

THE IDEAL VALUE OF SUM ASSURED

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Abstract: *The article discusses the concept and methodology of How to decide the Ideal Value of Sum Assured of Life Insurance of a Person. Insurance is an instrument by which a company or the state undertakes to provide a guaranty of compensation for specified loss, damage, illness, or death in return for the payment of a specified premium. Human life is priceless. No one can cultivate the life by the virtue of Money. However, Insurance is the tool of Social Security. The Insurance Sector does not have any specific formula to decide the Sum Assured Value. The Insurance Companies are using their own beliefs that do not land under the canvas of Economics. There are so many factors & elements are associated with Economics that could be used to decide the Sum Assured Value of a Life Insurance Policy. The newly developed mathematical formula can produce The Ideal Value of Sum Assured for the entire world & for respective countries. It has been using all the beliefs & conditions that are mostly applicable in the Insurance Sector. This formula advocates that why Women have Low Premium as compare to their Male counterparts when all the circumstances are the same. This formula is Universal, Gender Unbiased & Dynamic.*

Key Words: *G22 Insurance, D31 Income, E31 Inflation, J17 Value of Life, Life Expectancy, Sum Assured, Maturity.*

1. INTRODUCTION:

Insurance is an instrument by which a company or the state undertakes to provide a guarantee of compensation for specified loss, damage, illness, or death in return for the payment of a specified premium. Insurance is protecting against a possible eventuality. It is a tool of Social Security. The idea behind the Insurance is that the compensation should not lead to a monetary benefit to the Insured and the only amount that is equal to the actual loss suffered should be paid. Therefore, it may be very hard to decide the Right Amount of Sum Assured.

The **Sum Assured** is the amount payable on the occurrence of an event insured against under a benefit policy, such as the death of the insured. In the event of unfortunate death before the Maturity of a Life Insurance Policy, Nominee will receive 100% of the sum assured amount.

Maturity Amount is the amount payable after the Maturity of a Life Insurance Policy when the insured is alive. It would be equal to the Sum Assured + Bonus Amounts, which have been received throughout the policy term + any Final Addition Bonus if declared.

Human life is priceless. No one can cultivate the life by the virtue of Money. Many Economists are trying to find the Value of Human Life. As of 2011, the US Environmental Protection Agency set the value of human life at \$9.1 million. Meanwhile, the US Food and Drug Administration put it at \$7.9 million and the US Department of Transportation figure was around \$6 million.

The Insurance Companies cannot use the above values of human life because the Amounts are very huge & Most of the people cannot afford their Premium. Currently, there is no any specific formula is available to decide the Sum Assured Amount for all over the world.

The sum assured depends upon the income of the person and typically a maximum of up to 10 times of the annual income is allowed as the Sum Assured Value in current trend of the Insurance Sector.

Most of the insurance companies are deciding the Sum Assured amount based on the premium paid. It sounds better but not the best. Here we have only use the monetary capacity of insured. If the Insured Person can manage the high rate of premium than all the circumstances will dramatically change.

The other method is count the entire monetary liability of any Insurance buyer. It is also a good solution but Economics does not believe on the Family Responsibility because Economics treated Human as an Asset. The monetary liability

of any Insured may be very high or very low. The insurance companies may not be willing to serve the very high Sum Assured amount when the insured age is high or he/she is a member of low Income group because here the associated Risk Factor may be very high & the situation seems like a gamble.

Sum assured, if computed in terms of expenses, should be at least 12-15 times the annual expenses with debt obligations, such as a home loan, also accounted for.

Here is the example of different Factors that are use by Insurance Companies to decide the Ideal Sum Assured of any Insured Person.

1. Regular Household Expenses: The sum assured should ideally be 15-20 times your annual household expenses, as a general thumb rule depending upon the tenure of your policy as well as the number of years you are expected to remain in the workforce.
2. Current/Future Income & Inflation: This is particularly relevant for single income households. In such cases, it is crucial to account for expected increases in their salary, particularly increments due to inflation as it can create significant increases to the expected household expenditure.
3. Existing Assets, Debts & Liabilities: Listing off all assets such as securities, investments, property, vehicles, fixed deposits or mutual funds and balancing them with current liabilities such as debts, loans, mortgages etc. will allow you to include these onetime expenses and ensure that there are no unaccounted financial burdens left on your family's income after the death benefit is paid out.
4. Tenure: Picking an appropriate tenure is vital in relation to the number of years the policyholder is expected to remain in the workforce and draw a steady source of income.
5. Funds For Future One Time Expenses: Savings for onetime expenses in the future such as your children's higher education or weddings may also be a point of consideration.
6. Retirement Fund For Spouse/ Dependents: Insurance coverage should also include funds for the retirement of your spouse/ageing parents and young children if they are not earning, in order for them to enjoy a similar, comfortable lifestyle even after the policyholder's death.
7. Accidents & Illnesses: Accidental disability/incapacitation or any pre-existing or hereditary illnesses should also be consider as there is also a possibility of such events making the family's revenue stream sundry.

Due to lacking of universal formula, Insurance Companies are offering the services according to their own beliefs. This system is not up to the marks & should be avoidable. Therefore, it is most relevant to we have a Universal, Gender Unbiased & Dynamic formula for deciding The Ideal Value of Sum Assured. We could understand that the Sum Assured should be different for two different people due to their Origin, Current Age, Terms of Year, Maturity Age and Annual Income.

2. RESEARCH METHODOLOGY:

We are using the Hypothetical Testing Method to produce the result. Therefore, we make some Assumptions followed by Beliefs & Conditions that are mostly applicable in the Insurance Industry to fix the goal. To found out the Ideal value of Sum Assured I will try to develop a Formula that must follow and fulfill all the Assumptions taken in this calculation.

2.1 ASSUMPTION:

1. Sum Assured Value should be equal to the Economic Value of the Insured.
2. All the Insured have good Health, Habits & free from Hazards Works. Their additional Risk Factor is Zero.
3. Life Expectancy will decide the Rate of Risk. The Risk Factor will gradually increase when Assured Age is going nearer & beyond to Life Expectancy of the Nation where Insured lives.
4. Insured from a country of high inflation rate required high Sum Assured limit due to instability of the Economy.
5. Females have Low Risk Factor as compare to their Males counterpart due to High Life Expectancy when all the circumstances are same.

2.2 BELIEFS & CONDITIONS:

We have required a formula that must follow the following Conditions:-

1. It should depend on the Terms of the Insured Year.
2. It should depend on the Current Age of Insured.
3. It should depend on Annual Income.
4. It should depend on Geographical Boundaries because the Insurance Sector is highly influenced by Political & Geographical forces like – Health, Life Expectancy, etc.
5. It should not be Gender biased because Insurance Sector has low Premium for Female Insurer.
6. The World Population can Pay the Premium for that Sum Assured Limit.
7. Sum Assured Amount should be higher when the Current Age is low.
8. Sum Assured Amount should be purposely increasing with increment in terms of the year.
9. The Sum Assured Amount should be gradual decreases with increment in Secured Age.
10. When the Risk is high, the Sum Assured Amount should be Low and when the Risk is Low, the Sum Assured Amount should be High.
11. It must comply with the Term-end Plan. Term-end Plan is the actual method of Insurance Policy.
12. It must be Dynamic & Showing Chances according to chances in associated factors.

3. ANALYSIS:

We all of us know that when we are going to ensure any object, we need the economic value of that object. The Economic Value represents the maximum amount of money an agent is willing and able to pay for a good or service. Human Life is priceless. However, we can now decide the Economic Value of a Person.

Therefore, it is better to use the economic value of the Insured Person to decide the Ideal Value of Sum Assured.

Let us produce a Hypothetical Formula that can fulfill the entire requirements.

For this, First I borrow the formula of The Economic Value of a Person.

(This formula is published in my previous work under the Title of “**The Economic Value of a Person**” in **International Journal For Innovative Research In Multidisciplinary Field – IJIRMF**)
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DOIs:[10.2015/IJIRMF.2455.0620/202005031](https://doi.org/10.2015/IJIRMF.2455.0620/202005031)

ECONOMIC VALUE OF A PERSON = (LOG $\sqrt{\text{LIFE EXPECTANCY}}$ – LOG $\sqrt{\text{CURRENT AGE}}$) \times ANNUAL INCOME \times REMAINING YEARS OF WORK \times INFLATION.

It produces the Economic Value of a Person at Present Scenario.

Here,

- Life Expectancy is the Life Expectancy of a related Country where the Person is working.
- Current Age is the Person's Current Age.
- Annual Income is the Person's Annual Income.
- Remaining Years of work is the duration of Worker willing to work.
- Inflation is the Annual Average Rate of Inflation in the country in Quantitative form. i.e. 4, 6.5, 7, 7.4, 8 ...

Examples :-

1. A 32 Years old Indian Male worker is currently earning 10 Thousand dollars annually. He is willing to work until 62 years of age. How much is the Economic value of that worker according to Annual Inflation Rate of the world in Year 2020 ?

(The Annual Inflation Rate of the world is 3% & Life Expectancy of Male in India is 69 Years.)

$$(\log\sqrt{69} - \log\sqrt{32}) \times 10000 \times 30 \times 3.6 = 0.16685 \times 1080000 = \$ 150,165/-$$

2. A 32 Years old Indian Male worker is currently earning 10 Thousand dollars annually. He is willing to work until 62 years of age. How much is the Economic value of that worker according to Annual Inflation Rate of India in Year 2020 ?
 (The Average Inflation Rate of the world is 3% & Life Expectancy of Male in India is 69 Years.)

$$(\log\sqrt{69} - \log\sqrt{32}) \times 10000 \times 30 \times 4.1 = 0.16685 \times 1230000 = \$ 205,225/-$$

Now, **we make Two Modifications in the above formula to produce the Ideal value of Sum Assured according to the requirement of the Insurance Sector.**

- (1) We have changed the “Remaining Years of Work” element into “Terms of Year”. Because, We have only required the Economic Value of Insured Period.
- (2) We have multiplied the entire figure with a Ratio between Life Expectancy & Sum Assured Age. This Ratio represents the Risk Factor & plays a vital role.

IDEAL VALUE OF SUM ASSURED = (LOG √ LIFE EXPECTANCY – LOG √ INSURED AGE) × ANNUAL INCOME × INFLATION × TERMS OF YEAR × RATIO BETWEEN LIFE EXPECTANCY & MATURITY AGE.

Here,

- Life Expectancy is the Life Expectancy of a Country where the Insured is living.
- Insured Age is the Current Age when Insured Person bought the Insurance Policy.
- Annual Income is the Insured’s Annual Income.
- Inflation is the Annual Average Rate of Inflation of the country where Insured Person bought an Insurance Policy in Quantitative form. i.e. – 4, 6.5, 7, 7.4, 8 ...
- Terms of Year are the value of the Insured Period.
- Maturity Age is the Age until the Insured enjoys the insurance benefits.

It produces The Ideal Value of Sum Assured at Present Scenario.

We can use this Formula in two different forms.

- (1) We can find the Ideal Value of a Sum Assured for the entire world by using the Annual Inflation Rate of the world, whereas other factors are associated with the respective countries. We can use this method to compare the person from different countries on a single scale. Here we take only the Annual Inflation Rate of the world because when we take Average Life Expectancy of the world also, The Ideal Value of a Sum Assured from all over the world will be the same.
- (2) We can find The Ideal Value of Sum Assured for a particular country by using the Average Inflation Rate of a particular country where other factors are also associated with that country. We use this method to know that how much Value of Sum Assured is Ideal for a particular person for the respective country.

4. EXAMPLE:

(1) The Ideal Value of Sum Assured for the entire world according to Annual Inflation Rate of the World.

We take an example of 25 years old Man, who is interested to purchase a 30 Years Term-end Plan. His Annual Income is \$25000. In this case, How much is the Ideal Value of Sum Assured for entire world?

(Life Expectancy in India is 69, in the USA is 77, in China is 75, in South Africa is 61, in the United Kingdom is 83, in Australia is 82 respectively in 2020.) and (World Annual Average Rate of Inflation in 2020 is 3%)

$$\begin{aligned} \text{Ideal Value of Sum Assured (INDIA)} &= (\log\sqrt{69} - \log\sqrt{25}) \times 25000 \times 30 \times 3 \times (69 \div 55) = \$ 622,283/- \\ \text{Ideal Value of Sum Assured (USA)} &= (\log\sqrt{77} - \log\sqrt{25}) \times 25000 \times 30 \times 3 \times (77 \div 55) = \$ 769,467/- \end{aligned}$$

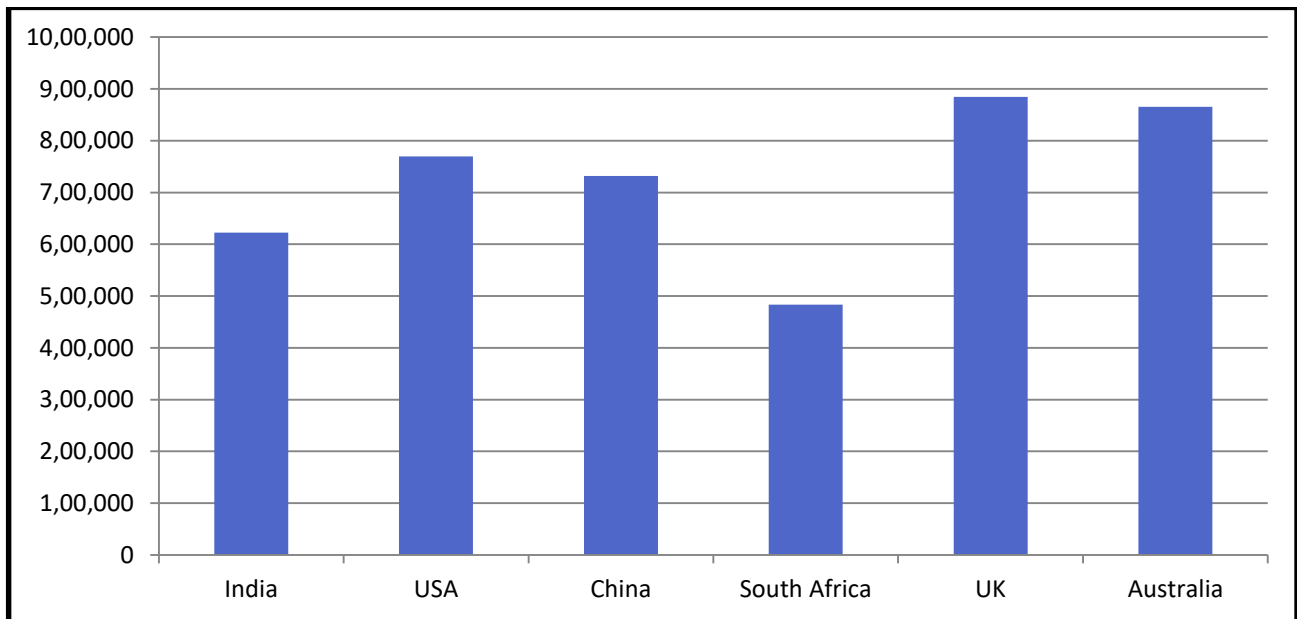
$$\text{Ideal Value of Sum Assured (CHINA)} = (\log\sqrt{75} - \log\sqrt{25}) \times 25000 \times 30 \times 3 \times (75 \div 55) = \$ 731,947/-$$

$$\text{Ideal Value of Sum Assured (SOUTH AFRICA)} = (\log\sqrt{61} - \log\sqrt{25}) \times 25000 \times 30 \times 3 \times (61 \div 55) = \$ 483,357/-$$

$$\text{Ideal Value of Sum Assured (UNITED KINGDOM)} = (\log\sqrt{83} - \log\sqrt{25}) \times 25000 \times 30 \times 3 \times (83 \div 55) = \$ 884,750/-$$

$$\text{Ideal Value of Sum Assured (AUSTRALIA)} = (\log\sqrt{82} - \log\sqrt{25}) \times 25000 \times 30 \times 3 \times (82 \div 55) = \$ 865,261/-$$

For making a comparison, We put these values in a Graph. Graph is as follow



The Ideal Value of Sum Assured for different countries

(2) The Ideal Value of Sum Assured is calculating here for the different countries according to their Annual Inflation Rate.

- (1) A 30 years old Man from India, is interested to purchase a 30 Years Term-end Plan. His Annual Income is \$10000. In this case, How much is the Ideal Value of Sum Assured ? (Life Expectancy of India for Male is 69 Years & Average Rate of Inflation is 4.1% annually in 2020.)

$$\text{Ideal Value of Sum Assured} = (\log\sqrt{69} - \log\sqrt{30}) \times 10000 \times 4.1 \times 30 \times (69 \div 60) \approx \$ 255832.$$

- (2) A 40 years old Woman from India, is interested to purchase a 30 Years Term-end Plan. His Annual Income is \$10000. In this case, How much is the Ideal Value of Sum Assured ? (Life Expectancy of India for Female is 72 Years & Average Rate of Inflation is 4.1% annually in 2020.)

$$\text{Ideal Value of Sum Assured} = (\log\sqrt{72} - \log\sqrt{40}) \times 10000 \times 4.1 \times 30 \times (72 \div 70) \approx \$ 161478.$$

- (3) A 20 years old Man from India, is interested to purchase a 30 Years Term-end Plan. His Annual Income is \$10000. In this case, How much is the Ideal Value of Sum Assured ? (Life Expectancy of India for Male is 69 Years & Average Rate of Inflation is 4.1% annually in 2020.)

$$\text{Ideal Value of Sum Assured} = (\log\sqrt{69} - \log\sqrt{20}) \times 10000 \times 4.1 \times 30 \times (69 \div 50) \approx \$ 456447.$$

- (4) A 25 years old Man from USA, is interested to purchase a 30 Years Term-end Plan. His Annual Income is \$60000. In this case, How much is the Ideal Value of Sum Assured ? (Life Expectancy of USA for Male is 76 Years & Average Rate of Inflation is 2.3% annually in 2020.)

$$\text{Ideal Value of Sum Assured} = (\log\sqrt{76} - \log\sqrt{25}) \times 60000 \times 2.3 \times 30 \times (76 \div 55) \approx \$ 1381194.$$

- (5) A 35 years old Man from China, is interested to purchase a 30 Years Term-end Plan. His Annual Income is \$40000. In this case, How much is the Ideal Value of Sum Assured ? (Life Expectancy of China for Male is 75 Years & Average Rate of Inflation is 2.4% annually in 2020.)

$$\text{Ideal Value of Sum Assured} = (\log\sqrt{75} - \log\sqrt{35}) \times 100000 \times 2.4 \times 30 \times (75 \div 65) \approx \$ 549958.$$

- (6) A 35 years old Woman from Russia, is interested to purchase a 35 Years Term-end Plan. His Annual Income is \$40000. In this case, How much is the Ideal Value of Sum Assured ? (Life Expectancy of Russia for Female is 78 Years & Average Rate of Inflation is 3.5% annually in 2020.)

$$\text{Ideal Value of Sum Assured} = (\log\sqrt{78} - \log\sqrt{35}) \times 40000 \times 2.88 \times 35 \times (78 \div 70) \approx \$ 950112.$$

- (7) A 45 years old Man from UAE, is interested to purchase a 25 Years Term-end Plan. His Annual Income is \$50000. In this case, How much is the Ideal Value of Sum Assured ? (Life Expectancy of UAE for Male is 78 Years & Average Rate of Inflation is 1.2% annually in 2020.)

$$\text{Ideal Value of Sum Assured} = (\log\sqrt{78} - \log\sqrt{45}) \times 50000 \times 1.2 \times 25 \times (78 \div 70) \approx \$ 199637.$$

- (8) A 40 years old Man from South Africa, is interested to purchase a 20 Years Term-end Plan. His Annual Income is \$20000. In this case, How much is the Ideal Value of Sum Assured ? (Life Expectancy of South Africa for Male is 61 Years & Average Rate of Inflation is 5.2% annually in 2020.)

$$\text{Ideal Value of Sum Assured} = (\log\sqrt{61} - \log\sqrt{40}) \times 20000 \times 5.2 \times 20 \times (61 \div 60) \approx \$ 193777.$$

For making a Graph for comparison, We take an example of 25 years old Man, who is interested to purchase a 30 Years Term-end Plan. His Annual Income is \$25000. In this case, How much is the Ideal Value of Sum Assured when he is living in different Countries?

(Life Expectancy in India is 69, in the USA is 77, in China is 75, in South Africa is 61, in the United Kingdom is 83, in Australia is 82 respectively in the year 2020.)

(Annual Inflation Rate in India is 4.1, in the USA is 2.3, in China is 2.4, in South Africa is 5.2, in the United Kingdom is 1.9, in Australia is 1.8 respectively in the year 2020.)

$$\text{Ideal Value of Sum Assured (INDIA)} = (\log\sqrt{69} - \log\sqrt{25}) \times 25000 \times 30 \times 4.1 \times (69 \div 55) = \$ 850,453/-$$

$$\text{Ideal Value of Sum Assured (USA)} = (\log\sqrt{77} - \log\sqrt{25}) \times 25000 \times 30 \times 2.3 \times (77 \div 55) = \$ 589,925/-$$

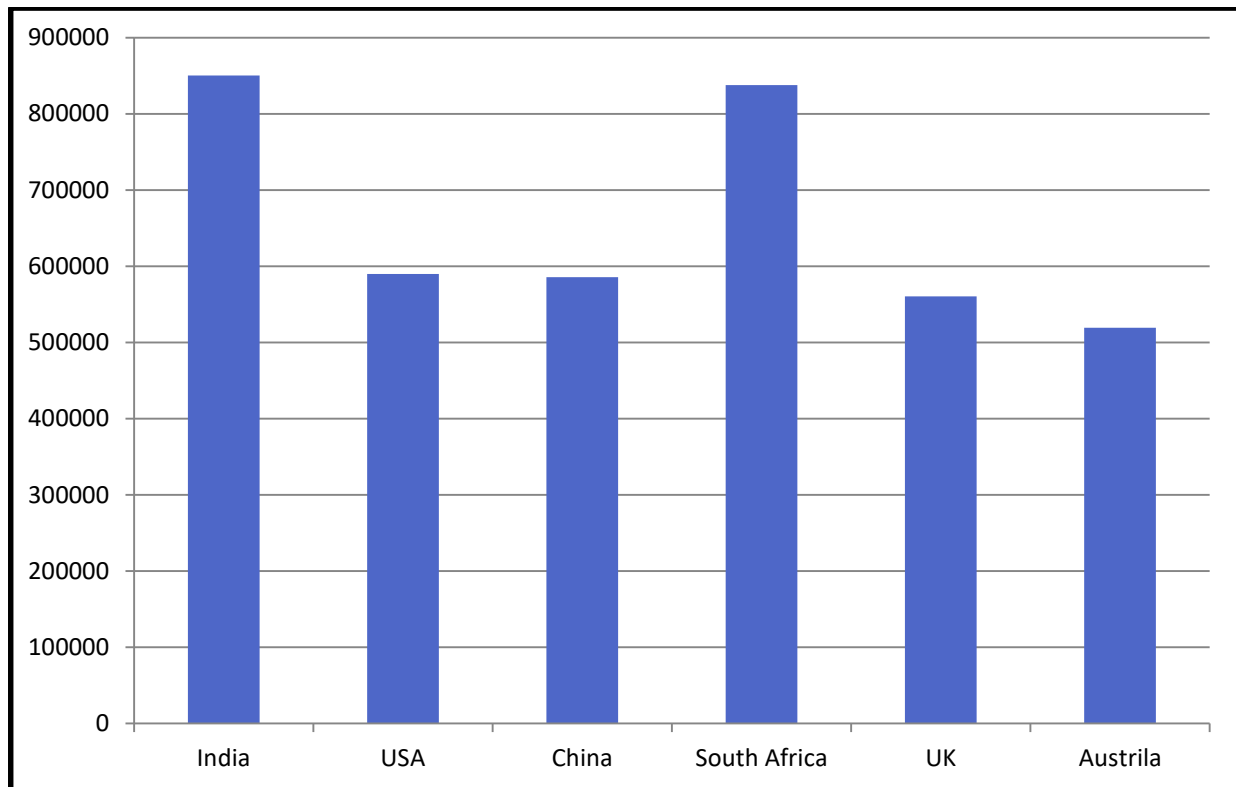
$$\text{Ideal Value of Sum Assured (CHINA)} = (\log\sqrt{75} - \log\sqrt{25}) \times 25000 \times 30 \times 2.4 \times (75 \div 55) = \$ 585,558/-$$

$$\text{Ideal Value of Sum Assured (SOUTH AFRICA)} = (\log\sqrt{61} - \log\sqrt{25}) \times 25000 \times 30 \times 5.2 \times (61 \div 55) = \$ 837,818/-$$

$$\text{Ideal Value of Sum Assured (UNITED KINGDOM)} = (\log\sqrt{83} - \log\sqrt{25}) \times 25000 \times 30 \times 1.9 \times (83 \div 55) = \$ 560,342/-$$

$$\text{Ideal Value of Sum Assured (AUSTRALIA)} = (\log\sqrt{82} - \log\sqrt{25}) \times 25000 \times 30 \times 1.8 \times (82 \div 55) = \$ 519,157/-$$

We put these values in a Graph. Graph is as follow



The Ideal Value of Sum Assured for Different Countries

5. APPLIED USES:

1. We can produce the Sum Assured Limit of any Insured from All over the World that may be highly efficient because it uses all of the factors that are applicable in the Insurance Industry. Any Insured can use this limit to maximize their satisfaction.
2. We can now compare the two insured on the ground of many other important factors like Life Expectancy, Annual Income, Current Age, Terms of Year & Insured Age.
3. We can now make the Graph on the ground of Life Expectancy, Annual Income, Current Age, Terms of Year & Sum Assured Age.
4. Insurance Companies use this Sum Assured Limit for any Insured to maximize their Goal & Business.
5. Any Government or Regulating Bodies can use this Sum Assured Limit to know the condition of the Insurance Sector in the country. If the maximum Population is unable to reach this limit, it means the Insurance Sector has been suffering from inadequate funds & has a better chance to grow.
6. We can now compare the two countries based on how much percentage of their population reached the Sum Assured Limit. We can also make the World index.

6. LIMITATIONS:

1. The Ideal Value of Sum Assured should be equal to The Economic Value of a Person. But, Here the formula produces some bit higher Amount. It is the reward of having low Maturity Age. When the Maturity Age is equal to the Life Expectancy than The Ideal Value of Sum Assured will equal to The Economic Value of a Person.
2. It is highly efficient for the Term-end Plan. The Endowment Plan may face some inefficiency because Premium Rate goes high.
3. It has only taken the Life Expectancy to measure the Risk Factor. It has a better scope to Add other Risk Factors based on Profession & Health.
4. It will not give the efficient result when the Insurance Companies are providing the Services on the bases of Family Wealth. But, This Chances are very Rare. Income from family wealth considered under the Annual Income of an Insured.

Special Notes: Here I have taken all the data for calculation published up to 1st May 2020. These data are mostly related to the duration of 2019 when was COVID-19 did not spread over the world. Due to the uncertainty of the COVID-19 pandemic world economy is suffering and lost its actual value of Growth Rate, Rate of Inflation, Life Expectancy and many other economical factors, the current data of 2020-2021 is not taken.

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