using the modern portfolio theory, which is an application of the capital asset pricing model (CAPM). Jenson Alpha of 0.004 implies that there is very less chance that there will be unexplained factors will contribute to abnormal returns of the portfolio and therefore it has higher return than the risk-adjusted returns.

The Sharpe ratio tells about more than expected return that can be generated per unit of the total risk undertaken. A Sharpe ratio of 10% reflects that the premium charged on the sum-assured is the risk-adjusted value per unit of the total risk represented by the standard deviation of the portfolio.

The Trenor ratio tells about more than expected return that can be generated per unit of the market risk that has been transferred. A negative trenor ratio of 0.28 indicates that the fund manager has outperformed the risk free rate while reducing systematic risk (negative Beta) which is a favorable situation.

An Information ratio of 0.024 means a manager can achieve higher returns more consistently and there is less volatility of in the portfolio returns. This ratio measures the consistency of an investment's performance, while the Sharpe ratio measures how much an investment portfolio outperformed the risk-free rate of return on a risk-adjusted basis.

The tracking error gives investors a sense of how "tight" the portfolio in question is around its benchmark or how volatile the portfolio is relative to its benchmark. It suggests that the fund manager took on greater risk. This is not always what the investors of the fund want, and therefore tracking error is in some ways a measure of excess risk. A tracking error of 0.058 signifies that the risk adjusted error of the deviation between portfolio return and market return has been minimized.

Market capture ratio of 115.22 indicates that the fund manager has outperformed the market by 15.22% during the period 2012-2017. The batting average of 46.67% tells that during these 5 years, the fund manager has outperformed the market 46.67% of the times.

The R-squared estimate of 0.0002 tells that there is very less co-relation between market volatility and the portfolio returns. The portfolio returns during the period 2012-17 is not explained appropriately by the market returns. This is corroborated by the Significance of F which indicates that the probability that the regression output could have been obtained by chance is as high as 91%. Therefore, the portfolio returns are almost independent of market returns thereby involving a high amount of risk for the fund managers to take to provide better returns.

The Alpha and Beta of assets with R-squared figures below 50 are thought to be unreliable because the assets are not correlated enough to make a worthwhile comparison. A low R-squared or Beta does not necessarily make an investment a poor choice. It merely means that its performance is statistically unrelated to its benchmark i.e. Nifty50 Index in this case.

6. RECOMMENDATIONS

Focus should be on better identification of customer attitudes and behaviour in a particular business environment towards insurance that will enable the distribution network to tap newer markets. Tight measures should be taken so that miss-selling is avoided.

Although IDBI Federal's products are more beneficial for long-term investments and for people with greater tax liability, it must design products to also cater to the lower rungs of the society who face greater risks than the affluent ones. Product innovation and user- friendly technology must be sensitive to the changing business environment. They should invest in

research and development to make new products by correctly gauging consumer's needs to sustain competitiveness in this highly competitive industry.

Unavailability of monthly savings option eludes many prospects towards competitors. Inspite of the fact that IDBI Federal stopped the monthly payment schemes due to its higher rate of lapses and fall in renewal premiums, new products can be designed with regular monthly saving option with a rider that will serve as a disincentive to lapse the policy.

Rather than enhancing the number of premiums per unit of the gross domestic product measured by the insurance density, focus must be to concentrate on the premiums collected per capita because as the income levels will rise in future, it will emerge as the real measure of insurance penetration

Business analytics software and services will help insurers meet solvency regulations by implementing an enterprise data management platform that will combine asset and liability data from operational applications across all different lines of business, cleanse and transform that data into a consolidated enterprise view.

A framework for analyzing risks in Indian Insurance Industry needs to be developed according to the risk profiles of different firms in the sector. Their sensitivity to different risks can be estimated using this framework. This can be used as a tool by investors to make investment decisions and by managers to take risk mitigating actions.

7. LIMITATIONS & FUTURE SCOPE FOR RESEARCH

- The study went for an attitudinal survey but did not get into the psychometrics of various insurance products and various risk perceptions related to it. It did not take into account how charges involved, namely policy allocation charges, fund management charges etc., are arrived at after risk-adjustment.

- The study restricted itself to a particular type of fund, i.e. the equity growth fund. It did not explore the risk adjustment in other types of funds to match the risk appetite of the clientele.

- The study did not go into a comparative analysis of risk measures across major players of the Indian insurance industry and develop risk profiling of insurance firms.

- The study did not explore the risk-rating framework for different types of insurance products in the market today.

The research takes into account one of the equity funds of life insurance segment in Indian insurance sector. Thus, the results can be sub sector specific. The inability to incorporate all relevant risks into the model could limit its effectiveness in representing a true risk profile. A potential data limitation prevented from exploring the value-at-risk (VaR). Future researchers may choose to develop a model for different types of unit-linked funds of insurance companies which have high interdependencies and thus impact the economy in a major way. The study of risks in different companies in this sector and their comparison is another important research area which can be undertaken.

8. CONCLUSION

The fundamental objective of any risk management discipline is to anticipate future threats and prevent or at least minimize potential losses. Risk management is already a core function of insurance companies since, unlike most other industries; carriers are in the business of assessing and covering potential worst-case scenarios. Indeed, to cope with the increasingly complex business environment, insurers have continued to enhance their internal risk management practices by incorporating more sophisticated data-analysis tools and technologies to better support underwriting, pricing, and claims management, as well as to hedge investment risks.

Indian Life insurance sector is growing at a faster rate. This sun rising industry has given a platform for economic growth and employment. The great extent of importance was realized after it has opened to the private players in the post liberalization period. With many players in business, the insurance regulatory and development authority came with innovative and constructive guidelines for both products and services.

It was a period where companies were getting major revenue out of their flagship Unit linked policies. During that time, both technology and investment knowledge were the key to success. Not only it was tough to convert from traditional to Unit linked products but also it was a challenge to keep the profitability. Customer preference, stiff competition and regulatory control are acting as catalyst for innovative products and services. When the policy is procured through advisors, internal marketing and motivation to them cannot be avoided. Also claim management along with new policies procurement need a viable and robust system.

The core business of insurance is managing and carrying risk – transferring risk from policyholders to insurers through the underwriting process. But the insurer's other risks – market, credit, operational, liquidity risk and so on – must also be managed effectively. All of these risks should be managed through an enterprise-wide framework that allows the insurer to identify, measure, manage, report and monitor risks, and then adjust the company's risk profile in line with its business objectives and risk appetite. There must be clear governance so that everyone – from the supervisory board and executive management through to heads of business and compliance – knows what their responsibilities and reporting lines are.

Life insurance business in India needs a special care as compared to other business. Understanding the customer expectation and attitude for this product is most important. There is time to re-engineer the business model. Effective enterprise risk management is about embedding risk management into everyday processes at all levels of the organization. To achieve this, it requires unified, quantitative software that can provide integrated, comprehensive data management; powerful predictive analytics; user-friendly self-service reporting; and a transparent environment that lets the risk professionals manage the entire process.

APPENDIX

The following is the survey questionnaire for the study that was conducted:

"Your Money, Your Choice"

This survey aims to analyse financial needs to provide financial solutions. Start investing in your family future today !!!

* Required

1. Email address *

_____

2. Name (optional)

_____

3. Age *
Mark only one oval.

- ⚪ < 20 years
- ⚪ 20-25 years
- ⚪ 25-30 years
- ⚪ 30-35 years
- ⚪ 35-40 years
- ⚪ > 40 years

4. Number of Dependents *

Mark only one oval.

- ⬭ 0
- ⬭ 1
- ⬭ 2
- ⬭ 3
- ⬭ 4
- ⬭ 5
- ⬭ More than 5

5. Annual Income of family (In Rs.) *

Mark only one oval.

- ⬭ < 5 Lakhs
- ⬭ 5 Lakhs - 10 Lakhs
- ⬭ 10 Lakhs - 15 Lakhs
- ⬭ 15 Lakhs - 20 lakhs
- ⬭ > 20 lakhs

6. What are your financial goals *

Check all that apply.

- ☐ Protection
- ☐ Wealth creation
- ☐ Regular savings
- ☐ Child's secure future
- ☐ Goal based savings like car, home, international travel etc
- ☐ Other: _____

7. While planning for these goals, what would you need as the financial solution? *
Check all that apply:

☐ Regular money back at important milestones

☐ Lump sum returns

☐ Benefits to family if I'm not around

☐ Tax benefits

☐ Guaranteed returns

☐ High insurance cover

☐ Other: _____

8. Family's monthly expenses (In Rs.) *
Mark only one oval.

◯ < 25,000

◯ 25,000-50,000

◯ 50,000-75,000

◯ 75,000-1,00,000

◯ > 1,00,000

9. Your monthly savings (In Rs.) *
Mark only one oval.

◯ < 10,000

◯ 10,000-30,000

◯ 30,000-50,000

◯ 50,000-80,000

◯ > 80,000

10. Do you already have a life insurance cover? *
Mark only one oval.

◯ Yes

◯ No

11. If yes, how much of an insurance cover you already have?
Mark only one oval.

◯ < 25 Lakhs

◯ 25 lakhs - 50 Lakhs

◯ 50 Lakhs - 75 Lakhs

◯ 75 lakhs - 1 Crore

◯ 1 Crore - 2 Crores

◯ > 2 Crores

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