

Pricing Model in the Concept and Practice of Conventional and Takaful Life Insurance

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Abstract: - The goal of insurance is to uphold a sense of solidarity among the parties involved, shared responsibility in protecting the individual against unexpected risk. Insurance is tools to minimize or transfer risk that has existed on individuals to the insurance company for future loss faced. The Islamic insurance (Takaful) based on the concept of Ta'awun that means mutual help to eliminate forbidden elements in the practice of insurance such as interest (*riba*), uncertainty (*gharar*), and speculation (*maysir*). In the setting rate of insurance pricing risk is very important and crucial role in life insurance policy. The aims of this paper are to identify and investigate the distinction of setting rates for a model of insurance pricing which applied by conventional and Islamic insurance (Takaful). This paper applied net single and annual level premium formula and performed the analysis with a numerical simulation using MATLAB. We found that between conventional and Takaful insurance systems utilize similar methods in the calculation of insurance premium whereas for both are consider pure risk would be faced by the insurance participant. It means that conventional and Islamic insurance utilizing historical data through mortality rate, expected return rate, expected costs and expected amount of claims in the future. Even for both look like applying a similar approach but in the practice of conventional insurance, the premium calculated to mitigate or minimize the risk of the insurance company against an amount of claim faced in the future such as premature death or the maturity contract. In simple terms, it can be called to avoid insolvency of the insurance company. Meanwhile, Takaful insurance is intended to share fair value among participant in determining benevolence through tabarru fund. This means that every participant must pay a premium tabarru to support one another that contributed sufficient amount to cover unexpected claims among them and to uphold mutual fund as evidence the sense of mutual co-operation and brotherhoods among participants.

Key-Words: Conventional and Takaful insurance, pricing model, premium, rate making, risk and tabarru fund

1 Introduction

The major objective of life insurance contract is to provide the benefits, which depends on risk regarding survival probability of individuals. The risk is a condition under uncertainty, it sometimes unpredictable that can be caused affliction to the people exposed. The providing of risk protection against a form of pure risks, such as the premature death is extremely important and plays a crucial role in life insurance policy [2]. In a natural phenomenon, most of peoples or everybody will be exposed all sorts of risks in their daily life. It is may be unexpected and some of them unforeseen [9]. These risks may happen in one's life, properties, or business ventures. In the fact, these risks influence the lives many of the individuals in a society that sometimes would be giving effect so devastating and shattering. As a result, it can be, leaving

unfortunate peoples of the vulnerable and helpless conditions [11].

The people will purchase an insurance policy to transfer or to minimize her/his some risk to the insurance company when known that they would be facing the uncertainty of loss in the future, and they agree to pay compensation to the insurance company as a protection agreement are we known as an insurance premium. In the agreement, the insurer will be paid a sum of money if insured faced losses such as accident, injury or premature death and it would be paid as long as insurance the insurance policy is in-force position [16].

The development of insurance practice in the current era originated from two civilizations namely the Babylonians civilization around 4000 – 3000 B.C. and ancient Arab tribes about 570 A.C. The insurance practice of both civilizations now have

been distinguished become two systems which known as the conventional and Islamic insurance systems. Despite, the main purpose of both the insurance systems is to create and uphold the value of solidarity and responsibility among the parties involved are accordance with the principle of mutual cooperation while one of them experiencing an unfortunate event that caused suffering [14]. However, there is a great difference in the practice of the conventional insurance system in the views of Islamic teachings, because of the practice of conventional insurance is present the elements which prohibited by sharia namely *riba*, *gharar*, and *maysir* [13].

Currently, Islamic insurance presents as an alternative to the conventional insurance, this is the form of resistance by Muslim Ummah. Because for the Muslims, Islam is complete ways of life that endeavor to build the wholly the structure of human life and culture because the Muslims hold on that the Islam is a religion based on peaceful coexistence with fellow man through maintenance of stable and conservative societies. In another word, Islam is a society that cares for the most of the unfortunate members then the outcome is a Muslim community can thrive, free from crime, bitterness, and sadness [9].

The Islamic insurance practice is extremely different with the conventional insurance, this is because in the policy of Islamic insurance is based on the concept of Al-Mudharabah, it is a mutual financial transaction between two parties with a profit and loss sharing and must be free from the elements that are prohibited and unlawful in the eyes of the sharia. The model of Islamic insurance policy based on the divine principles of solidarity and mutual co-operation, such as which has enshrined by Allah (s.w.t) in the Holy Qur'an [1]; "... and help you one another in righteousness and piety".

On a model of Takaful life insurance, it is based on the Shari'a principles whereby the insurance policy does not involve the forbidden elements in the teachings of Islam, such as usury (*riba*), uncertainty (*gharar*) and speculation (*maysir*), but it is accordingly on Al-Mudharabah (*the loss and profit sharing financing technique*). Mudharabah is one of the major Islamic concepts that referred in the context of insurance by Islamic insurance operator today. It is a contract whereby one party (Rabb al-mal) entrusts a sum of money to another party (the Mudarib) to trade with for an approved proportion of the profits [17]. The profits which, received by the operator (mudarib) from such transaction should

be shared by both parties, namely the operator (*mudarib*) and participant accordingly [18].

This paper focused on the aspect of rate setting in life insurance premium as concept and practice applied in the conventional and Takaful Insurance taking into account individual risk. Because individual risks play a crucial role in life insurance policy and the restriction of the insurance company to predict the total of risk that would be protected precisely or accurately. The consequence of the issue is the insurance company automatically would be facing a larger problem such as lowering of demand for insurance that affected by premium insurance which giving the influence to achieve target premium income and cause insolvency of the insurance company. The objective of this paper is to clarify and investigate the distinction calculation on setting rate of life insurance premium between conventional and Takaful (Islamic insurance) taking into account risk. Because it plays a crucial role to determine life insurance premium

2 Literature Review

This section would be reviewing previous study related to the development of the conventional and Takaful Insurance, a premium of life insurance and then would be presented and discussed the result then to conclude with a discussion and the essential findings.

2.1 The Origin of Conventional and Islamic Insurance

The primary idea regarding of insurance comes from the Babylonians and their civilizations around of 4000 - 3000 B.C. Since the beginning of this idea about insurance through the contract of *Bottomry* which illustrates that, the world witnessed a gradual development of this idea through their basic principles of insurance among countries them such as Babylon, Greek, Rome, Italy and India. The practices of insurance have been obtained an appreciation of the many societies in the world throughout the history which role as a significant financing technique [6].

The nature of *Bottomry* contract, it was introduced by the merchants of Babylon whereby they have applied the money or goods were advanced to the merchants for the aims of trade. A pure loan is one of which became consideration of interest in which the lender had the right to claim at a fixed rate of interest from merchant more than or above the loan, or between such as a loan for

interest and capital for a share of profits from the trade. The transaction who conducted between the lender and the borrower based on a mutual understanding with consideration of the payment of the interest and the lender should be protecting the borrower from liability against unforeseen and accidental happenings in the trade. The interest payments in *Bottomry* contract have similarities with insurance premiums today, whereby the merchant (borrower) such as insured and the lender played the role as an insurer [3]. Therefore, it can be concluded that the practice of conventional insurance today originated from the practice of an ancient Babylonian era through the *Bottomry* contract [12].

Today's, the practice of insurance through "*Bottomry Contract*" obtained a substantial recognition in the common law, as recent years have witnessed that a rapid development in this area. Such a rapid development might have resulted from the rapid growth of the lawful system in the field of commerce and trade. Conversely, in the Islamic law, the main idea of insurance originated from the practice of ancient Arab tribal custom before 570 A.C through the doctrine of *al 'Aqilah*. It was common practice by ancient Arab tribes that, if any the tribe member killed by another tribe member then an heir of the victim would be received payment an amount of blood money as a compensation for the close relatives of the killer. It consequently obtained recognition under Islamic law based on the agreement of the Holy Prophet Muhammad (s.a.w) within one of his verdicts against a woman from the tribe namely *Huzail*. Therefore, the main idea of *'Aqilah* was that the tribes of ancient Arab had to be prepared to make a financial contribution on behalf of the killer to compensate the heir of the victim such readiness to make a financial contribution which has resemblance with the premiums in the practice of insurance. While the payment of compensation to the heir of a victim under the system of *al 'Aqilah* could be similar to the indemnity in the insurance practice now, it is a form of monetary protection for the beneficiaries against inevitable affliction such as the premature death of the victim [10].

In the main views of the conventional insurance system, insurance is minimized of risk or transferring risk from customers that are individual and a company by the sharing of uncertainty (risk) to the large group of customers [19]. According [20] defines that insurance constitute of the contract whereby the individual (*insured*) agreed to pay compensation or costs of purchasing a specific agreement (*premium*) to the insurance company

(insurer) with sum of money or value to cover of loss from particular events such as premature death, injury, illness, accident, permanent disability and other unforeseen circumstance.

Accordance with previous descriptions, it was confirmed that conventional insurance extremely different with *Takaful* insurance. The discussion about permissible and prohibited around an insurance issue which until today becoming an important issue in the field of the Islamic financial system at risk and insurance. The application of both insurances has similarities and differences. The similarities of both applications of insurance can be seen from two civilizations of insurance namely indemnity, whereas differences between both systems of insurance is the *bottomry* contract, transaction who made by the lender and the borrower following the concept of the mutual understanding, whereas the borrower should be paying the interest and the lender should be protecting the borrower from liability for unexpected loss and accident in the trade. Besides that, for *Takaful* insurance is originated from the tribes of ancient Arab known as the contract of *'Aqilah* where the killer to compensate the heir of the victim such readiness making a financial contribution. It has a resemblance with the premiums in the practice of insurance today.

Following the issue related practice of the contract used in conventional and *Takaful* still presence forbidden element in views of Islam law. So, starting from this discussion about the validity of insurance still becomes an important issue among researchers.

2.2. Ratemaking on Life Insurance Premium in the Conventional and *Takaful* Insurance

In an insurance company, the rate of premium insurance plays an important role, whereas it is based on the concept of pooling or sharing of loss. Black and Skipper (2000) stated that the sharing of loss, in turn, involves the accumulation of a fund from amounts paid by insured to provide benefits for the unfortunate few who suffer loss, where to establish the amount to be charged by the insurer to the insured must start with some idea as to likelihood of loss for the group. The likelihood of losses in life insurance is shown by specially constructed namely mortality table. Mortality table represented a record of mortality observed in the past and is arranged so as to show the probabilities of death and survival at each age separately. It shows hypothetical group individuals beginning

with a certain age and traces the history of the entire group year by year until all have died.

The basic principle of insurance pricing is if insurers are to sell coverage willingly, they must receive premiums that, first premium is sufficient to fund their expected claim and administrative expenses. Second, premiums are providing an expected profit to compensate for the charge of obtaining the capital necessary to support the sale of coverage. In addition, the premium level that is just sufficient to fund the insurer's expected costs and provide insurance company owners with a fair return on their invested capital is known as the fair premiums [8]. Further, [5] confirms that insurance premiums must be adequate, which means that for a group of contracts, the money collected from policyholders, plus the interest earned from the investment of these amounts, shall be sufficient to pay all promised amounts and cover the insurance company expenses; insurance premiums must be equitable, that risk must consider each person insured; insurance premiums should not be excessive compared to the sums insured.

The rate of premium for life insurance policy is based on two underlying concepts namely mortality and interest. However, there is the third variable is the expense factor which is the amount the company adds to the cost of the policy to cover operating costs of selling insurance, investing the premiums, and paying claims. Mortality in life insurance is based on the sharing of the risk of death by a large group of people. The amount at risk must be known to predict the cost to each member of the group. Mortality tables are used to give the company a basic estimate of how much money it will need to pay for death claims each year. By using a mortality table, the insurer can be to determine the average life expectancy for each age group. Later, the rate of interest is the second factor used in calculating premium that is interest rate earnings. Companies invest your premiums in bonds, stocks, mortgages, real estate, etc., and assume they will earn a certain rate of interest on these invested funds [15].

In addition, third consideration is the expenses of operating the company. The company estimates such expenses as salaries, agents' compensation, rent, legal fees, postage, etc. The amount charged to cover each policy's share of the expenses of operation is called the expense loading. This is a cost area that can vary from company to company based on its operations and efficiency [15].

The values of life insurance and annuity liabilities move in opposite directions in response to a change in the underlying mortality. Natural hedging utilizes this to stabilize aggregate liability

cash flows. They have shown empirical evidence that the insurer who utilize natural hedging also charge lower premiums than otherwise similar insurers. This indicates that insurers who are able to utilize natural hedging have a competitive advantage. In addition, they show how a mortality swap might be used to provide the benefits of natural hedging to a firm business [7].

Furthermore, the practice of Islamic insurance, insurance premium originated from the idea of '*Aqilah*' whereas the tribes of ancient Arab had to be prepared to make a financial contribution on behalf of the killer to compensate the heir of the victim such readiness to make financial contributions. While the payment of compensation to the heir of a victim under the system of *Al 'Aqilah* could be similar to the indemnity in the insurance practice now, it is a form of monetary protection for the beneficiaries against inevitable affliction such as the premature death of the victim [10].

According to previous studies, we found that the setting rate of insurance premium greatly affected by risk. It is necessary to convert a random value between gain and loss in financial terms specifically in insurance premium or pricing of insurance. It is an interesting finding for further discussion because the standard approach used in the calculation to setting rate of the life insurance premium almost similar. But, in the conventional and Takaful insurance still applied the similar concept namely indemnity. Hence, we would be investigate pricing model in the determination of life insurance premium, specifically for Takaful insurance as evidence that there are the differences between the two systems of insurance, not only differ on sides of name or terms, for example, in conventional insurance premium to cover risk called risk premium, and Takaful insurance named tabarru (charity fund).

3 Methodology

This paper treats the most important topics related to the calculation of premiums for realistic insurance and annuity contracts. It was applied quantitative analysis to achieve the objective of this study and a numerical simulation using MATLAB. The qualitative analysis used to elaborate whole of the ratemaking system by the insurance company on the setting rate for premium insurance and to investigate the dissimilarity method applied in the two types of insurance namely conventional and Takaful insurance. Almost all life insurance products are actuarially created by calculating the relationships of mortality, interest, and expense and

the financial values resulting from each based on time. This study would be considered at length net single premium formulas for insurance and annuities due, under the standard assumptions of the survival function between integer ages, when there is a periodical premium per year. The calculation would be highlight related with the death benefits payable and benefits payable if insured still alive until the insurance contract ends.

Basic models for setup of premium insurance are statistical and financial approach is applying through random variable [15 - 21]. It analyzes the total monetary amount of claims arising from an insurance pool during a specified reporting period (e.g., one year). The total amount of claims is the sum of the expenses for claims of the individual exposure units comprising the pool.

First, we calculate the present value of the future death benefit known as net single premium calculation. The model used to setup rate of net premium insurance applied in insurance such as below:

$$H(P) = \omega \left(\frac{Lx_{t=0} - Lx_{t+1}}{Lx_{t=0}} \right) \left(\frac{1}{1+i} \right)^n \quad (1)$$

It can be written in the simple forms such as:

$$H(P) = \omega (1-p_x)(v^n) \quad (2)$$

Where $H(P)$ is the function of premium, ω denotes as the sum of insurance coverage planned by the insurance participant or the insurer must be protected if insured facing of loss. Lx_{t+1} is the number of the policyholder live until the time period of the contract and $Lx_{t=0}$ denoted as the number of the policyholder live while the installment of insurance. It is can be called probability death of the policyholder, and then i is the interest rate, and v_n known as a discount factor.

Nevertheless, in the Takaful, there is no implementation of interest as notation i in the formula. However, the practice of present value and future benefit still applied by using return rate denotes by $(1+r)$. r is appropriate opportunity cost by the seller (Insurance company). It is calculated following the gross domestic product or economic growth

Then the formula can be rewritten for Takaful insurance as follow:

$$H(P) = \omega \left(\frac{Lx_{t=0} - Lx_{t+1}}{Lx_{t=0}} \right) \left(\frac{1}{1+r} \right)^n \quad (3)$$

In the simple form rewrite as:

$$H(P) = \omega (1-p_x)(v^n) \quad (4)$$

The rate setting of net single premium payment is based on three main assumptions, namely,

premiums are paid at the beginning of the policy year, second death claims are paid at the end of the policy year, and the death rate is uniform throughout the year. Further, after we have obtained the value of net single premium having that determines net annual level premium payment, the formula can be written such as below:

$$NALP = \frac{\omega (1-p_x)(v^n)}{PVLAD - (t-T)} = \frac{H(P)}{PVLAD - n} \quad (5)$$

The description of the above formula is if the premiums are paid for life, the premium is called a whole life annuity due and if premiums are paid for only a temporary period, the premium is called a temporary life annuity due. This paper would highlight through following above formula and derivation of the formula related. Where the basic principle the rate setting of the insurance premium is statistical and financial technique, it is based on present and future value formula. Following the previous formula, we desired to determine and investigate the differences of rate making applied in conventional and Takaful insurance.

4 Discussion

The rate setting of life insurance premium used by conventional insurance firsts considers the amount of insurance coverage and it is multiplied by the number of insured alive at the ends of period and second expected value of interest rate to obtain all cost must be paid by the insured as agreed to pool risk in a large group of peoples. It is usually known as a discount factor that functioned as to obtain the present value of future cash flow. The premium applied by conventional insurance here called net single premium, this is the primary technique to determine how insured must be paid insurance coverage in the amount of coverage such expected by the insured. In this case, we are using 1 unit exposure purchased by the insured/ sum of insurance coverage is \$1000, time of insurance contract that is 10 years, and we are assuming the value of guarantee rate is 5 percent, and then the age of the insured is 30 years old. Using the equation (1 and 2) we are obtained as below:

The Fig. 1 exhibits that the premium insurance charge for insured if he or she wants to buy insurance coverage, is \$1000 at 10 years, the age of the insured is 30 years old and guarantee rate is 5 percent. Then the premium charge or premium should be paid by the insured to the insurer is \$103 per unit exposure. We can observe red line indicates the accumulation of premium paid annually by

insured to cover risk would be faced in the future. Further, look that the value of the investment fund after deducted expenses such as a risk premium, administrative and operational cost refer green-line it is the accumulation of a fund for investment. This illustrates that for 10 years contract until maturity, there are expenses which time to time smaller. The beginning of one year insured must be paid high cost included operational cost almost 50 percent or \$53 of the amount of payment until the last year or before insurance the ends that are \$8 or 7.8 percent.

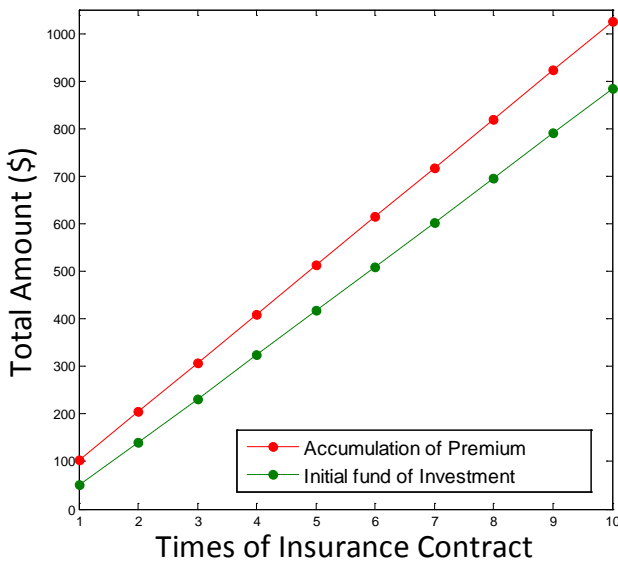


Fig.1 Value of accumulation premium and an initial fund of investment in Conventional Insurance

Further, we will show about accumulation return on investment and accumulation of premium. Following Fig. 2 demonstrates that investment return time to time increase, the beginning of first-year investment fund only \$50 until the end of the year is \$890 or 87 percent from the accumulation of premium received from the insurer. So, because this product has great benefit, whereas if the is insured death before the insurance contract ends or maturity time, his or her beneficiaries would be obtained payment as much as the sum of insured coverage added with the accumulation of investment return. For instead if 5 years later, after insuring the death (premature death) beneficiaries receive 100 percent sum of insurance coverage plus investment return compounding \$419 or total amount received is \$1,419. Then, if insured still alive at the ends of insurance contract he or she would receive payment from the insurer as much as investment returns \$890.

In this case, we do not include the assumption of investment, here we only involved rate as big as 5

percent or called guarantee rate. Therefore, if the conditions like this we can be concluded that the total amount which paid by the insured to the insurer is \$1.025 for 10 years and insured would receive \$890. This means that the insured loss around \$135 (this value of risk to cover the risk of insured in times of insurance).

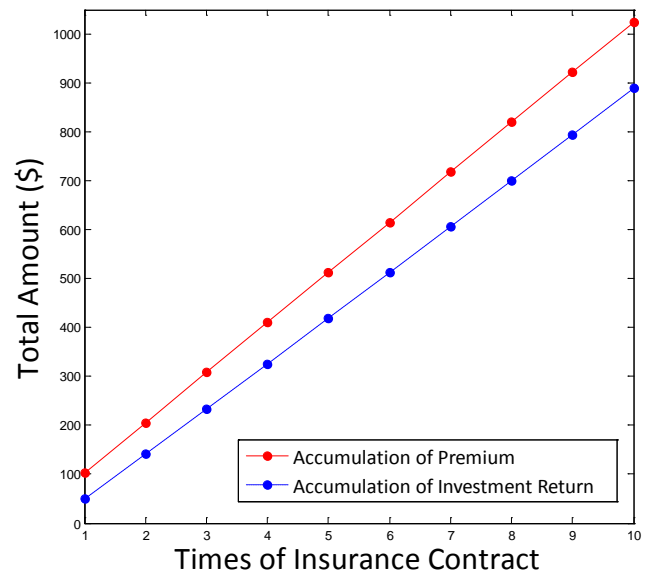


Fig. 2 Value of accumulation premium and investment return in conventional insurance

Besides that, in the practice of Takaful insurance, the premium ratemaking used a similar technique which applied by conventional insurance. Nevertheless, in the Takaful insurance the relationship between the insurance company and participant or insured is based on a contract namely mudaraba. It means to eliminate the forbidden element prohibited in Islamic views. The mudaraba contract employs as a form of profit and loss sharing, whereas through this contract Takaful insurance has changed the relationship between insurer and insured and among insured.

The issue permissible and prohibit elements in the application of insurance not only in the rate of interest share from insurer to the insured only but in Takaful also giving a profit through the participant account or an account that has contents investment fund after deducted operation fees and tabarru fund. The tabarru fund is one of the terms used by Takaful insurance, in the conventional insurance tabarru fund called risk premium, it looks like a different name, but in the practice, it is different. Because, in the practice of the Takaful insurance tabarru fund is compensation should be paid by the insured to uphold the sense of mutual help, solidarities, and brotherhoods. The calculation applied is separated

between the amounts of insurance coverage based on the expected claim faced and operating expenses should be spent by the insurance company in managing an investment fund of insured to obtain a return that would be shared as profit normally each year of the insurance contract.

The ease understanding related this implementation of ratemaking by Takaful, the below figure used can be described as follows:

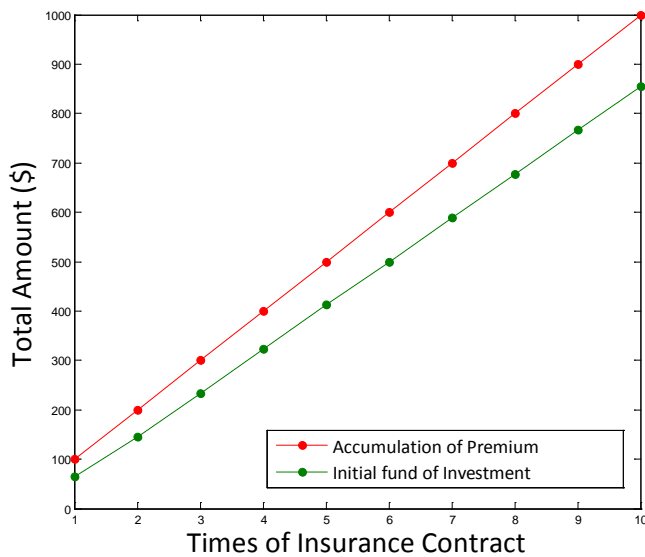


Fig. 3 Value of premium payment and initial investment fund in Takaful Insurance

Based on the same case in the previous example, Fig. 3 shows that the premium insurance charge for insured if he or she want to buy insurance coverage is \$1000 at 10 years, the age of the insured is 30 years old and guarantee rate is 5 percent. Then the premium charge or premium should be paid by the insured to the insurer is \$100 per unit exposure. We can see the red line indicates the accumulation of premium paid annually by insured to cover risk would be faced in the future. Further, look that the value of the investment fund after deducted expenses such as a risk premium, administrative and operational cost refer green-line it is the accumulation of a fund for investment. Nevertheless, in Takaful, insurance premium assumed is compensation to share risk among participant or called tabarru fund, further margin annual premium after deducted tabarru fund would be reduced other cost such as operational and administrative expenses.

Having that the annual premium after deducted expenses, it would be called participant account this is content, the amount for invested by the insurer. Following the description, before this is clear that for 10 years contract until maturity, there are

expenses which time to time smaller. The beginning of one year insured must be paid high cost included operational cost almost 35 percent or \$35 of the amount of payment until the last year or before insurance the ends that are \$11 or 1.1 percent compounding. This can be summarized that the annual premium paid by the insured on Takaful insurance cheaper compared with conventional is \$3 (\$103-\$100), although cost at the beginning of the year is able categorized low around 35 percent, but in the 9 to 10 years insured spent \$11 or 1.1 and overall expenses have to pay by the insured is \$145 this cost greater than cost in conventional insurance is \$140 or have a marginal value of \$5. It has caused by Takaful insurance is created a different function in a calculation based on mudaraba concept. Whereas, each of charge portion separated to fulfill Shariah compliant in order to clear in the type of contract. Furthermore, we would be showing about the accumulation return on investment and accumulation of premium in Takaful insurance practice:

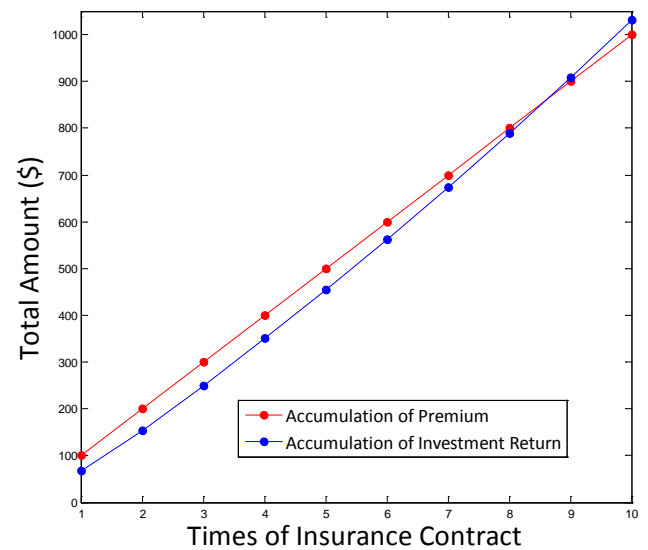


Fig. 4 Value of Accumulation premium and investment return in Takaful insurance

Following Fig. 4 displays that investment return in Takaful insurance is increasing time to time, the beginning of first-year investment fund only \$67 until the end of the year is \$1.032 or 103.2 percent from the accumulation of premium received from the insurer. So, because this product has great benefit, whereas if the is insured death before the insurance contract ends or maturity time, his or her beneficiaries would be obtained payment as much as the sum of insured coverage added with the accumulation of investment return. For instead if 5 years later, if insured death (premature death)

beneficiaries receive 100 percent sum of insurance coverage plus investment return compounding \$455 or total amount received is \$1,455. Then, if insured still alive at the ends of insurance contract he or she would receive payment from the insurer as much as investment returns \$1,032. In this case, we do not include the assumption of investment, here we only involved rate as big as 5 percent or called guarantee rate. So, if the conditions like this we can be concluded that the total amount which paid by the insured to the insurer is \$1.000 for 10 years and insured would receive \$1,032. This means the insured earn yield around \$32 (this a share of surplus underwriting and sharing profit from investment fund with pre-agreed is 70 percent for insured and 30 percent for the insurer). Furthermore, can be seen the figure of the accumulation value of the investment return that has the conventional and Takaful insurance:

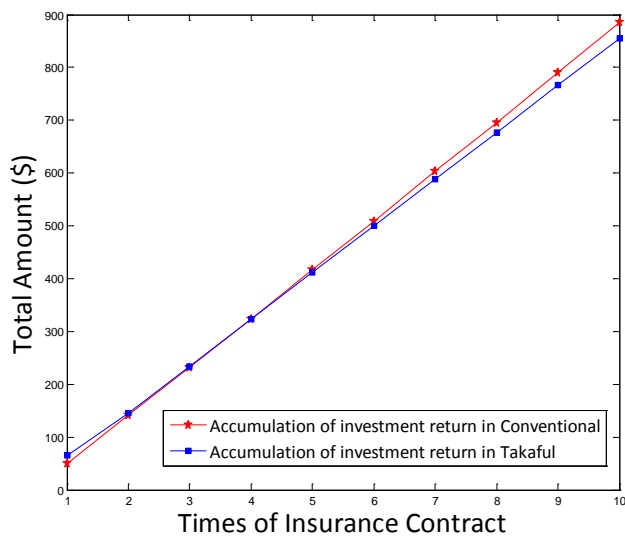


Fig. 5 Value of Accumulation investment return in conventional and Takaful insurance

Following the above figure, we can be concluded that accumulation of investment return on the conventional insurance for year to year has increased, this differ with Takaful insurance although in the first year the value of investment return higher than conventional insurance, but to the next year until the maturity of the contract the accumulation investment return is decrease.

Further, Fig. 6 giving information for us, where annual investment return obtained by the conventional insurance from time to time are increased (see red line). Meanwhile, for the Takaful insurance annual investment return begin in the first year to the second year very large that is \$33 to \$133, then for the future time is decreased. If we would be determined how much average annual

investment return would be shared by the conventional and Takaful insurance to the participant or policyholder is \$180.70 and \$122.40 and total investment return would be earned by the policyholder is \$1,807 for conventional insurance and \$1,224 for Takaful insurance.

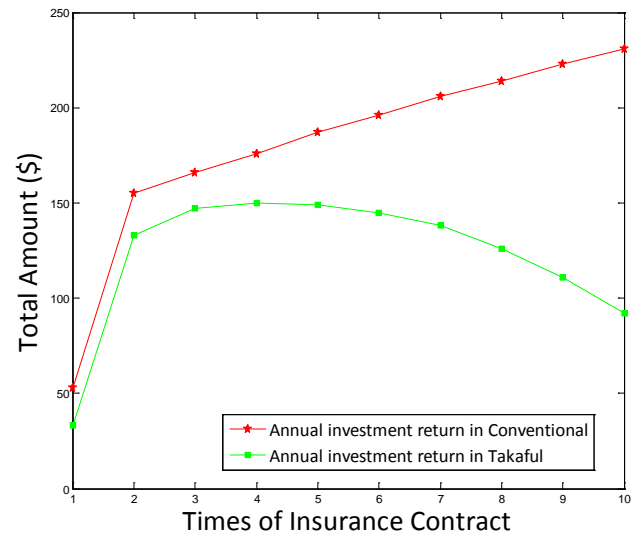


Fig. 6 Value of Accumulation the premium and investment return in Takaful insurance

Having that, we would be displays the accumulations of expenses by life insurance company both, as below:

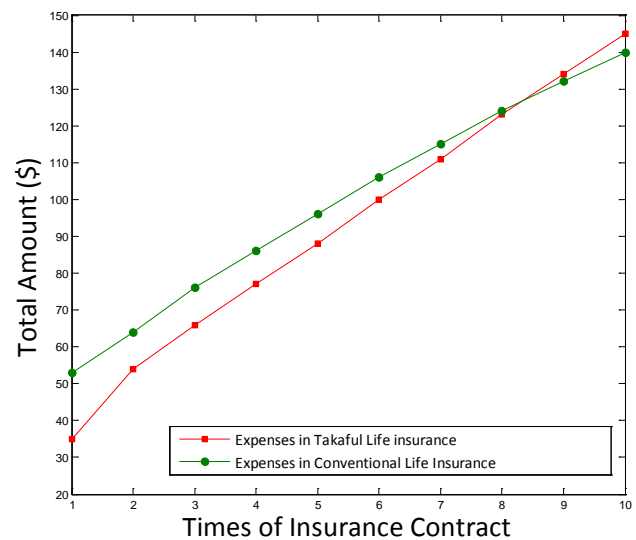


Fig. 7 The accumulation of expenses in Conventional and Takaful Life Insurance

According to Fig. 7 shows that in the first year conventional life insurance has high cost is \$53, meanwhile in Takaful insurance only \$35. However, in the 8 years different between cost should be spent by policyholder only differ \$1 that is the conventional insurance has accumulation costs

worth \$124 and Takaful insurance is \$123. Having that after 8 years, expenses in the conventional insurance decrease in the year of 9 is \$132 and last years or at the maturity of the contract only 140. This cost lowest than costs by Takaful insurance where in the 9 years is \$134 and until the maturity contract is \$145. Following the previous figure can be summarized that although accumulation value for expenses in Takaful insurance displays the lowest cost in the first year, but in future more than 7 years it has the highest cost compared with conventional life insurance. The accumulation expenses differ about \$5.

Furthermore, we would be showing the expenses value between conventional and Takaful life insurance in the annual time.

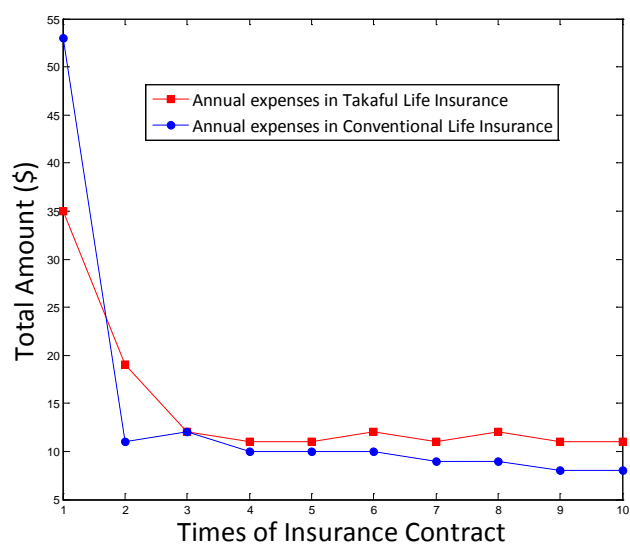


Fig. 8 The value of Annual expenses in Conventional and Takaful Life Insurance

According to Fig. 8 showed that annual cost should be bearded by the participant when installment insurance plans. Blue line is annual expenses for conventional insurance, in the first year cost should be paid is \$53, further second years cost enormously decrease from \$53 to \$11 or it has a large margin around \$42. This fluctuation is because in the one-year insurance company must be spent a lot of commission to the agent, operational and administrative cost. So, that why annual expenses spent by conventional insurance high. Further, in the second year the company only paid agent namely the collection funds cost, operational and administrative cost. It shows stable in the fluctuating line of annual expenses.

In the above case different to Takaful, where the commission cost would be paid to the agent divided into two times that is the first year and second year. This one of strategy by Takaful to increase initial

investment fund see the red line the annual expenses should be spent by Takaful is \$35 for the first year while in the second years is \$19 and the thirds years are \$12. This values displayed the fluctuation is stable. But after thirds years cost should be spent by Takaful higher than conventional whereas, the average expenses is \$11.29

Based on the determination by the same case and numerical example, we obtain that although premium insurance paid cheapest for Takaful insurance, but it has a high cost in operational and administrative compared with conventional annual premium payment high. Then the investment fund in Takaful insurance giving good choice in investment, whereas, with guaranteed rate 5% return on investment can be received by insured more from the annual premium paid compared with conventional insurance. This indicates that the Takaful insurance besides aiming to eliminate forbidden elements that exist in conventional insurance, it is also giving a better profit compared with the conventional insurance.

5 Conclusion and Finding

Based on the above discussion, we found that the conventional and Takaful insurance applied similar techniques to calculate risk premium (term in conventional insurance) or tabarru fund (term in Takaful insurance) both determined considering pure risk through mortality risk but in the Takaful not existed the practice of interest rate in calculation for present value and future benefit. Further, to fulfill Islamic law relating violation toward interest (*riba*) in the practice of insurance by Takaful, the discount factor here by the different notation for instead is r defined as appropriate opportunity cost by the seller, it is because in the practice of pricing model indicating that existence of Martingale measure called Standard normal distribution. Therefore, after fulfilling the calculation, we also detected that there are the differences about the goal of them. First, conventional insurance, the calculation using pure risk using life function form through mortality risk intended to account all risk will be faced by the insurance company to give protection for insurance participant and financial risk of the insurance company. Besides that, different with Takaful insurance, the mortality risk considered to share fair value in the payment of compensation (*tabarru* or charity fund) by a participant to the insurance company. Takaful insurance used contract of *Al-Mudaraba*, it aims to eliminate forbidden elements which existing in the practice of conventional insurance. It also aims to

uphold the sense of mutual cooperation, solidarities, and brotherhoods among participant of insurance.

In this study also confirms that premium insurance charged by conventional life insurance higher than by Takaful life insurance according to with a numerical example. Further, for annual and accumulation of investment return demonstrated that the conventional insurance higher than Takaful insurance.

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