

2012 UNDERINSURANCE STUDY IN MALAYSIA

**Life Insurance Association of Malaysia
&
Universiti Kebangsaan Malaysia**

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1. Executive Summary

Mortality protection gap measures the extent to which families are underinsured following the death of the primary wage earner. The findings of this study suggest that many Malaysian households are substantially underinsured. Considerable size of the protection gap is worrying since many dependents may not be able to maintain a reasonable lifestyle in the event of the death of the primary breadwinner or they may even be driven into poverty.

This study examined potential mortality gap among working population of the country in 2012 who were either insured under life and medical insurance, or not insured. The average protection gap for families whose primary wage earner was covered by life and medical insurance was RM553, 000 per family. Families whose primary wage earner was covered by life policy only and not medical policy had a slightly higher gap, at RM642, 000 per family. The average protection gap for the group headed by breadwinner who was not covered by either life or medical insurance was largest, at about RM723, 000 per family. However, based on the assumption of this study that each household in Malaysia consists of 5 members (parents and 3 children), the average mortality gap for each member of a family was about RM100, 000 to RM150, 000. This amount is quite far from the per capita sum insured in Malaysia which is about RM34, 000. Thus, the findings of this study clearly suggest that purchasing life insurance can provide solutions to close the protection gap. In addition, an assumption was also made that the income of the household was generated by one primary breadwinner. The true extent of the protection gap may be smaller if the spouse of the primary breadwinner was also in employment.

The protection gap is further estimated according to the age group of the breadwinner. The families whose wage earner was between 26 to 55 years old had sizeable protection gap compared with other age groups. This is evident given that many breadwinners of this age group were typically at the phase when their financial obligations reached their peak in terms of dependents' support, mortgage repayment, savings creations and others. The study also found that the younger families whose

primary breadwinner was under 25 years old had a relatively high probability of being underinsured. This finding suggests that the purchase of insurance among individuals below the age of 25 is not encouraging enough although the premium rates for this age group would be relatively low. Proactive measures must be taken to increase insurance awareness among individuals of this age group to take advantage of the favorable premium rates. This study also found a fairly large proportion of families headed by a breadwinner above 55 years old and covered by life and medical insurance who had sufficient resources to maintain current standard of living in the event of death of the main breadwinner.

The results of this study are expected to provide an indicator for the industry to move forward in achieving the targeted penetration rate of 75% by 2020 under the Economic Transformation Plan. There exists a vast potential for growth in the life insurance market, in light of government support through incentives on tax relief for life insurance products as well as the changing socio-economic landscape and the liberalization measures undertaken to stimulate the growth of the insurance industry.

2. Introduction

For many individuals, the financial consequences from the premature death of the primary wage earner signify major personal loss exposure. As such, adequacy of life insurance coverage provides an excellent opportunity to deal with this loss exposure.

The uses of life insurance have been highlighted in one's personal financial planning as income replacement, debt repayment, savings creation and wealth replacement, among others.¹ The Chartered Life Underwriters (CLU) states that the objective of mortality protection (i.e. life insurance protection) is to maintain the current living standard of dependents upon the death of the main wage earner.² Mortality protection gap quantifies the extent to which families are insufficiently covered, or underinsured, in the event of the death of the primary breadwinner.

Life insurance offers a relatively low-cost solution to close mortality gap. Closing mortality gap allows the insurance markets to be better penetrated. In 2012, the life insurance sector in Malaysia collected 67.7% of the insurance industry premium income. Even though penetration rate (premiums as a percentage of GDP) and insurance density (premiums per capita) have improved over time, the demand for life insurance remains low compared to neighboring countries. Per capita spending on life insurance was RM850 or USD330 in 2012, lower to the world average of USD373 and much lower to other developed Asian countries. Singapore recorded per capita premium seven times higher than Malaysia in 2012, while Hong Kong and Japan recorded per capita premium twelve times higher. Similarly, life insurance penetration was 3.08% of the country's GDP, slightly below the world average of 3.69%. These indicators suggest that the Malaysian life insurance market is still substantially under-penetrated. Improvement in the mortality protection gap allows the vast untapped insurance market to be explored to the fullest.

¹ Black K. and Skipper, H.D. (2000). Life and Health Insurance. 13th edition. Prentice Hall. Upper Saddle River, New Jersey

² Sigma No 4/2004: Mortality protection: the core of life, p 23.

3. Objective of the Study

The main objective of this study is to investigate the extent of the life insurance protection gap in Malaysia. The mortality protection gap is often a true reflection of the potential demand for life insurance coverage. This study seeks to highlight and quantify the magnitude of mortality gap protection, or underinsurance, among the Malaysian working population in 2012.

A thorough investigation of the extent of mortality gap in Malaysia is timely. The degree of underinsurance indicates the potential financial hardship endured by dependents upon untimely death of the family's breadwinner. Inadequate life insurance protection can prevent a family from maintaining its current living standard upon the death of the main wage earner. Other dire financial consequences that may result are the inability to pay off the mortgage, debts or children education. As insurance is one of the most effective ways to deal with mortality gap, understanding the extent of the gap allows the insurers to take proactive measures that can encourage life insurance purchase.

Furthermore, the local life insurance market (as well as family takaful market) is still much under-tapped. In 2012, only about 41 percent of Malaysians were protected under life insurance plans, the highest rate ever attained by the local insurance industry. The demand for life insurance in Malaysia is apparently still far below that of other more developed Asian markets. This is evident from the per capita life insurance premium expenditures for Singapore, South Korea and Japan in recent years, which are more than seven times higher than for Malaysia. As mortality protection gap is often a good indicator of the potential demand for life insurance protection, the findings of this study will offer important information for the insurers and policymakers to further develop and promote the Malaysian insurance industry, given the relatively low insurance market penetration.

4. Definition of the Mortality Protection Gap

The mortality protection gap is defined as the difference between the resources needed and the resources that would be available to maintain the living standards of the dependents following the death of the primary wage earner.³ The resources needed refer to the resources surviving dependents require for income replacement, debt repayment and other major expenses. The resources available refers to those resources actually available to the dependents from financial assets (net financial assets/savings), social security benefits and life insurance protections (sums insured of life insurance, medical insurance plus the accumulated savings).⁴

Mortality protection gap quantifies the extent to which families are insufficiently covered in the event of the death of the primary wage earner. It can also be used as a gauge of the extent to which the citizens in a country are underinsured.

Swiss Re highlights the concept of mortality gap as follows:

*“Life assurance protection gap is computed as the present value of future income required to maintain dependents’ current living standard, plus the amount needed to meet debt obligations, minus the sum of the present value of future social security payments to survivors plus life insurance proceeds, plus one-half of financial assets”.*⁵

Drawing on recent work by Swiss Re, a general form of the mortality gap functional relationship can be described as follows:

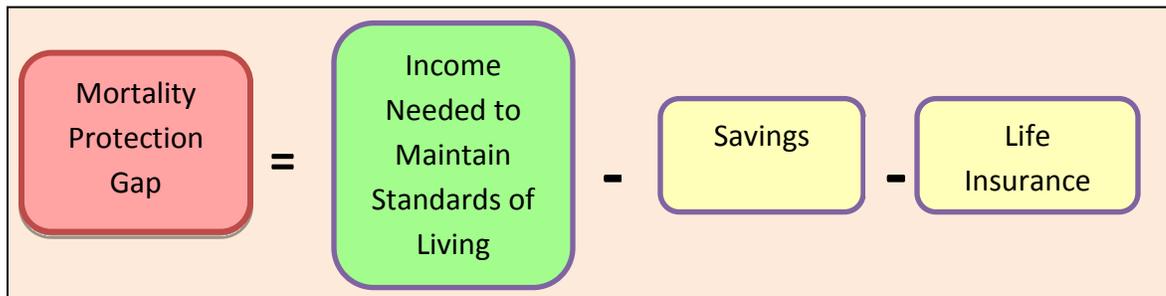
$$\text{Mortality Protection Gap} = \text{Resources Required} - \text{Resources Available}$$

³ Sigma No 4/2004: Mortality protection: the core of life, p 3

⁴ Journal of Financial Planning. (March 2013). Study Cites Gap in Mortality Protection.

⁵ Sigma No 4/2004: Mortality protection: the core of life, p 23

The resources readily available mainly come from savings and life insurance. In light of the mortality gap function specified above, the resultant conceptual framework of this study can be portrayed as follows:



Drawing on mortality gap function proposed by Swiss, the resources required constitute three elements:

- (1) The income required to maintain the current standard of living for the spouse and/or dependents.
- (2) Retirement needs, university education needs for children and other major expenditure needs.
- (3) Liabilities, such as paying off debts and taxes.

The resources available encompass these components:

- (1) Survivor income from social security
- (2) Financial assets, such as personal savings and other investments such as stocks, bonds and mutual fund.
- (3) Life insurance coverage and coverage provided under employee benefit plans.

5. Scope and Limitations of Study

As noted in the Mortality Protection Gap: Asia-Pacific 2011 study published by Swiss Re, the protection gap in Malaysia witnessed an increasing pattern during the period 2000-2010, with the value of gap of USD380 billion reported in 2010. An examination of the extent of underinsurance in Malaysia is thus opportune to provide useful information to the insurers and the policymakers in formulating new strategies to close the gap.

This research is the first mortality protection gap study undertaken by local researchers for Malaysia. The methodology adopted for this study involves a simulation process, called Monte Carlo analysis, and differs from the methodology adopted by other studies such as the Mortality Protection Gap: Asia-Pacific 2011 or gap studies of countries such as Singapore.⁶ Unlike deterministic analysis or single-point estimate, Monte Carlo simulation provides a range of possible outcomes and the probabilities of their occurrence. Parallel to the protection gap studies conducted by Swiss Re, this study examines potential gap among employed populations with dependents. This is essential to ensure that the study covers the economically active segment of the population who is more likely to have the financial ability to purchase insurance. Besides the application of Monte Carlo simulation, this study examines the mortality gap for three categories of working populations; (1) individuals who are covered by life insurance (2) individuals who are covered by life insurance and also medical insurance, (3) individuals who are not covered by either life or medical insurance. Detailed discussions on the methodology of this research are presented in forthcoming topics.

Although the present mortality gap study is certainly not exhaustive, it provides a useful initial platform to a more broad understanding of the magnitude of the protection

⁶ 2012 Protection Gap Study- Singapore, Life Insurance Association Singapore.

gap in this country. Aside from life insurance, there is also mortality protection provided by family takaful plans that may influence the estimation of the gap. Mortality protection afforded by family takaful is not incorporated in this present study, but can be considered for future research work.

One of the major limitations of this study is the lack of official statistics such as data related to salary according to age group and data on debt repayment. Due to the lack of various useful statistics, the true extent of the mortality gap of this country may differ slightly from the gap estimated in this study.

6. Methodology

6.1 Conceptual Framework

Mortality protection gap (also referred to as life insurance protection gap or protection gap or underinsurance) is defined as the difference between resources needed to maintain average living standards and resources available. Typically, the resources available consist of savings and life insurance (see Figure 1).

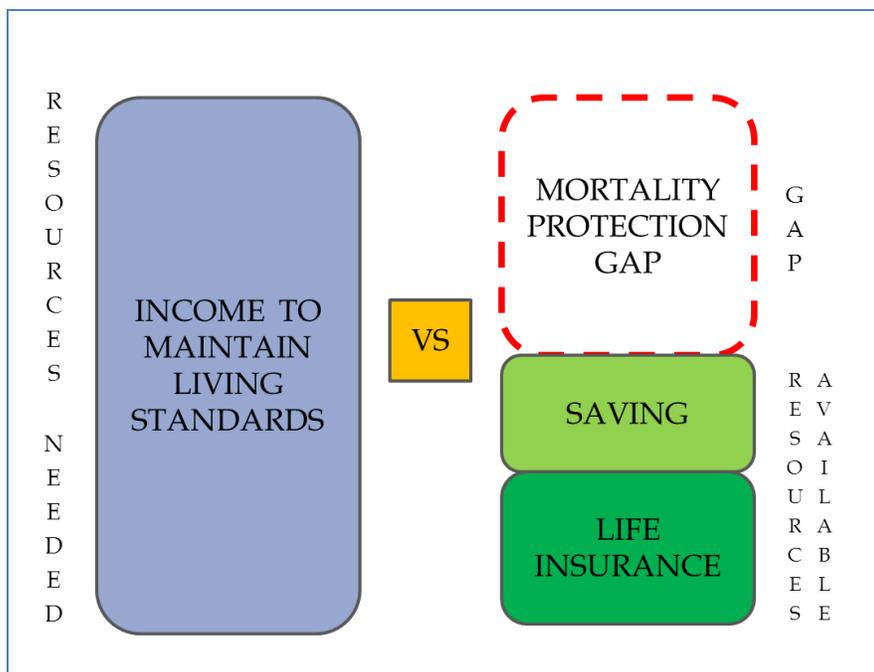


Figure 1: Conceptual framework of the mortality protection gap.

Drawing on mortality gap function proposed by Swiss Re, the classification of resources needed and resources available are exhibited in Figure 2. The resources needed are divided into 3 categories;

- (1) The basic expenses - the income required to maintain the current standard of living for the spouse and/or dependents
- (2) The retirement expenses – income needed to provide for retirement needs
- (3) The debt repayment expenses – income needed for paying off debts such as mortgage.

The resources available comprises of these categories:

- (1) Employee Provident Fund (EPF) savings – income from social security
- (2) Personal savings – financial assets
- (3) Life insurance protections – individual life and medical insurance.

The magnitude of mortality protection gap estimated in this study approximates the extent of underinsurance experienced by the population.

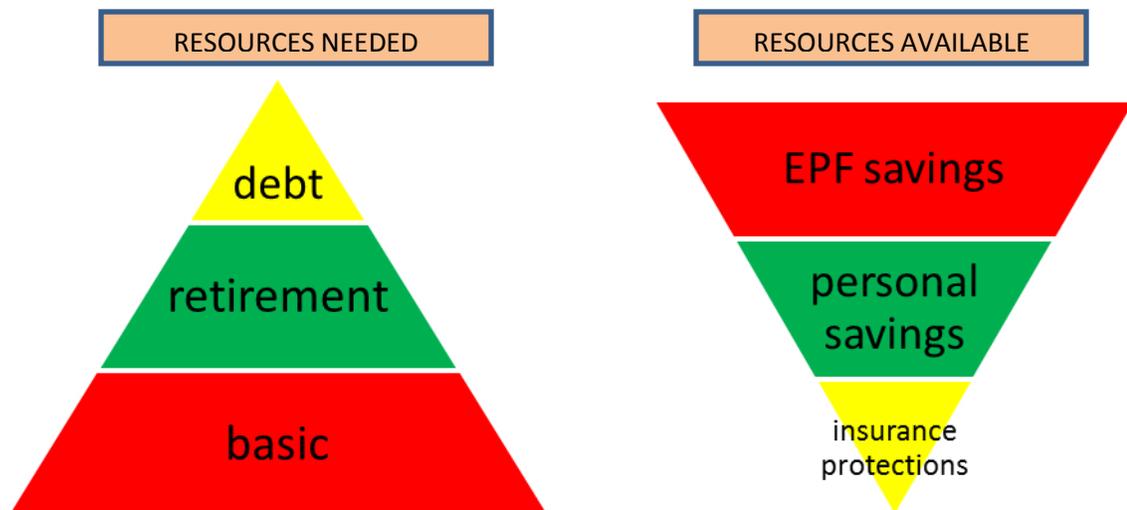


Figure 2: Resources needed and resources available

6.2 Data

The data used for this study were obtained from different sources as reported in Table 1. The authors are indebted to the Life Insurance Association of Malaysia (LIAM) for providing various life insurance, medical and critical illnesses data in support of this research. The distributions of the data provided by LIAM can be viewed in Appendix 2.

Table 1: Sources of Data

Variable	Sources of Data
Basic expenses	Household Expenditure Survey Malaysia 2009/2010,
Retirement expenses	EPF Annual Report 2012, Annual Statistics Reports
Debt repayment expenses	Financial Stability & Payment System Reports, BNM
EPF savings	EPF Annual Report 2012
Personal savings	Annual Statistics Reports
Life and medical insurance	LIAM and Annual Insurance Reports, BNM

6.3 The Resources Needed

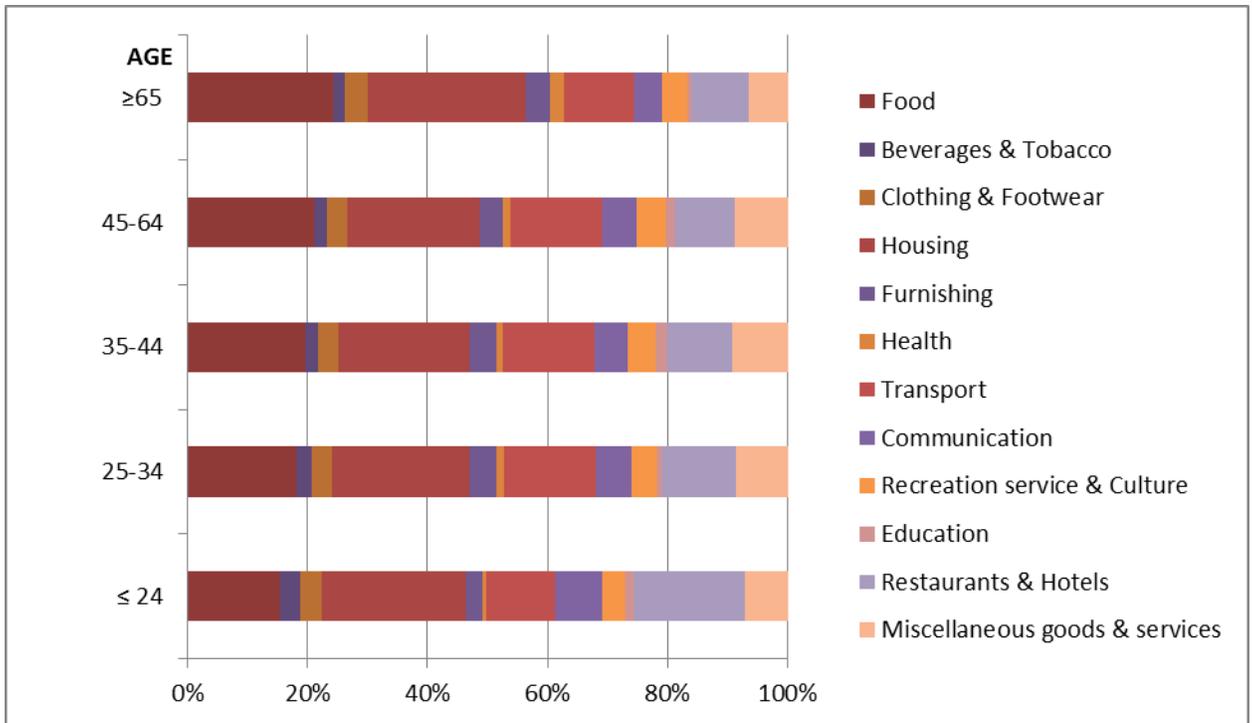
6.3.1 *Basic expenses*

The first component of the resources needed is the income required to maintain the current standard of living for the dependents following the death of the main breadwinner. These resources are represented by the basic needs expenses. As highlighted in the Household Expenditure Survey Malaysia 2009/2010, basic needs comprise the following factors:

- Food
- Beverages and tobacco
- Clothing and footwear
- Housing
- Furnishing
- Health
- Transport
- Communication

- Recreation service and culture
- Education
- Restaurants and hotels
- Miscellaneous goods and services

The basic expenditure incurred by households is illustrated in Figure 3 while the monthly average of total expenditure per household is illustrated in Figure 4.

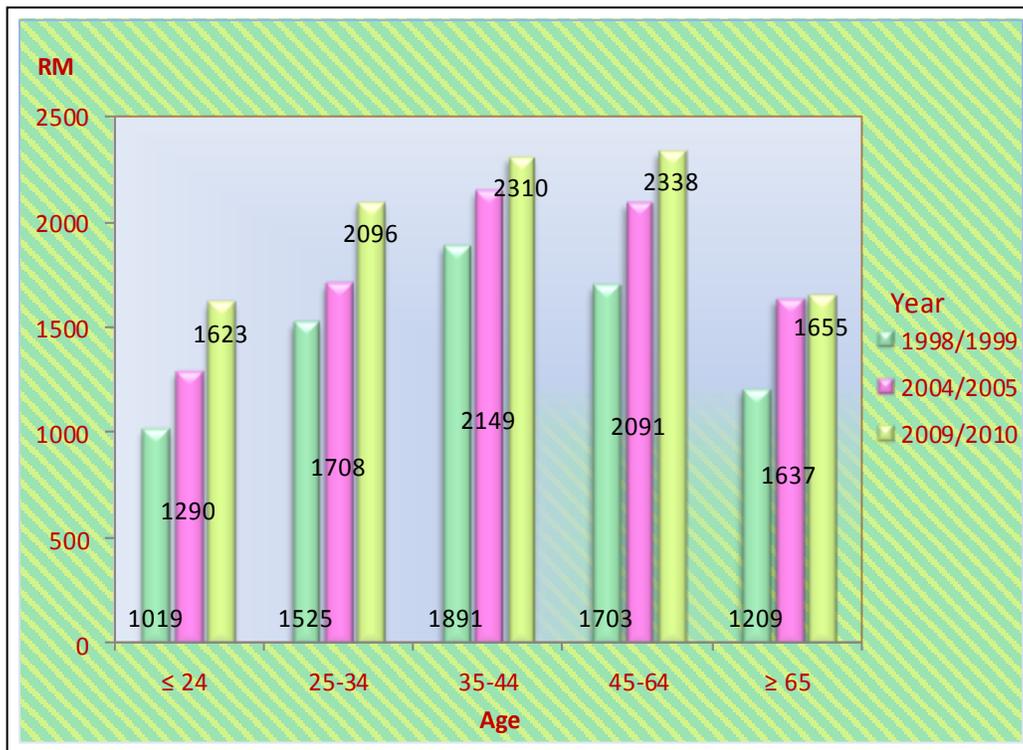


Source: Household Expenditure Survey Malaysia 2009/2010

Figure 3: Percentage expenditure per household by age of head of household, Malaysia 2009/2010

- Figure 3 indicates that the largest portion of expenditure incurred by a household was the housing expenses
I.e. for age group below 24 years old, between 25 to 34, between 35 to 44, between 45 to 64 and above 65 years old, the percentage of housing expenses is 23.8%, 23.1%, 21.9%, 22.1% and 26.3% respectively.
- The second largest expenditure was the food expenses.
I.e. 15.5%, 18.2%, 19.6%, 21.2% and 24.4% for each age group respectively.

- For most age groups, the smallest amount of expenditures of a household was the health-related expenses except for the age group above 65 years old. The percentage of health expenses for the other age groups is 0.8%, 1.1%, 1.1% and 1.4% respectively.
- Education is also among the smallest expenses incurred by a household; the percentage of expense for each age group was 1.5%, 0.7%, 1.9%, 1.5% and 0.5% respectively.



Source: Household Expenditure Survey Malaysia 2009/2010 DOS

Figure 4: Monthly average of total expenditure per household by age group of head of household

- Figures 4 suggest that the monthly average of total expenditure for each age group increases throughout the three National censuses.
- In the last two censuses, the most significant increase of the monthly average of total expenditure was in the age group below 24 years old and age group between 25 and 34 years old. The increase is about 25% and 22% respectively.

- On the contrary, the increase in the monthly average of total expenses at the age 65 and above was very low which is only at 1%
- Households headed by breadwinner up to age 64 years old witnessed an increase in the monthly average of total expenditure; however it started to decrease from age 65.
- The monthly average total expenditure per household in 2009/2010 for age group below 24 years old, between 25 to 34, between 35 to 44, between 45 to 64 and 65 years old and above was RM1, 623, RM2, 096, RM2, 310, RM2, 388 and RM1, 655 respectively.
- It is worth noting that the monthly average total expenditure for all age group was higher than the Malaysians minimum wage level of RM900.

The head of the household, who is also most likely the breadwinner of the family, should bear these basic needs as long as they work. If he dies at any age before reaching the retirement age, the dependents would still have to be provided with these needs. Assuming that on average, a worker chooses to retire at age 60, therefore, the required amount of basic needs is represented by:

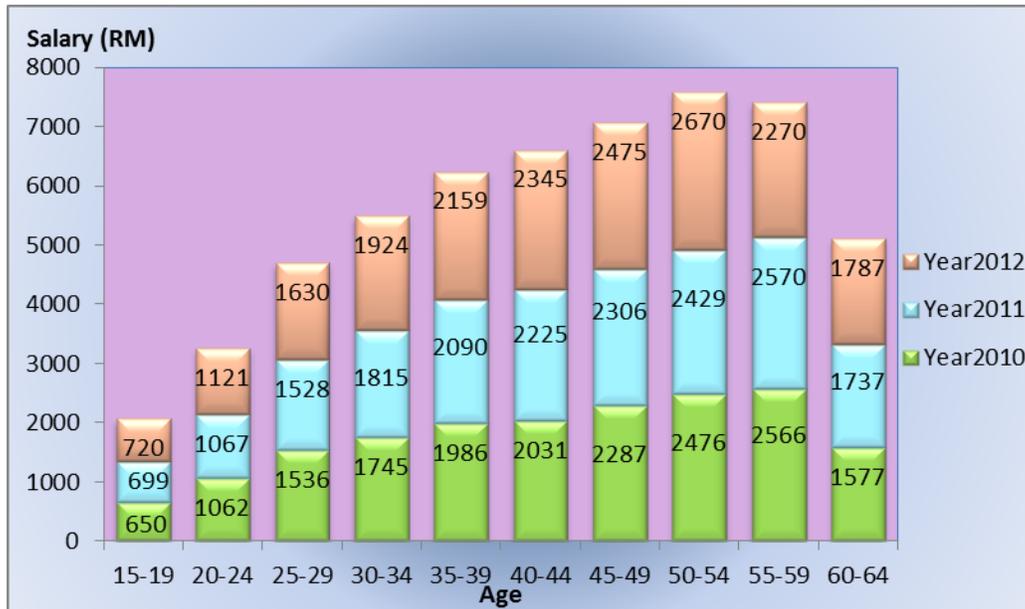
The present value of yearly basic expenses until age 60 at any age of death

6.3.2 Retirement expenses

The second component of the resources needed is the resources required to pay for the retirement needs. This component is measured by the EPF contributions of an employee.

- The biggest retirement expenses for Malaysians are the EPF contributions.
- In this present study, only the contributions made by the employee is considered for the retirement expenses as this contribution is deducted from the employee's monthly salary
- The EPF contribution is 11% from the basic salary of the employee.

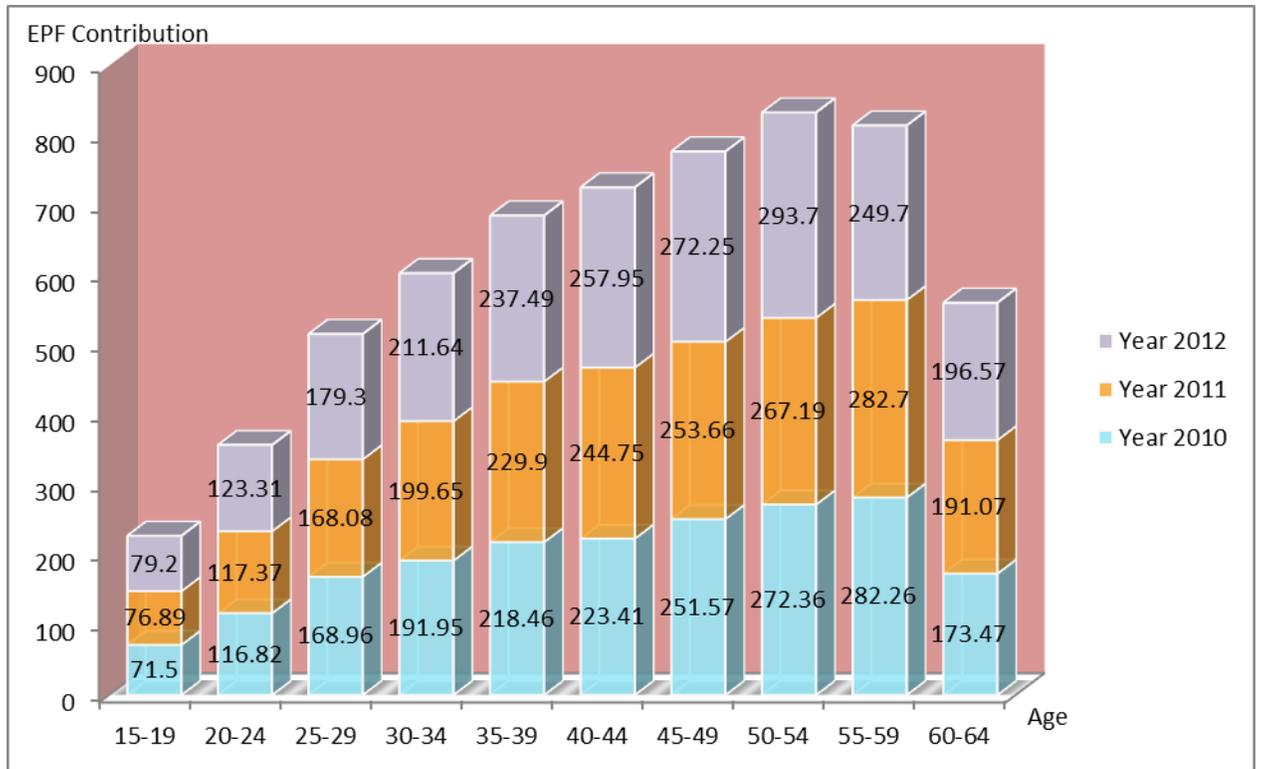
Figure 5 and Figure 6 demonstrates the average monthly salary of Malaysians and the average monthly EPF contributions.



Source: Department of Statistics

Figure 5: Average monthly salary of Malaysians

- Figure 5 demonstrates that the average monthly salary increases by age until the employee reaches the age 50 to 54. The average monthly salary decreases at the age of 55 and above,
- The highest average monthly salary recorded in 2012 was RM2, 670 attained at the age between 50 to 54 years old.
- The lowest average monthly salary in 2012 was RM720, attained at the age of 15-19. This amount is below the minimum wage level imposed by the government.
- The rate of EPF contributions is 11% of the monthly salary, and the distribution of the average EPF contributions is displayed in Figure 6.



Source: EPF Annual Reports, 2010-2012.

Figure 6: Average monthly EPF contribution by age group

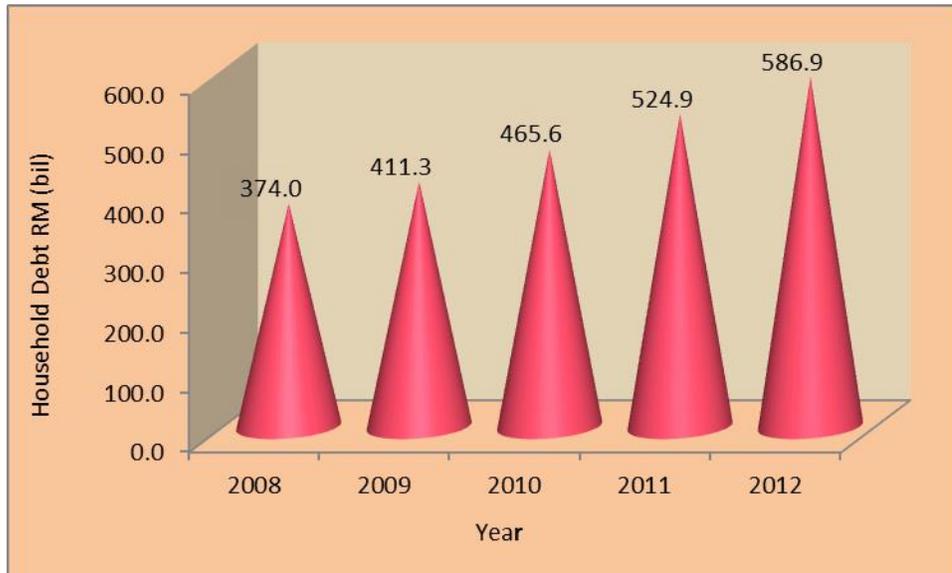
- Figure 6 reveals that the average monthly EPF contributions continued to increase until the employee reaches the age between 50 to 54 years old, and then started to decrease starting from age 55.
- The highest average monthly EPF contributions recorded in 2012 was RM293.70 and the lowest was RM79.20.
- An employee contributes to the EPF throughout his employment period until the age of 60 years old.

An employee should be paying the EPF contributions throughout his employment period until he reaches the retirement age. However, he might die before reaching the retirement age. Assuming that an employee chooses to retire at age 60, the required amount of retirement needs can generally be expressed as:

The present value of yearly retirement expenses (EPF contributions) until age 60 at any age of death

6.3.3 Debt repayment expenses

The third component of the resources needed is the resources to pay off debts. In this study, this component is represented by the debt repayment expenses. The distribution of the debt repayment expenses is portrayed in Figure 7.

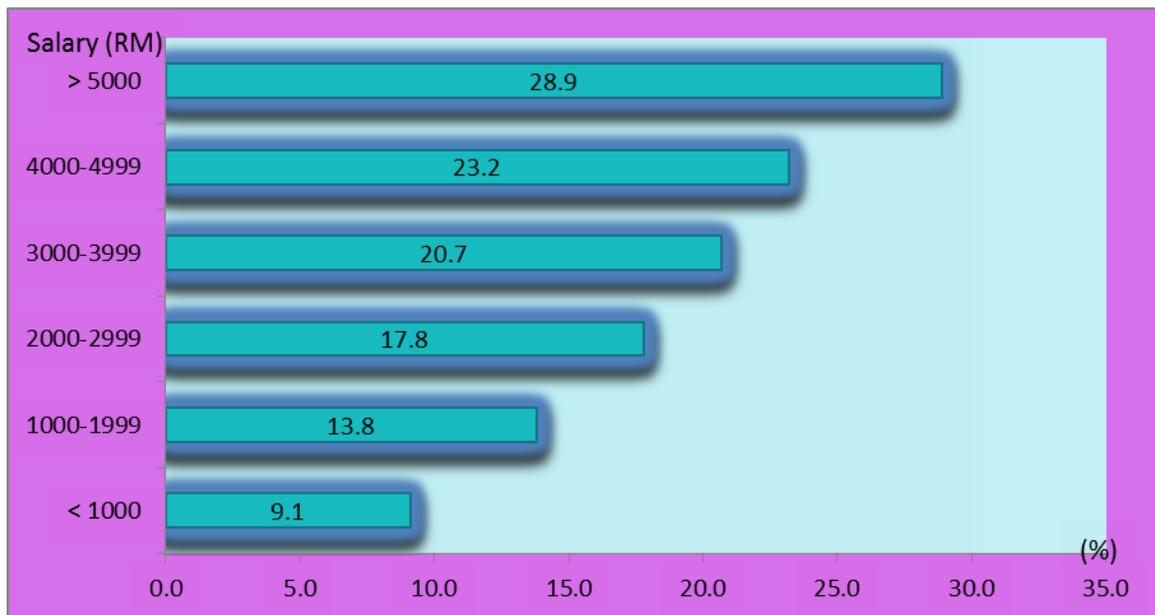


Source: *Financial Stability & Payment System Reports*

Figure 7: Household total debt

- Figure 7 indicates that over the period 2008-2012, the household total debt increased each year at a rate of between 9% to 12%, totaling RM586.9 billion by 2012.
- “The numbers associated with Malaysia’s household debt are an 83% debt-to-GDP ratio at the end of March 2013, and a 140% debt-to-household-income ratio” (Joseph, 2013).

- It is believed that the large amount of indebtedness among Malaysian is attributed to mortgage loans.
- Agensi Kaunseling dan Pengurusan Kredit (AKPK) reported that a total of 35,825 cases have received counseling in 2012 which makes the whole counseling cases so far stood at 229,334 cases. Of this total, 40.8% or 93,652 cases have enrolled for Debt Management Programme (DMP).
- The main reasons for the relatively high amount of debt are poor financial planning, high medical expenses, failure in business, loss control on usage of credit cards, lost job, death of breadwinner and failed investment.
- It is also reported that cases enrolled for DMP consist of 35% private sector, 35% unknown sector, 10% self-employed, 8% public sector, 8% unemployed and 4% others employment.
- The detailed demographic profile of individuals who enrolled into DMP is provided in Appendix 1.
- According to Bank Negara Malaysia (BNM) Report 2012 and Financial Stability & Payment System Report 2012, the estimated debt service burden which is the ratio of debt repayment to disposable income is 43.9%.



Source: Department of Statistics and BNM

Figure 8: Household debt by income group

- Figure 8 demonstrates a direct relationship between income and debt repayment, i.e. the higher the income the greater the percentage of debt repayment
- In order to maintain data consistency, the percentage of debt repayment by salary bands must be aligned with a specific age group, followed by the estimation of the percentage of debt repayment.

Assuming that on average, the debt must be paid off until the employee reaches the retirement age of 60 years old. However, the employee might die before reaching age 60. In general, the required amount of debt repayment expenses can be represented as follows:

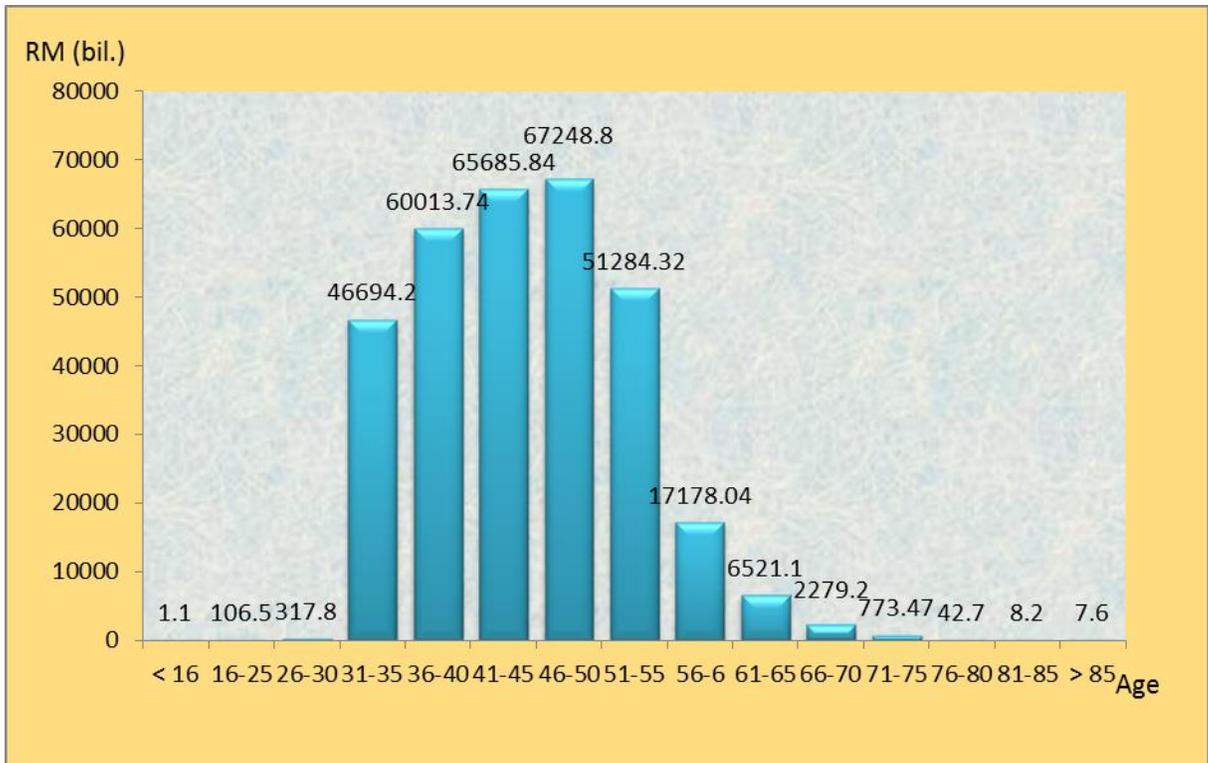
The present value of yearly debt repayment expenses until age 60 at any age of death

6.4 The Resources Available

6.4.1 EPF savings

The first component of the resources available is the resources obtainable from social security. This variable is represented by the EPF accumulated savings of an employee.

- As at end 2012, EPF membership stood at 13,585,007 and of these numbers, 6,389,080 are actively contributing towards the Fund (EPF Annual Report, 2012).
- In line to the increasing number of membership, total EPF contributions increased by 11.45% amounting RM46, 178 billion in 2012.
- The statutory contribution rate indicates that the rate for employee contributions is 11% and the rate for employer contributions is between 12% to 13%.



Source: EPF Annual Report 2012

Figure 9: EPF saving by age, 2012

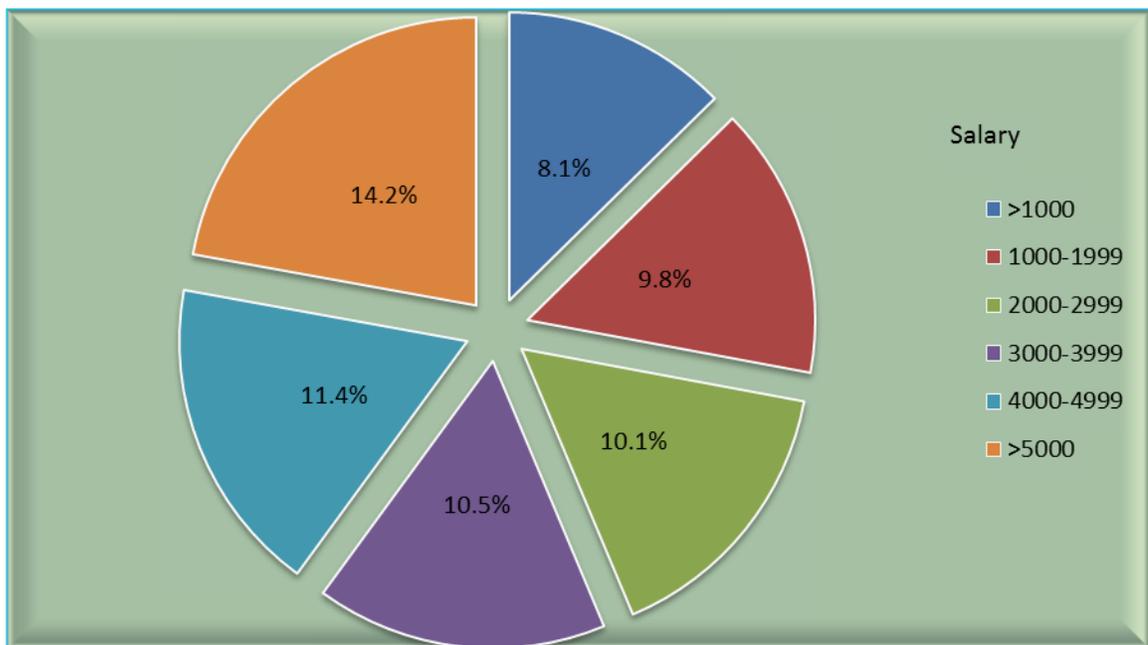
- Figures 9 illustrate EPF savings according to age group in 2012.
- Based on Figure 9, a significant portion of EPF savings are contributed by members between 31 and 55 years old, with total savings ranging from RM46,694.2 to RM51,284.32 billion.
- The highest EPF savings amounting RM67,248.8 billion was contributed by members in the age group between 46 to 50 years old.
- The lowest EPF saving of RM1.1 billion was contributed by members in the age group of 16 years old and below.
- The accumulated EPF savings can be withdrawn by an employee upon reaching the retirement age.

In general, an employed person would continue to contribute into the EPF funds throughout his employment period until reaching the age 60. However he may die at any age during his employment.

Therefore, if a person dies at a certain age or lives to reach the age of retirement, the EPF savings equal to the accumulated EPF savings at the age of death.

6.4.2 Personal savings

The second component of the resources available is measured by the amount of personal savings. Figure 10 displays the distribution of personal savings according to income group in 2012.



Source: BNM Reports

Figure 10: Percentage of personal saving by income group

- Figure 10 reveals that the higher the income of the wage earner, the higher the amount of personal savings of a household.

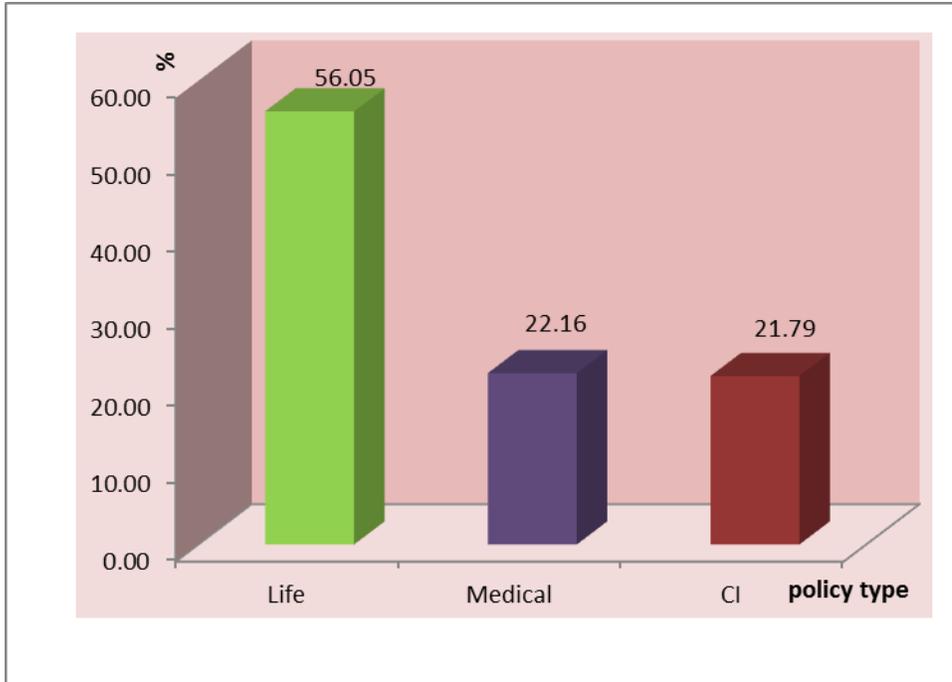
- On average, an individual who earns RM5, 000 a month have been found to save as much as 14.2%, whereas individuals with a salary less than RM1, 000 a month would save as much as 8.1%.
- The percentage of personal saving by income group will be aligned with a specific age group. Through this process, the percentage of personal saving by age is obtained. This has to be done in order to maintain data consistency.

In general, an employed person would continue to save a portion of his salary throughout his employment period until reaching the age of 60 years old. However, if he dies before reaching the retirement age, he would cease to save at the age of death.

Therefore, if a person dies at a certain age or lives to age 60, the personal savings equal to the accumulated savings at the age of death

6.4.3 Life insurance protections

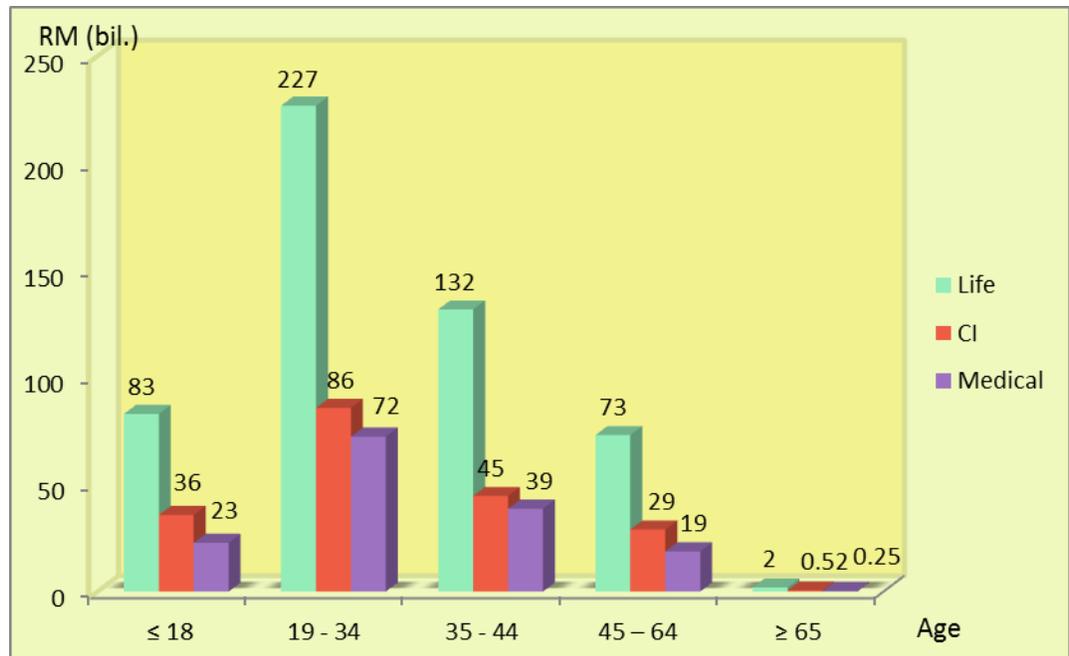
The third element of the resources available is the life insurance coverage. In this study, the life insurance coverage is measured by the sums insured of the individual life insurance and medical insurance protection. Figures 11 and 12 demonstrate the statistics of the life insurance, medical and critical illness coverage.



Source: Life Insurance Association of Malaysia (LIAM)

Figure 11: Percentage of Total Life Covered by Policy Type 2012

- Based on the statistics shown in Figure 18, life insurance products accounted for the biggest market share in the life insurance sector i.e. 56.05%.
- This percentage of market share accounted for sums insured of RM516 billion.
- The medical and critical illness policies are typically complementary to life insurance policies with market share of 22.16% and 21.79% respectively.
- The sums insured for the medical and critical illness in 2012 is reported at RM195 billion and RM152 billion respectively.



Source: Life Insurance Association of Malaysia (LIAM)

Figure 12: Total Sum Insured by Policy Type and Age Group

- Based on Figure 12, the insureds in the age group between 19 and 34 years old have the largest sum insured for all the three types of policies. The sums insured for this age group for life, medical and critical illness is RM227 billion, RM86 billion and RM72 billion, respectively.
- The lives covered in the age range between 35 to 44 years old and 45 to 64 years old have a significantly large amount of insurance protection.
- As expected, the insureds in the age group of 18 and below have a very small amount of insurance for all the three types of policies.
- The lives covered in the age group of 65 and above have the lowest sums insured for life, medical and critical illnesses protection, i.e. at RM2 billion, RM0.52 billion and RM0.25 billion respectively.
- The average amount of insurance for life, medical and critical illness policy is approximately RM54, 000, RM41, 000 and RM53, 000 respectively.

In general, the death benefit constitutes the sums insured of the life insurance policy payable to the beneficiary in the event of death to the policyholder.

Therefore, if a person dies at any age, the amount of insurance payable to the beneficiary equals to the sums insured of all policies owned by the person.

7. Data Analysis

7.1 Assumptions of Study

The analysis carried out in this research is based on a few assumptions.

- a. The samples of this study are the populations under employment
- b. Each household has an average of 5 members (parents and 3 children)
- c. The household income is solely contributed by the head of household
- d. Interest rate = 4%
- e. The personal saving includes savings in banks, Amanah Saham Bumiputra (ASB), Tabung Haji and other financial institutions
- f. Minimum working age : 20 years old
- g. Maximum working age : 60 years old (retirement age)
- h. The minimum, most likely and maximum values of monthly salary according to age group are defined as follows:

Age	Min	Most likely	Max
20-24	900	1000	3500
25-29	900	1500	12000
30-34	900	2500	16000
35-39	900	3000	20000
40-44	900	3200	30000
45-49	900	3500	30000
50-54	900	3500	30000
55-59	900	3500	30000
60-64	900	3200	30000

7.2 Model Development

The present value specification is given as below:

$$\text{Net Present Value (NPV)} = P \frac{(1-(1+i)^{-n})}{i}$$

where:

i = interest rate; *n* = period of discounting; *P* = payment

In view of the present value specification, recall that the total resources needed have been modeled as follows:

The present value of yearly basic expenses until age 60 at any age of death

The present value of yearly retirement expenses (EPF contributions) until age 60 at any age of death

The present value of yearly debt repayment expenses until age 60 at any age of death

And the total resources available are modeled as follows:

The accumulated EPF savings at the age of death

The accumulated savings at the age of death

The sums insured payable to a beneficiary in the event of death of the policy owner

Similarly, recall the framework of the mortality gap protection, i.e.

$$\text{PROTECTION GAP} = \text{TOTAL RESOURCES NEEDED} - \text{TOTAL RESOURCES AVAILABLE}$$

- The value of the protection gap indicates the amount of insurance coverage a household should acquire to ensure that the dependents can maintain a reasonable standard of living following the death of the breadwinner.

7.3 Monte Carlo Simulation

- The present study applies the Monte Carlo simulation in order to take into consideration the variation of inputs.
- Monte Carlo analyses are computer generated simulations which provide a range of possible outcomes and the probabilities they will occur for any empirical models with specific coefficient values and an error term distribution.
- During a Monte Carlo simulation, values are sampled at random from specific probability distributions.
- By randomly generating values from the assumed distribution, various possible outcomes within the assumed distribution will be created.
- Common probability distributions include normal, lognormal, uniform, triangular and discrete, among others.
- In this study, the triangular probability distribution was deemed suitable to represent certain data. Hence, the minimum, most likely and maximum values needed to be defined for the probability distribution.
- The number of samples generated in this study reaches at least 5,000 and the result is a probability distribution of possible outcomes.
- Monte Carlo simulation provides probabilistic results, i.e. results that show what are the possible outcomes, and also the probability of occurrence of each outcome.

- Since 5000 possible values of input for present value of resources needed and accumulated values of resources available were generated in this study, as much as 5000 possible values of protection gap were obtained.
- The ensuing protection gaps are shown in the form of distributions.

7.4 Probability Distributions of Simulated Variables

7.4.1 Distributions of Age

Figure 13 illustrates the age distribution of the employed populations in Malaysia

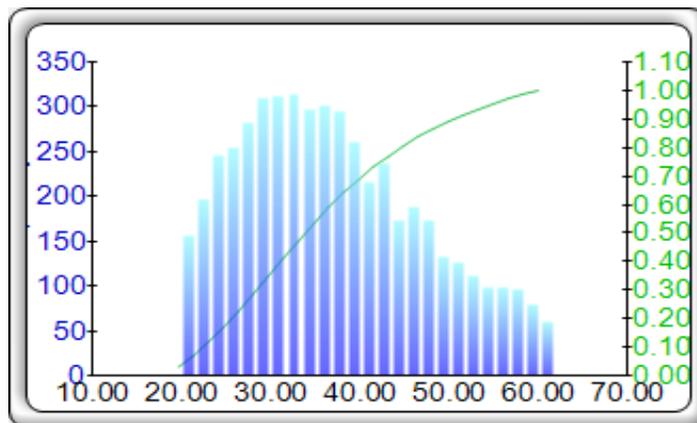


Figure 13: Distribution of Age

Table 2: Summary statistics of age

	Age
Mean	35
Median	34
Maximum	60
Minimum	20

- Referring to Figure 13, most individuals are in the age range of 20s and 30s years old. As shown in Table 2, the average, median, max and min of the age distribution is 35, 34, 60 and 20 years old, respectively.
- In this study, the protection gap is calculated based on this age distribution. The present value of basic needs, the present value of retirement expenses, the present value of debt expenses, the EPF savings, the personal savings and the total sums insured is computed based on the same age distribution.

7.4.2 *Distributions of Resources Needed*

Figures 14 - 16 show the distribution of simulated resources needed components i.e. the present value of basic needs, the present value of retirement expenses and the present values of debt repayment expenses.

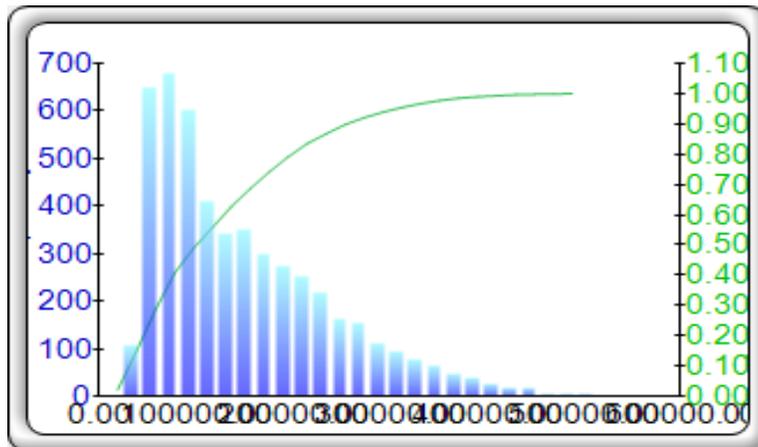


Figure 14: Distribution of present value of basic needs

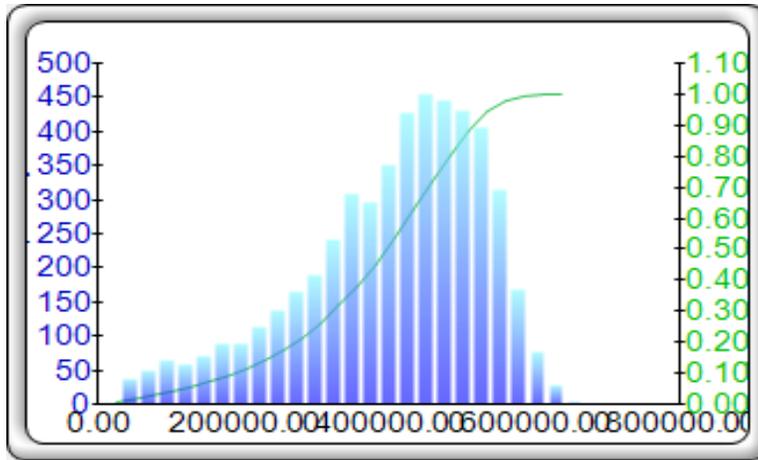


Figure 15: Distribution of present value of retirement needs

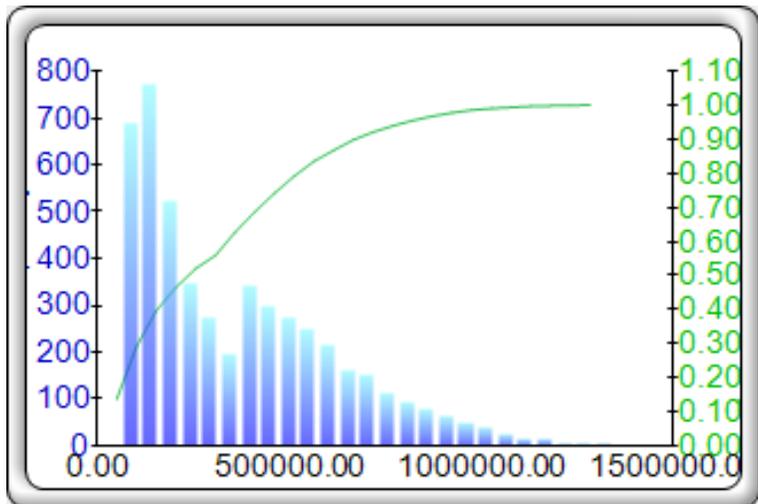


Figure 16: Distribution of present value of debt repayment

Table 3: Summary statistics of resources needed

	Present Value of		
	Basic Needs	Retirement Needs	Debt Repayment
Mean	373,529	125,516	307,453
Median	397,381	100,086	235,271
Max	637,302	489,120	1,285,051
Min	206	208	545

- Figure 14 indicates that the average amount of the basic expenses that the dependents would have to bear upon the death of the breadwinner is between RM400, 000 to RM500, 000.
- The mean, median, maximum and minimum values for basic expenses that should be shouldered by the dependents upon the death of the breadwinner are approximated at RM374,000, RM397,000, RM637,000 and RM206 respectively (see Table 3)
- Meanwhile, the probability that the present value of retirement needs is in the range of RM100, 000 to RM150, 000 is relatively high at 0.9 (see Figure 15).
- The mean, median, max and min value for the present value of retirement expenses is around RM121,000, RM100,000, RM489,999 and RM208 respectively (see Table 3)
- The debt expenses that the dependents would have to assume upon the death of the breadwinner stood at less than RM500, 000. However, there still exists a small probability of a debt in excess of RM1 million (see Figure 16).
- From Table 2, the mean, median, max and min value for the present value of debt repayment expenses is about RM307, 000, RM235, 000, RM1, 285,000 and RM54, respectively.

7.4.3 Distributions of Resources Available

Figures 17 - 20 describe the distributions of the simulated components of the resources available, namely the EPF saving, personal saving, life and medical coverage.

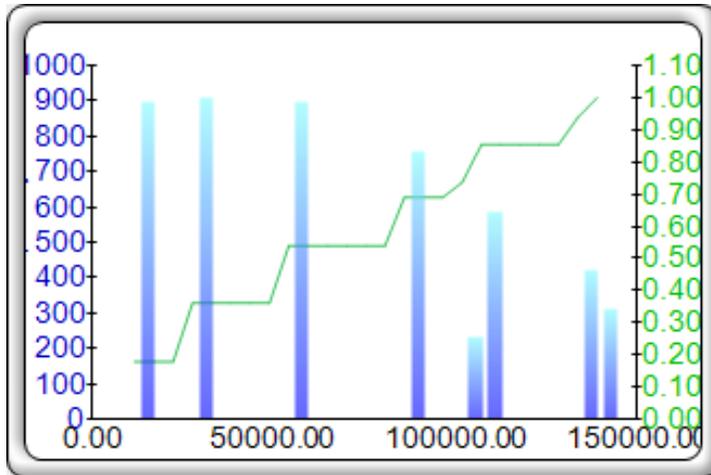


Figure 17: Distribution of EPF saving

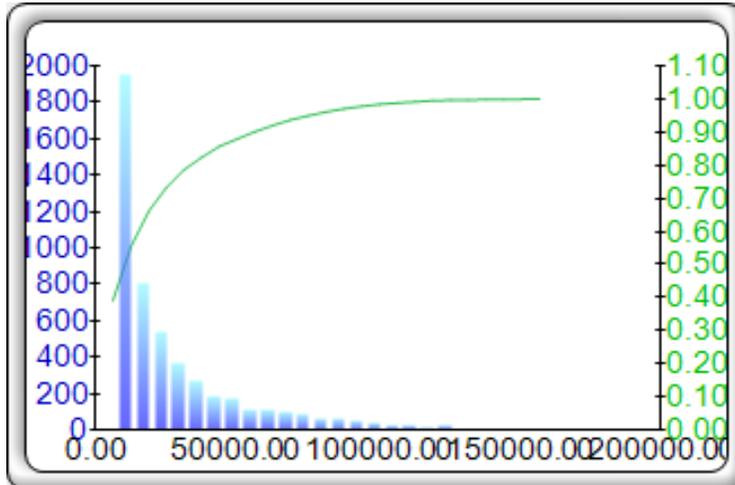


Figure 18: Distribution of personal saving

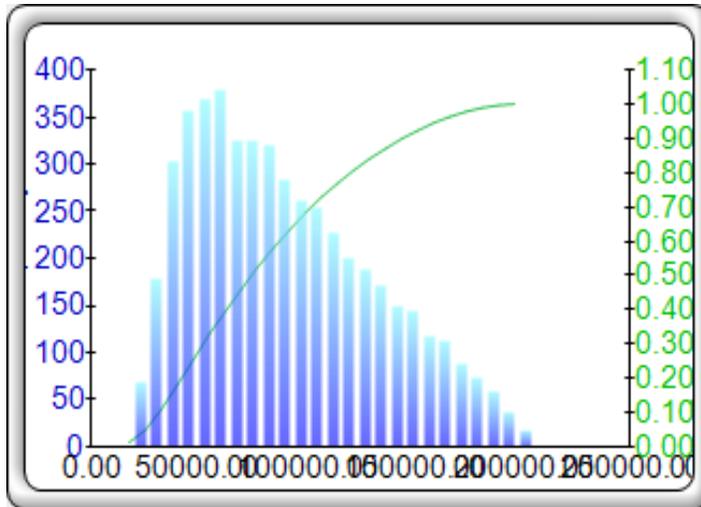


Figure 19: Distributions of the sums insured of life insurance protection

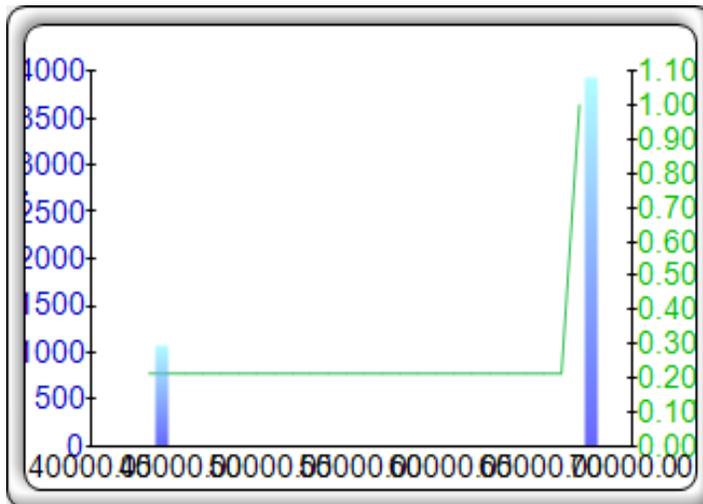


Figure 20: Distributions of the sums insured of medical insurance protection

Table 4: Summary statistics of resources available

	EPF Savings	Personal Savings	Life Insurance Sums Insured	Medical Insurance Sums Insured
Mean	63,437	19,923	81,606	61,524
Median	50,259	10,102	74,628	67,071
Max	139,069	157,217	196,443	67,071
Min	6,469	0	10,295	42,223

- Figure 17 show that EPF savings with the amount of RM50, 000 has the highest frequency with the probability of occurrence of 0.99.
- Mean, maximum and minimum value for EPF savings is RM63, 437, RM139, 069 and RM6, 469 respectively (refer Table 4).
- For accumulated savings, Figure 18 indicates that the working populations seem to have relatively small amount of personal savings. The average amount of savings is about RM20, 000. The maximum total personal savings is recorded at about RM158, 000 (see Table 4).
- Based on Figure 19, the sums insured of life insurance ranges from RM50, 000 to RM70, 000. However, there is only a small probability that the amount of sums insured would exceed RM200, 000.
- From Table 4, the mean, median, max and min value for life insurance protection is around RM81, 000, RM75, 000, RM196, 000 and RM10, 000, respectively.
- Figure 20 suggests that the amount of medical protection with the highest frequency lies in the range of RM65, 000 to RM70, 000.
- The mean and median of the sums insured of medical protection is RM62, 000 and RM67, 000, respectively. The maximum amount of the medical coverage sums insured is recorded at RM67, 000 while the minimum amount is RM42, 000 (refer Table 4).

8. Protection Gap Results

Based on the mortality protection gap specification presented earlier, the results of the protection gap estimation are provided below. Recall that Monte Carlo simulation adopted by this study provides a range of possible outcomes and the probabilities of their occurrence. The present study examines the mortality gap for three categories of working populations; (1) individuals who are covered by life insurance (2) individuals who are covered by life insurance and also medical insurance, (3) individuals who are not covered by either life or medical insurance. The results for each category are presented in Tables 5-7.

Table 5: Protection gap of individuals covered by life and medical insurance

Age Group	15-25	26-35	36-45	46-55	56-65	TOTAL
Mean	468,089	681,498	677,127	324,530	-120,346	553,033
Median	436,395	653,972	620,389	270,948	-121,913	494,017
Prob (Gap>0)	1.00	1.00	0.99	0.87	0.14	0.94

- Table 5 depicts the amount of protection gap for families whose primary breadwinner was covered by life and medical insurance with the probabilities of the gap occurring.
- The average protection gap for families whose primary wage earner was covered by life and medical insurance was RM553, 000 per family.
- The probability of an average family to be underinsured is relatively high, i.e. 94%.
- The protection gap for families headed by a breadwinner who was between 26 and 35 years old was largest, estimated at RM681, 000 per family.
- The group headed by 36 to 45 year-olds had the second largest gap, at RM677, 000.

- The families whose primary breadwinner was under 25 years old had a lower gap of RM468, 000. However, statistically, these families are almost certain to be underinsured since the probability of having protection gap for this group is 1.
- The group headed by 46 to 55 year-olds had the lowest gap of RM325, 000.
- Most average families headed by a breadwinner above 55 years old experience negative protection gap which implies that these families had sufficient resources to maintain current standard of living in the event of death of the main breadwinner. Only about 14% of them expected to be underinsured.

Table 6: Protection gap of individuals covered by life insurance only

Age Group	15-25	26-35	36-45	46-55	56-65	TOTAL
Mean	561,862	775,506	768,722	393,140	-50,511	641,532
Median	530,880	745,565	709,059	337,310	-54,534	583,607
Prob (Gap>0)	1.00	1.00	1.00	0.95	0.31	0.96

- Table 6 exhibits mortality protection gap of families whose primary wage earner is protected by life insurance but not medical insurance.
- The average protection gap for the group headed by breadwinner who was covered only by life insurance was RM642, 000 per family.
- The protection gap is found to be generally larger across all age groups compared with individuals who are covered by life and medical coverage.
- The average protection gap for families whose breadwinner was below 25 years old was RM562, 000 per family.
- The families who were headed by the 26 to 35 year-olds had a huge protection gap of RM776, 000 per family.
- The group headed by breadwinners between 36 and 45 years old had second largest gap, at RM769,000, per family.
- Families whose head was between 46 and 55 years old had a slightly lower gap of RM393, 000 per family.

- Quite a large proportion of families headed by a breadwinner above 55 years old had sufficient resources to maintain current standard of living in the event of death of the main breadwinner. Only about 31% of them might experience some protection gap.
- This finding suggests that mortality gap can be reduced by purchasing more life or medical insurance, or by increasing the sums insured of the existing life insurance.

Table 7: Protection gap of individuals not covered under life or medical insurance

Age Group	15-25	26-35	36-45	46-55	56-65	TOTAL
Mean	642,728	856,003	850,930	475,884	35,535	723,137
Median	610,912	827,723	792,063	417,913	19,509	661,057
Prob (Gap>0)	1.00	1.00	1.00	0.99	0.60	0.98

- Table 7 shows that generally, the average gap for households whose primary breadwinner is not covered by any life or medical policies is much larger across all age group than families whose breadwinner is covered by at least one policy.
- The results in Table 6 also indicate that households with breadwinner from any age groups would experience some degree of underinsurance. No groups are found to have sufficient resources for the dependents to maintain current living standard following the death of the wage earner.
- Families with breadwinner in the age group between 26 and 45 years old are found to experience the highest amount of underinsurance compared with other age groups.
- The results further suggest that breadwinner in the age group of 15 to 45 years old of this category are certain to experience underinsurance since the related probability is 1.
- The average gap for this category is found to be RM723, 000.

- For families whose breadwinner in the age group between 26 to 35 years old, the protection gap was a staggering RM856, 000 per family.
- Those families headed by 36 to 45 year-olds had enormous gap of about RM851, 000 per family.
- For breadwinner in the age group of 15 to 25 years old, the estimated gap was RM643, 000 per family.
- The group whose head of family was between 46 and 55 years old had protection gap of 476,000 per family.
- The probability of households with breadwinner in the age group of 56 to 65 years old to experience some protection gap is 0.60.
- These findings clearly suggest that protection gap can be closed by purchasing life and medical insurance.

9. Conclusions

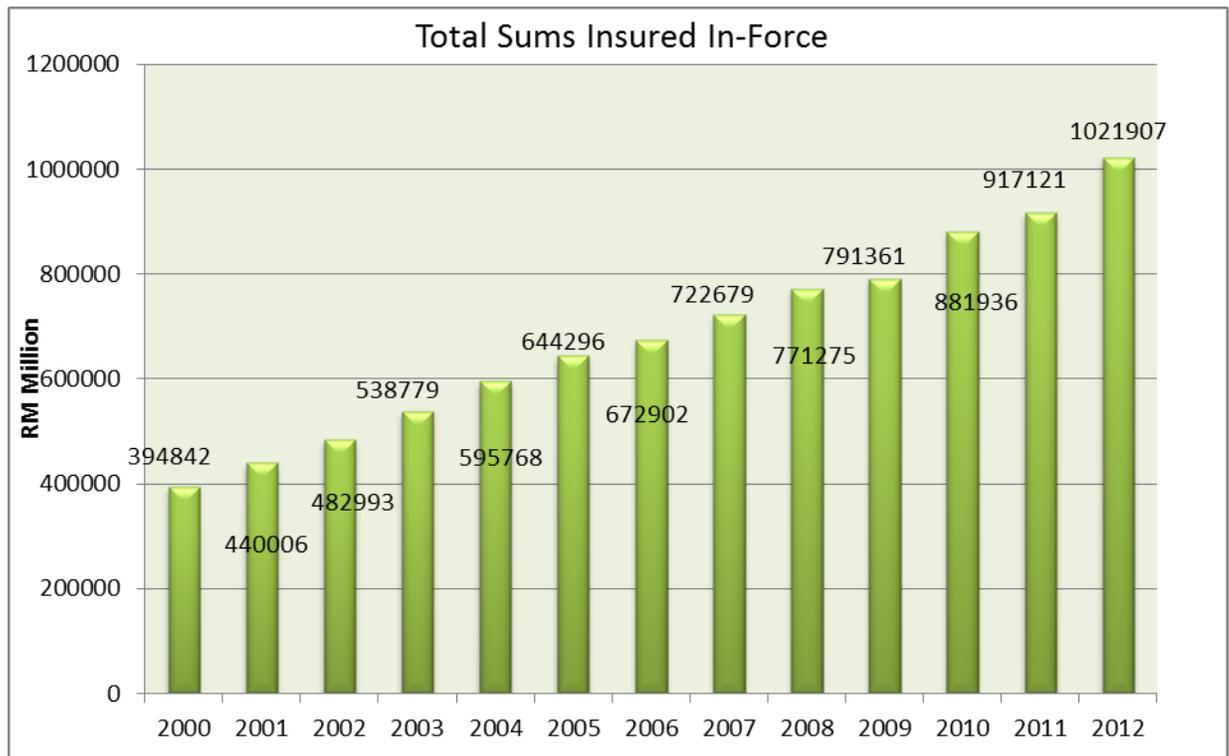
- This study examined potential mortality gap among working population of the country in 2012 who were either insured under life and medical insurance, or not insured.
- The average protection gap for families whose primary wage earner was covered by life and medical insurance was RM553, 000 per family with the probability of being underinsured at 94%.
- Families whose primary wage earner was covered by life policy only and no medical policy had a slightly higher gap, at RM642, 000 per family with the probability of being underinsured at 96%.
- The average protection gap for the group headed by breadwinner who was not covered by either life or medical insurance was largest, at about RM723, 000 per family with the probability of experiencing underinsurance at 98%.
- These findings clearly suggest that purchasing life insurance can provide solutions to close the protection gap.
- In this study, the assumption made is that the income of the household is generated by one primary breadwinner. The amount of mortality gap is expected to reduce if the spouse of the family is also employed.
- Based on the assumption of this study that each household in Malaysia consists of 5 members (parents and 3 children), therefore average mortality gap for each member of a family is about RM100,000 to RM150,000
- The highest mortality gap is experienced by the age group between 26 to 55 years old. This can be explained by the large financial obligation typically faced by the breadwinner in this age group. Insurance coverage seems to be insufficient for these individuals.
- The findings of this study indicate that families with breadwinner in the age group of between 15 and 25 years old have a high probability of experiencing underinsurance. This finding suggests that the purchase of insurance among individuals below the age of 25 is not encouraging enough although the premium

rates for this age group would be relatively low. Proactive measures must be taken to increase insurance awareness among individuals of this age group to reap the benefits of favorable premium rates while financial obligations are still minimal.

- A large proportion of households whose breadwinner in the age range of 56 to 65 years old and was covered by both life and medical insurance did not experience protection gap. This clearly suggests that life insurance offers solution to close the protection gap.

10. The Malaysian Life Insurance Environment

In the estimation of mortality protection gap, life insurance is one of the components of resources available. This component is measured by the sums insured of life insurance policies. Figure 21 displays the sums insured of the life insurance sector for the period 2000-2012. In 2012, sums insured in force grew by 11.43% from 2011 with an average annual growth of 7.83 % during the last ten-year period.

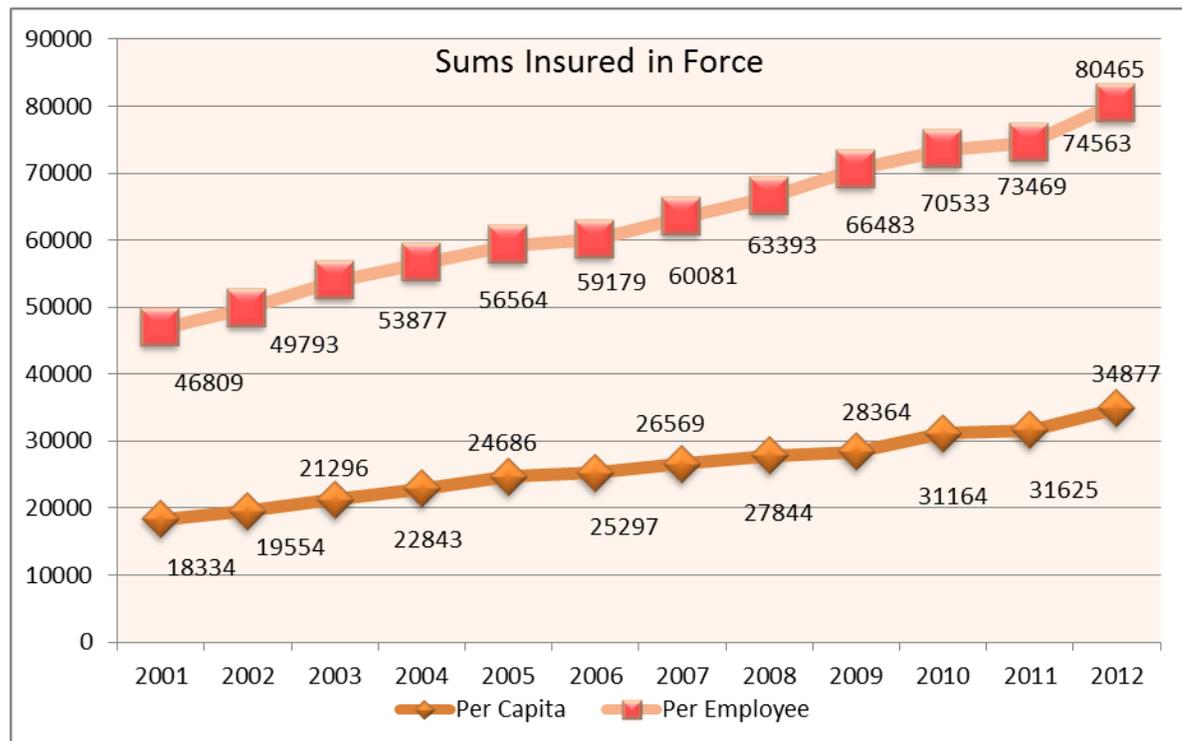


Source: Insurance Annual Reports and <http://www.bnm.gov/insurance>, 2000-2012.

Figure 21: Total Sums Insured In Force for Life Insurance

The significance of life insurance as an essential part of the financial system is exhibited in the growing per capita and per member of employment sums insured. Per capita sums insured reflects the average insurance protection enjoyed by each citizen of a country. In 2003, the figure was recorded at RM12, 374 and in ten years period, per capita sums insured grew by 63.7% to reach RM34, 877 in 2012. The sums insured per member of employment also increased from RM53, 878 in 2003 to RM80, 465 in 2012 as

exhibited in Figure 22. The sums insured of a life insurance policy reflects one of the resources available to enable the dependents to maintain the current living standard in the event of death to the policyholder. The cheapest and fastest way to close the mortality gap is through the purchase of life insurance protection.

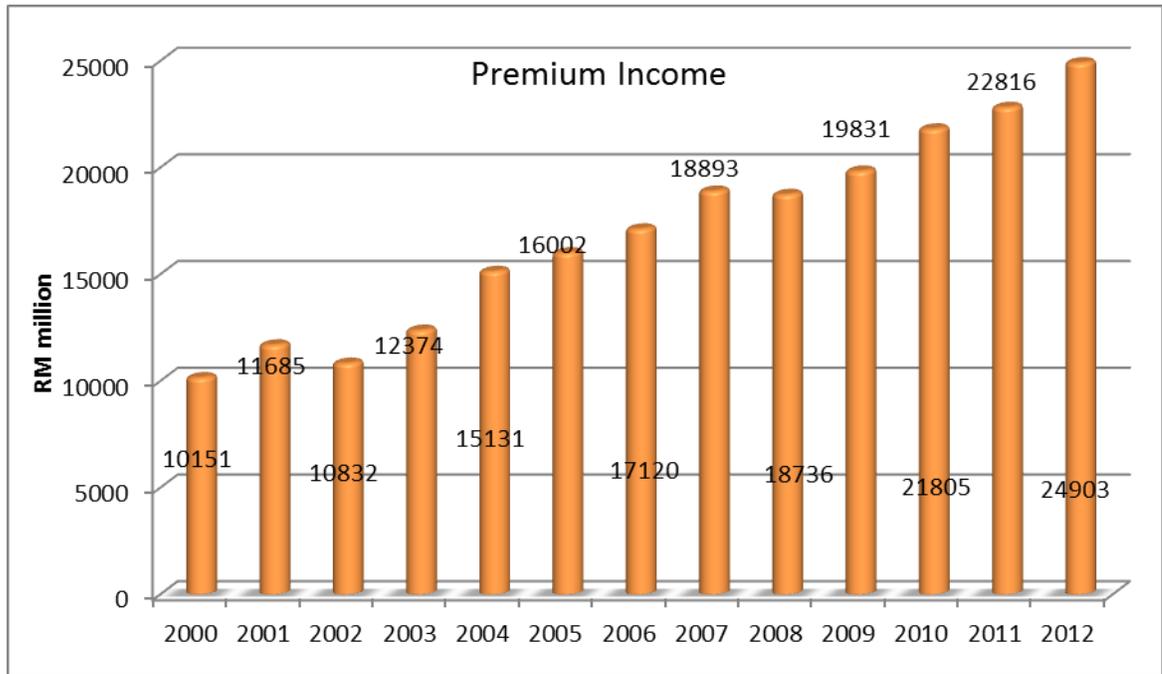


Source: Insurance Annual Reports and <http://www.bnm.gov/insurance>, 2000-2012.

Figure 22: Sums Insured In Force for Life Insurance – Per Capita and Per Member of Employment.

The premium income of the life insurance sector amounted RM24,902.5 million in 2012, which accounted for a share of 67.7% of the total insurance industry premium. The premium income of life insurance grew on average by 8.84% per year in the past decade, compared to 5.09% the average growth rate of the economy. Although the importance of life insurance as a medium for long-term savings and as an alternative investment option remained evident by the positive growth in premium income, global financial crisis experienced between 2007 and 2011 resulted in fluctuating growth rates as depicted in Figure 23. Nevertheless, the relatively under-tapped life insurance market

is expected to record a compound annual growth rate (CAGR) of 7.5% over the years 2012–2016.⁷

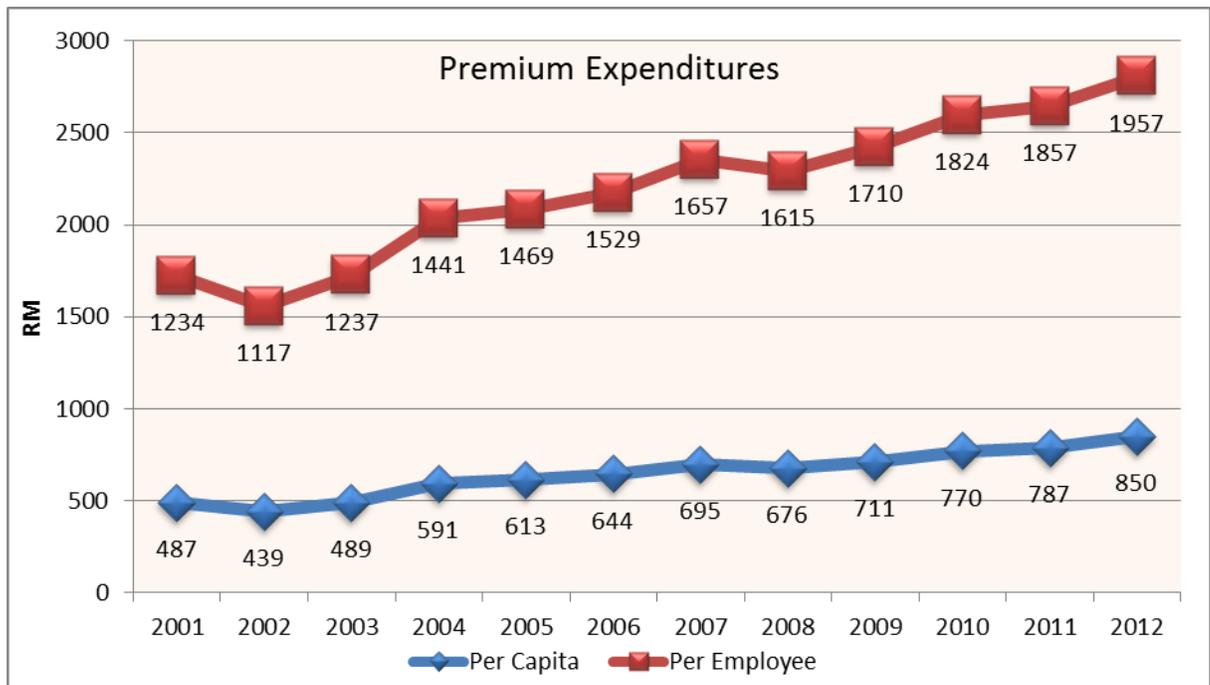


Source: Insurance Annual Reports and <http://www.bnm.gov/insurance>, 2000-2012

Figure 23: Premium Income of Life Insurance

The growth of the Malaysian life insurance market is also evident from the rise in per capita premium expenditure (or insurance density). Over the period of ten years, premium per capita increased by 73.8%, from RM489 in 2003 to RM850 in 2012 as exhibited in Figure 24. Over the same period, premium per member of employment also grew by 50.2% from RM1, 237 in 2003 to RM1, 957 in 2012. The annual average premium per capita of the total population and of the working population in the previous five-year period was RM759 and RM1, 793, respectively.

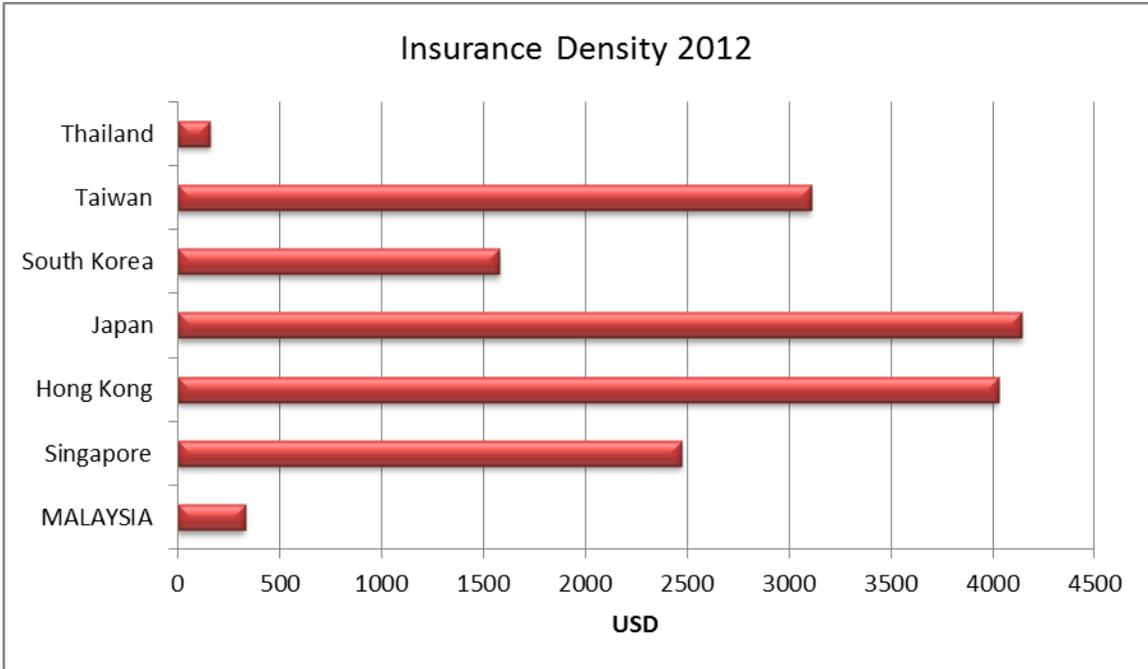
⁷ Life Insurance in Malaysia, Key Trends and Opportunities to 2016



Source: Insurance Annual Reports and <http://www.bnm.gov>, 2000-2012.

Figure 24: Premium Expenditures for Life Insurance – Per Capita and Per Member of Employment.

Although the penetration rate (premiums as a percentage of GDP) and insurance density (premiums per capita) have improved over time, the demand for life insurance in Malaysia remains low compared to other more developed Asian countries. Per capita spending on life insurance was RM850 or USD330 in 2012, lower to the world average of USD373. In the same year, Singapore recorded per capita premium of USD2, 472, Hong Kong USD4, 025, Taiwan USD3, 760, Japan USD4, 143 and South Korea USD2, 785. Similarly, life insurance penetration in Malaysia was 3.08% of the country’s GDP in 2012, and relatively below the penetration rate of neighboring countries. The world average of penetration rate in 2012 is 3.69% (See Figure 25 and Figure 26). These indicators suggest that growth opportunities in the Malaysian life insurance market are substantial.



Source: Sigma: World Insurance 2012, Swiss Re.

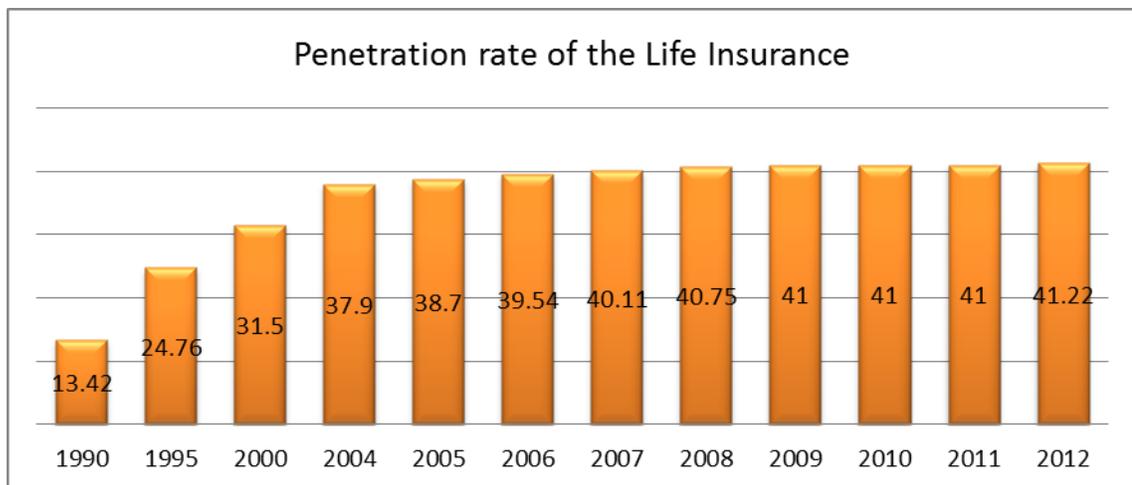
Figure 25: Life Insurance Density (life insurance premiums per capita) for Malaysia and Selected Asian Countries.



Source: Sigma: World Insurance 2012, Swiss Re.

Figure 26: Life Insurance Penetration (life insurance premiums as a percentage of GDP) for Malaysia and Selected Asian Countries.

Market penetration can also be defined as ‘the ratio of the number of policies in force as a proportion to the total population’.⁸ For the period 2000 to 2008, the life insurance market penetration rate increased from 31.5% to 40.75%. The penetration rate has since remained at about 41%. The rate in 2012 was recorded at 41.22%. As consumer’s confidence in life insurance rises, and with government incentive on tax relief for life insurance products, market penetration is expected to steadily increase, driving the growth in the life insurance sector.



Source: Insurance Annual Reports and <http://www.bnm.gov>, 1990-2012.

Figure 27: Market Penetration of Life Insurance (in percentage).

⁸ Insurance Annual Report, BNM, 2001

Appendix 1: Enrolment in the Debt Management Program

Table 1: Demographic Profile of Individuals Who Enrolled Into DMP

	2007	2008	2009	2010	2011	2012	2013 ¹	Total	%
Breakdown by gender									
Male	1,868	6,355	11,621	10,047	10,357	9,949	6,337	61,269	65.4
Female	828	2,598	5,520	5,231	5,225	4,974	3,213	29,713	31.7
Not Stated²	2,248	90	47	3	-	-	-	2,670	2.9
Total	4,944	9,043	17,188	15,281	15,582	14,923	9,550	93,652³	100.0
Breakdown by age									
20≤x<30	3,516	1,394	2,954	2,662	2,350	1,885	959	17,642	18.8
30≤x<40	745	4,084	7,461	6,189	6,277	6,026	3,829	37,239	39.8
≥40	683	3,565	6,773	6,430	6,955	7,012	4,762	38,771	41.4
Total	4,944	9,043	17,188	15,281	15,582	14,923	9,550	93,652	100.0
Breakdown by salary									
<24	4,942	9,043	14,434	6,722	5,064	4,113	2,799	52,462	56.0
24K≤x<36K	2	-	1,206	3,579	4,423	4,261	2,470	16,723	17.9
36K≤x<48K	-	-	752	2,420	2,903	2,965	1,859	11,364	12.1
≥48K	-	-	796	2,560	3,192	3,584	2,422	13,103	14.0
Total	4,944	9,043	17,188	15,281	15,582	14,923	9,550	93,652³	100.0
Breakdown by marital status									
Married	1,291	7,018	12,877	11,516	12,070	11,626	5,749	62,137	73.7
Single	268	1,381	2,938	2,582	2,449	2,294	1,053	12,965	15.4
Divorced	74	365	672	723	808	713	374	3,729	4.4
Widow/widower	30	148	307	294	255	290	197	1,521	1.8
Not Stated²	3,291	131	394	166	-	-	-	3,982	4.7
Total	4,944	9,043	17,188	15,281	15,582	14,923	9,550	93,652³	100.0

Source: AKPK

Note:

- ¹Total Debt Management Program (DMP) case received at month end.
- ²Breakdown by gender and marital status only made mandatory in CCDM in 2011
- ³Adjusted for invalid data and manual opening balance of 4,898 (prior to CCDMS) in March 2013

Appendix 2: Life Insurance Data

The data on sums insured, number of life covered and premium volume for life, medical and critical illnesses coverage provided by LIAM.

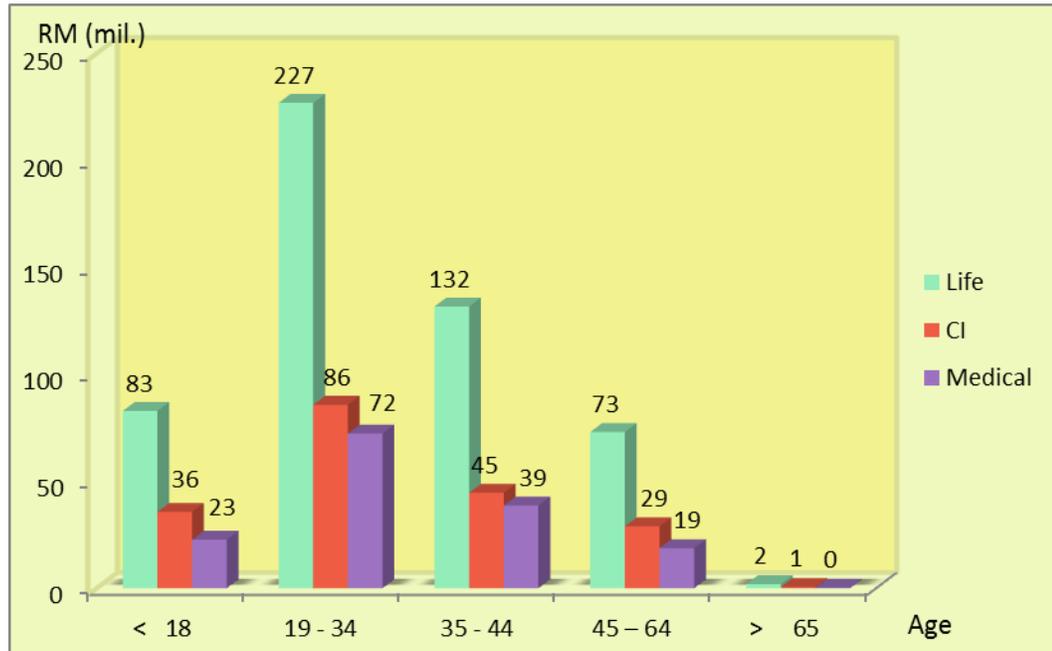


Figure 1. Total Sum Insured by Age and Policy Type

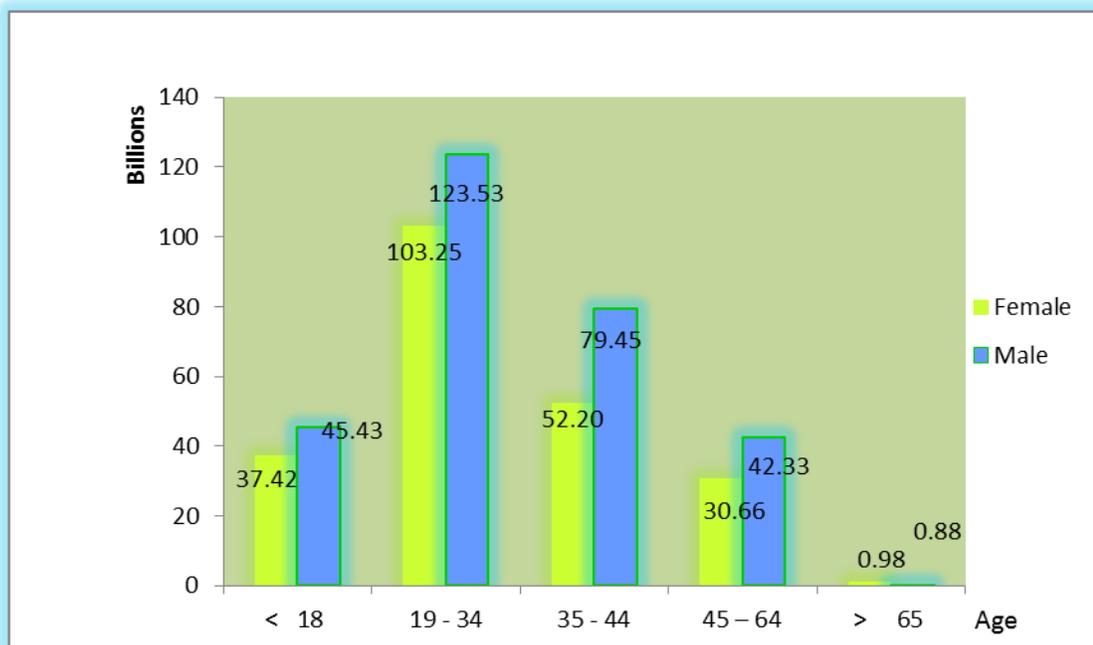


Figure 2. Sum Insured (Life Policy) by Age and Gender

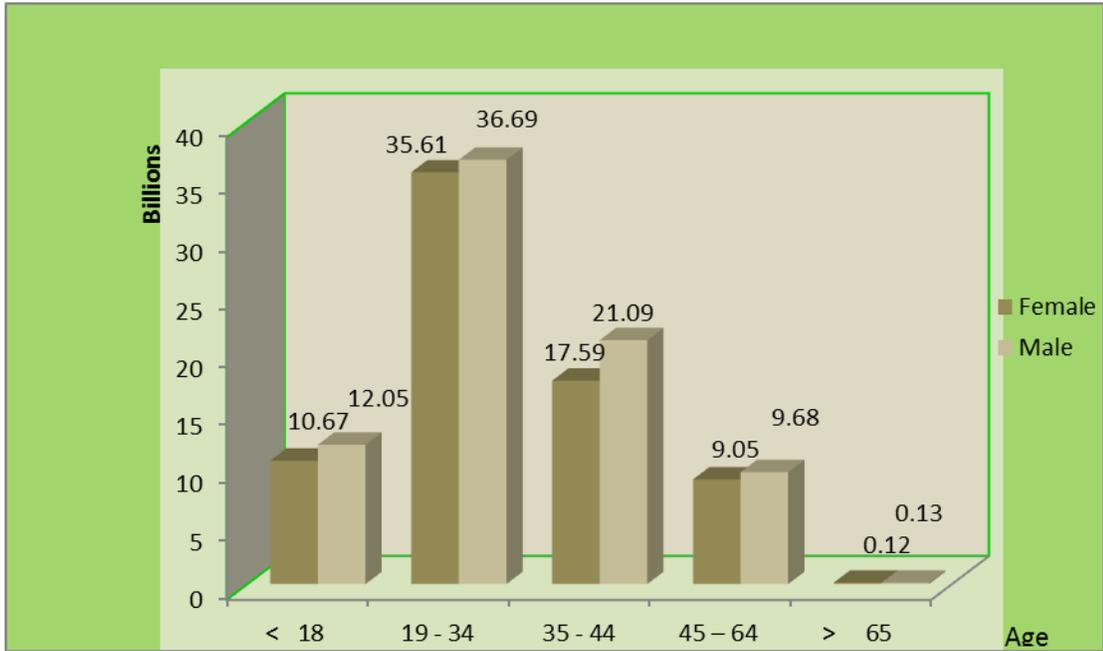


Figure 31. Sum Insured (Medical Policy) by Age and Gender

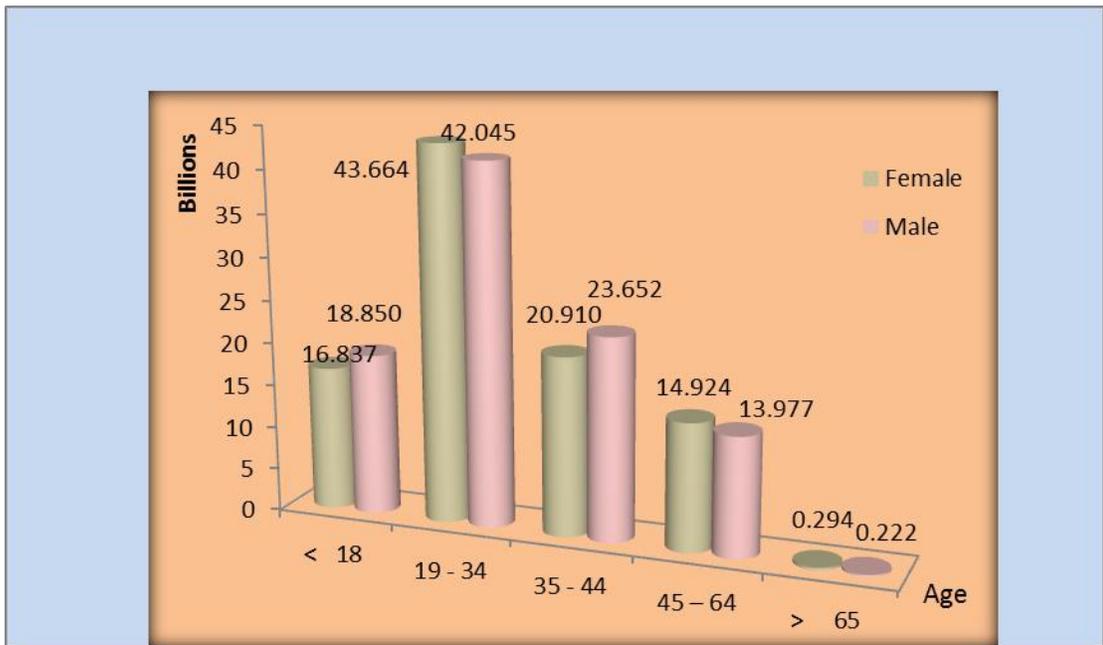


Figure 3. Sum Insured (CI Policy) by Age and Gender

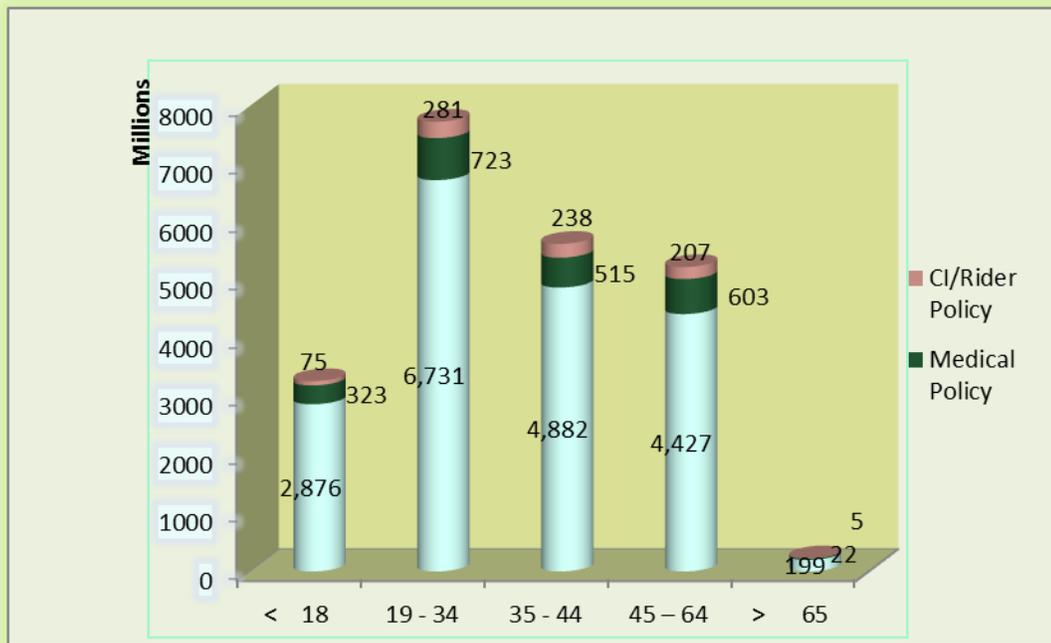


Figure 4. Premium Income by Age and Policy Type

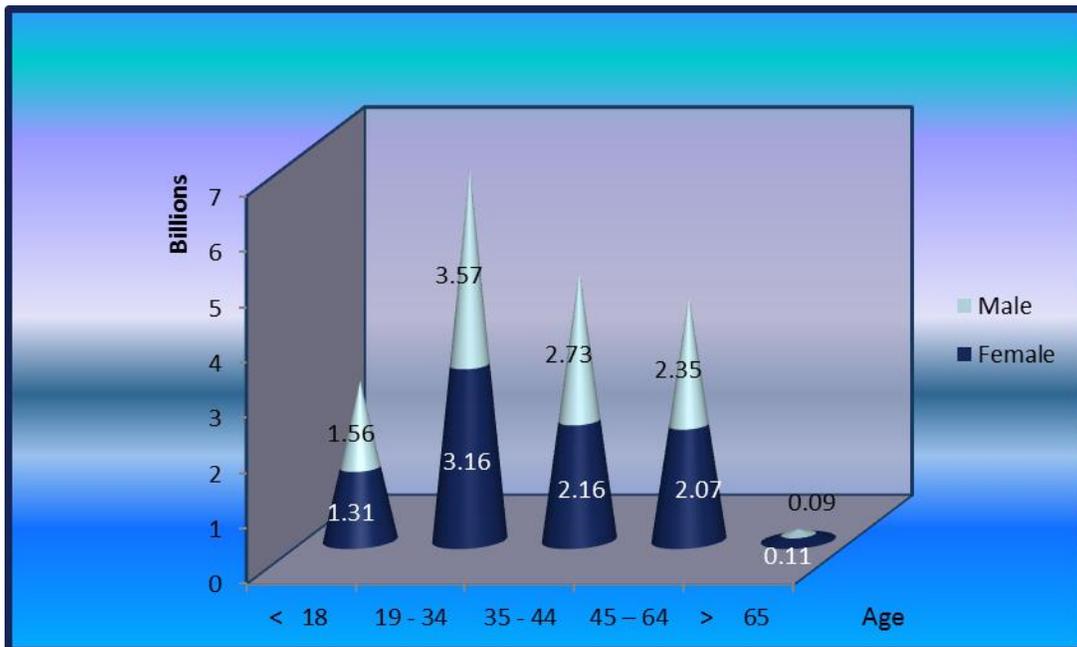


Figure 5. Premium Income (Life Policy) by Age and Gender

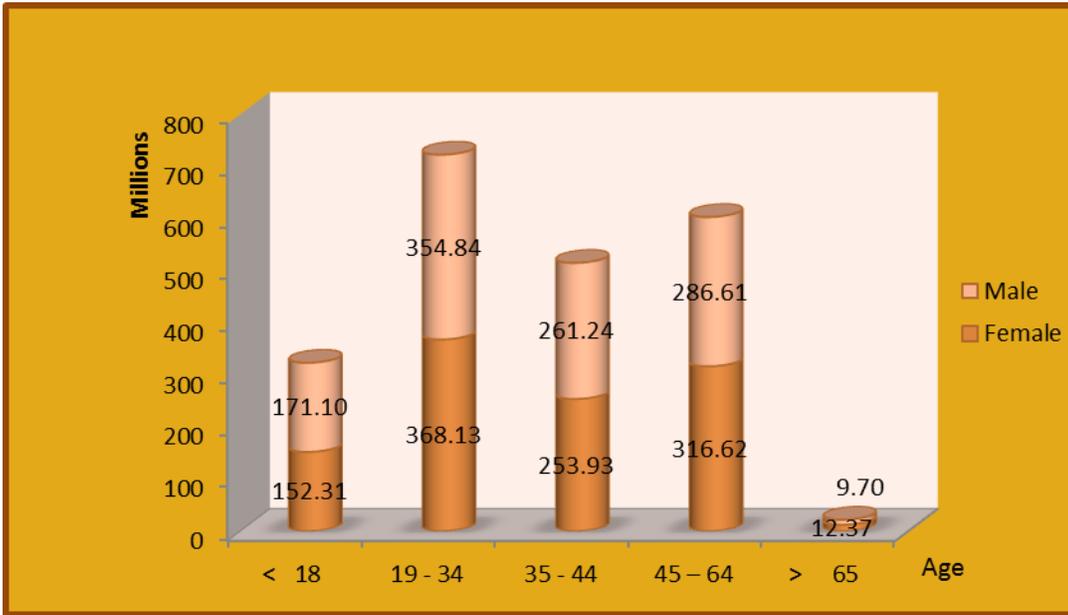


Figure 6. Premium Income (Medical Policy) by Age and Gender

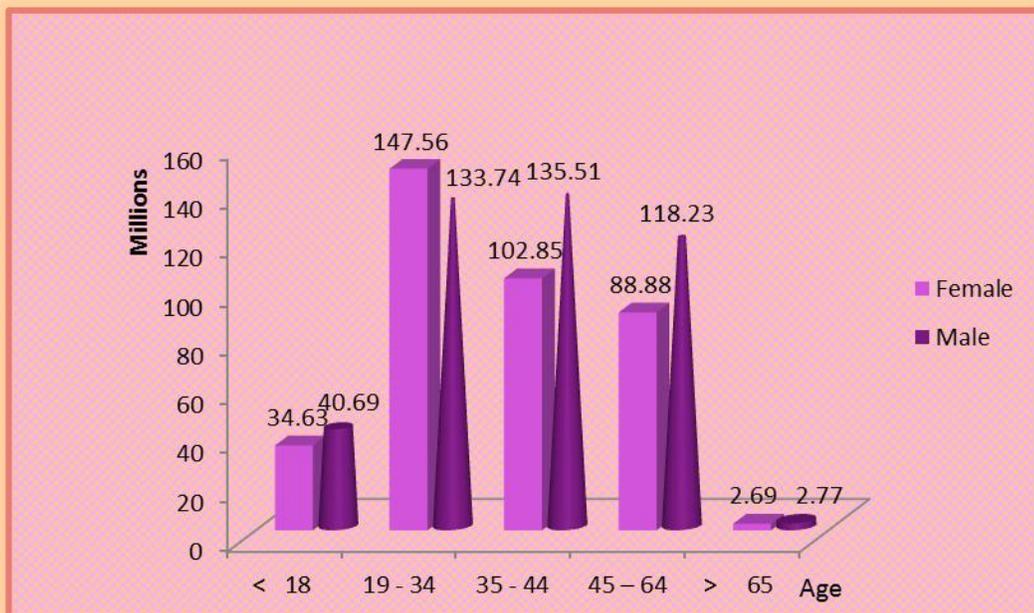


Figure 7. Premium Income (CI Policy) by Age and Gender

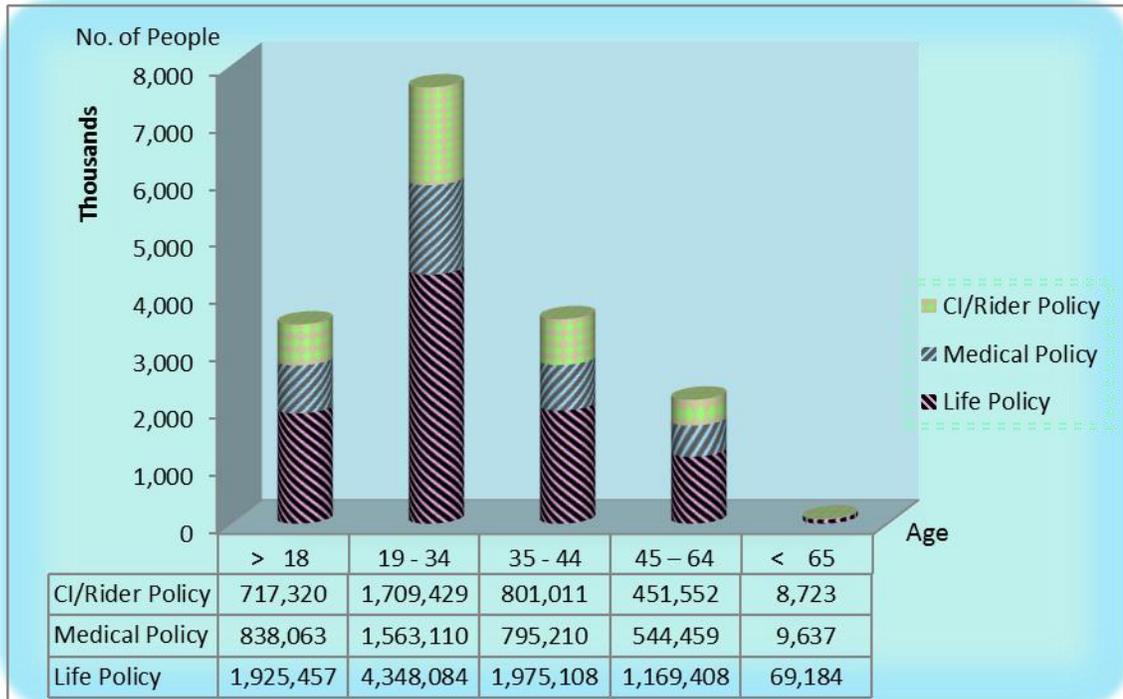


Figure 8. Live Covered by Age and Policy Type

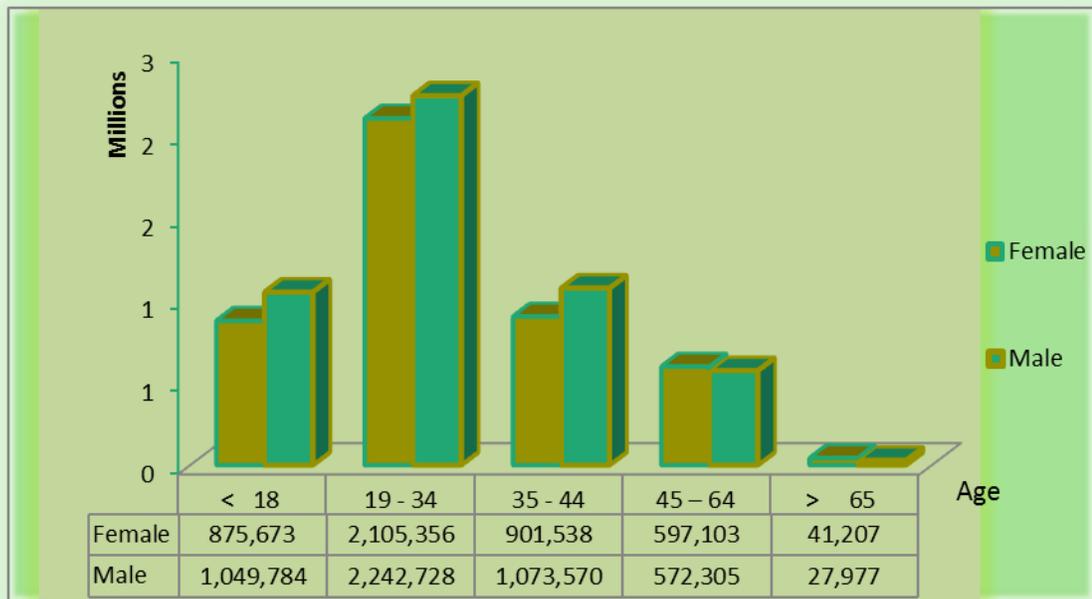


Figure 9. Live Covered (Life Policy) by Age and Gender

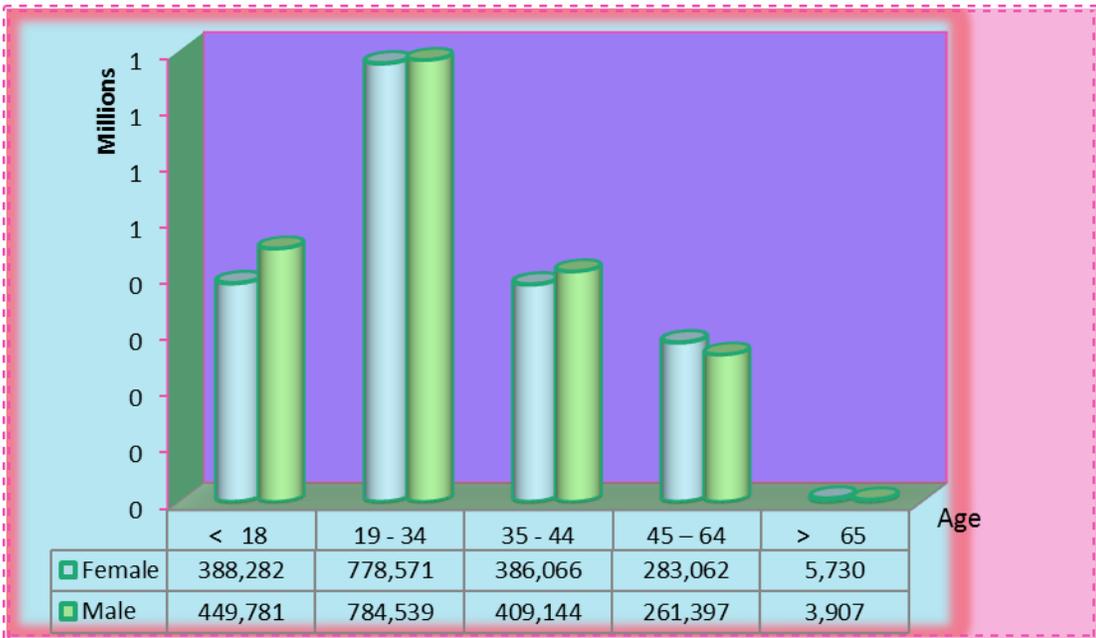


Figure 10. Live Covered (Medical Policy) by Age and Gender

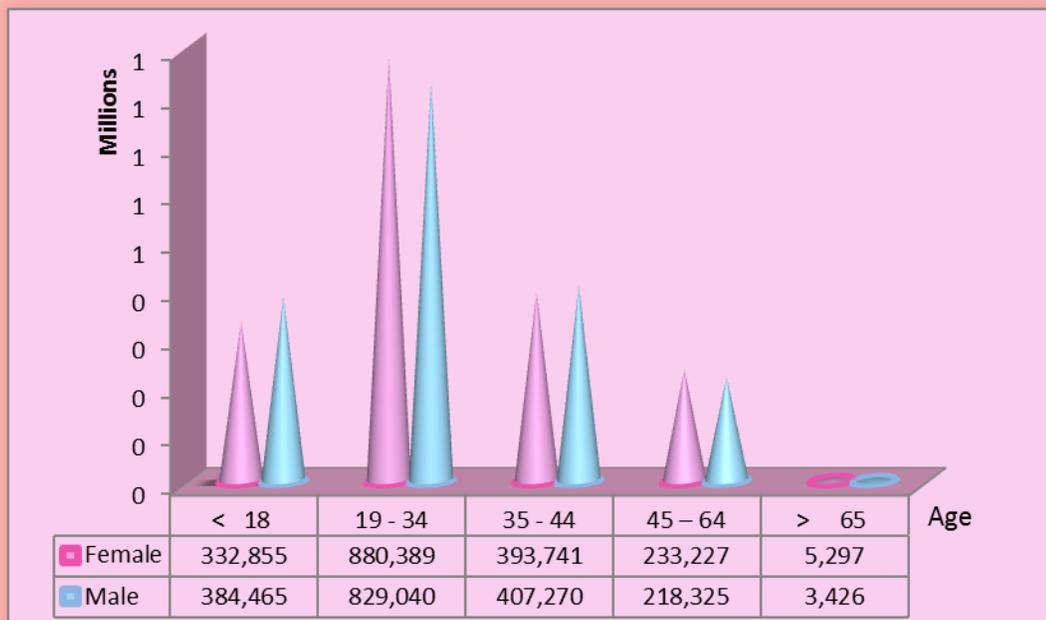


Figure 11. Live Covered (CI Policy) by Age and Gender

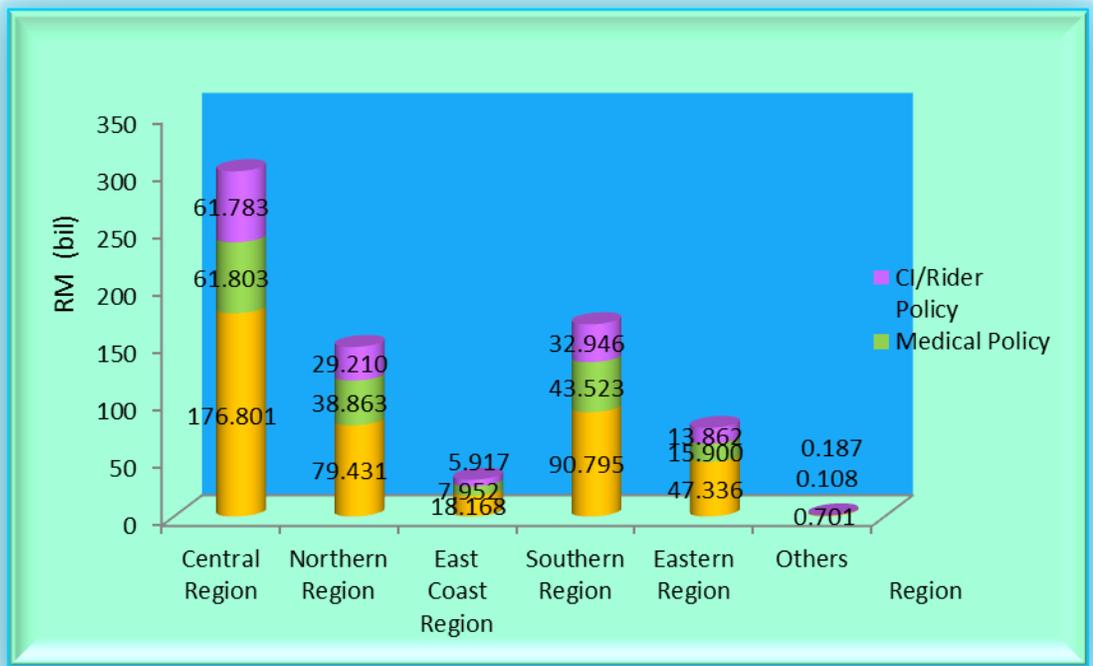


Figure 12. Sum Insured by Region

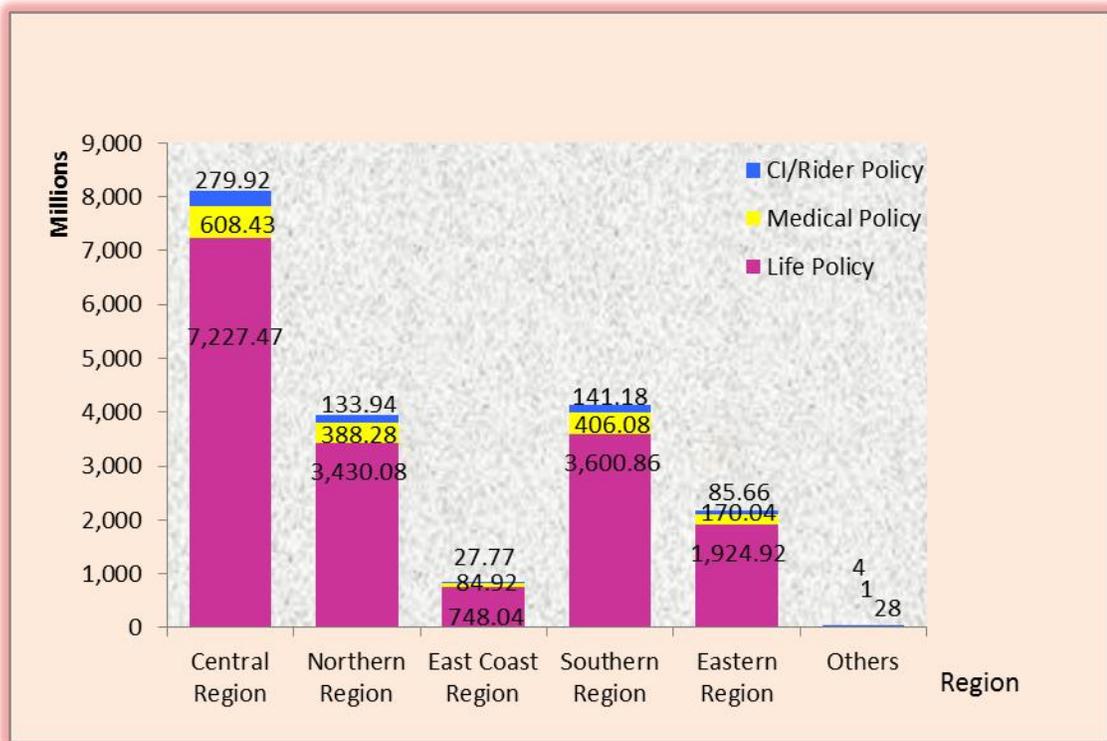


Figure 12: Premium Income by Region

