

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY,
KUMASI

MODELLING OF EDUCATIONAL POLICY TO SUSTAIN RESERVES A case study of State
Insurance Company.

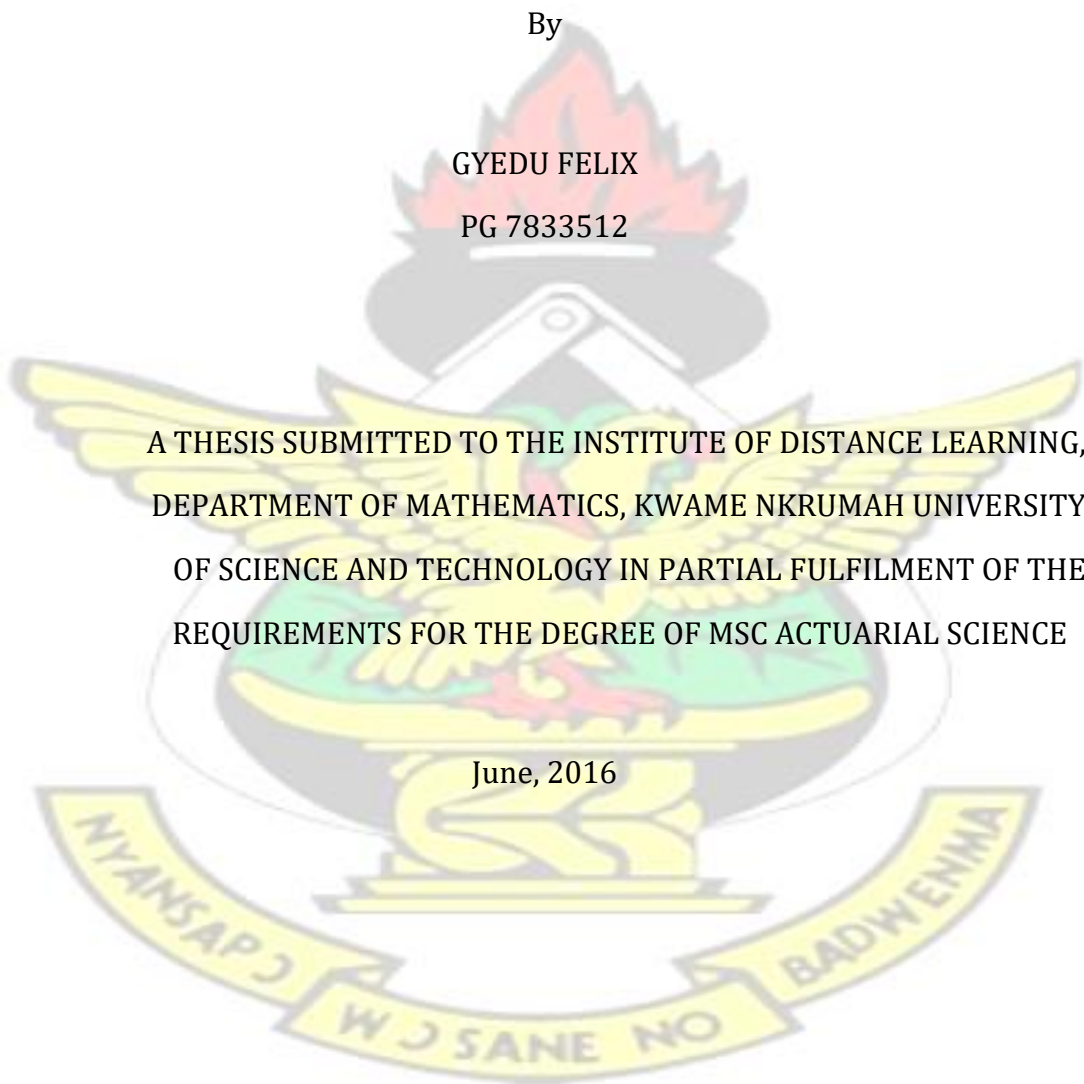
By

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Declaration

I hereby declare that this submission is my own work towards the award of the MSc degree and that, to the best of my knowledge, it contains no material previously published by another person nor material which had been accepted for the award of any other degree of the university, except where due acknowledgement had been made in the text.

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Dedication

This thesis is dedicated to my parents Mr. Kwame Gyedu and Madam Akosua Mensah who have devoted their lives for me and who have been giving their continuous blessings to me for success and to my dear brothers and sisters with whom I shared big portion of my life.



Abstract

The Insurance Industry in Ghana has seen setbacks though situations after 1986 stabilized and many Insurance companies came into being. The entry into the market of many firms led to stiff competition which resulted in firms engaging in unethical malpractices. The firms in their operations registered poor performance over the years. The main objective of the study was to model one year educational plan for State Insurance Company (*SIC*) clients by estimating a reasonable premium to the full year for which the company can also earn profit after selling the product. Among the insurance companies in the country, SIC-Life insurance Company was purposively selected as a sample to represent Ghana's Insurance sector. The study took the form of longitudinal and documentary review that included among others, financial, annual and other corporate documents. The study revealed that SIC-Life Insurance Company sells four life products under Universal Life policies namely; Family Security Plan, Flexi-Child Education Policy, Ultimate Life Plan and Education Plan. Annual premiums estimated for the policy at 6% interest rate using principles of equivalence indicated the company can keep enough reserves as compare with their current operations. Profit testing analysis was performed to arrive at 1.38% profit margin of the education plan. The study revealed that Insurance companies manage risk through a number of ways including re-insurance and co-insurance. It is recommended that Insurance companies should conform to the ethical conduct and statutory regulations and procedures if they are to succeed, including optimal premium ratings, sound investment policies and risk management processes.

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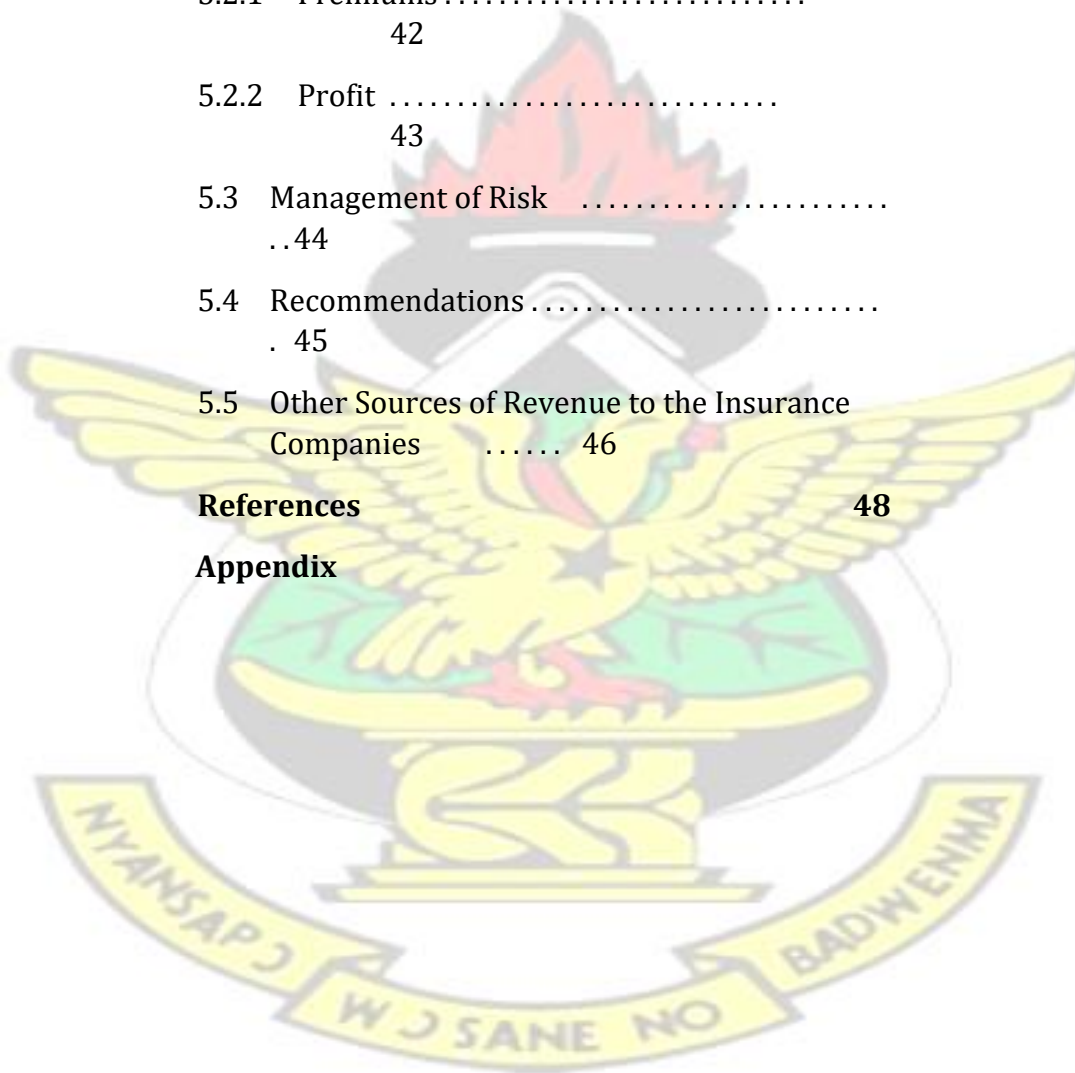
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Chapter 1

Introduction

The reserve of any company gives the office a measure of the minimum funds it needs to hold at any point during the term of a contract. The process of calculating a reserve is called the valuation of the policy.

A reserve is money set aside by the insurer, for the policyholder to pay policyholders benefits and where appropriate, future expenses.

Reserves can be estimated by means of prospective approach which is looking into the future and discounting to the present or retrospective, that is looking at the past and accumulating to the present.

Premium is an amount of money paid by policyholder to insurer for a policy within a given period of time. Premium can be paid daily, monthly, yearly etc.

The child education policy is a life insurance product specially designed as a savings tool to provide an amount of money when the child reaches the age for entry into college (18 years and above). The funds can be used to pay for the child's higher education expenses.

Under this policy, the child is the life assured, while the parent/legal guardian is the policy owner. An adult life can also purchase educational policy for himself or herself.

1.1 Background of the Study

Insurance practice is said to date back to the period when the Phoenician traders plying the Mediterranean Sea 3000 years ago, had a system of insuring against loss during their maritime adventure. Marine insurance is therefore first class of insurance business ever transacted. It was followed by fire insurance, which came after the great fire of London in 1666.

In 1950, life insurance was introduced and the industrial revolution of the 18th century gave birth to the accident insurance, (Turner, 1984).

According to National Insurance Commission (NIC), the market for insurance in Ghana is growing and changing rapidly. The market offers great opportunities for existing ones as well as new entrance since Ghana has relatively small number of insurance companies as compared to other countries. The expected growth potential is attributed to its highly untapped market, rising awareness level, health consciousness and initiative taken by the government and the industries governing body.

Prior to the enactment of the insurance law in 2006, only two companies Gemini Life Insurance and Ghana Life insurance were operating in the country. Among other enactments, the law barred players in the industry from operating composite insurance companies. Since most of the insurers operated very large life insurance business unit as part of their portfolio, they needed to comply with the law by separating the life unit from non-life unit.

According to National Insurance Commission's Annual report (2005), the industry as at 31st December, 2005, was made up of eighteen (18) registered firms with two (2) re-insurance companies and thirty two (32) brokerage firms.

The total number of licensed sales agents as at then was four thousand three hundred (4300). Between 1998 and 2002, non-life insurance premium income accounted for 86.68% of gross premium income with life and health accounting for only 14.2%. Motor accident insurance dominated in the non-life (General Insurance) business unit and life insurance accounting for 41.6% and 16.4% respectively probably as a result of the enforcement of the legal requirement for vehicle owners to ensure their vehicles by the police.

It is becoming increasingly pertinent for the insurance industries to be creative, innovative and proactive in engineering products that will attract the interest of the public.

Consequently, after years of symbiotic relations, two business units, non-life and life, parted ways leading to the biggest corporate restructuring ever in Ghana's insurance industry.

The financial stability and strength of an insurance company should be a major consideration when buying an insurance contract. An insurance premium paid currently provides coverage for losses that might arise many years into the future. For that reason, the viability of the insurance carrier is very important. In recent years, a number of insurance companies have become insolvent; leaving their policy holders, with no coverage or coverage only from a government backed insurance pool or other arrangement with less attractive payouts for losses.

1.2 Problem Statement

Claim reserves represent estimated future payments to settle claims related to insured events that have occurred by the balance sheet. Insurers typically refer

to this liability as a loss reserve. The loss reserve represents the estimated liability for claims that have been reported to the insurer but not yet settled and claims incurred but not reported.

Estimation of reasonable premium related issues to insurer's lost reserve have been the focus of these studies. Academics and practitioners are interested in the reporting of lost reserves for various reasons, including the economic significance of the reserves and the substantial discretion involved in their measurement. The controversy regarding the mathematical valuation (e.g. lack of discounting, reporting, the minimum of equally-likely amounts) and importantly, the disclosures of subsequent adjustments to lost reserve estimates which provides a unique opportunity for testing errors and manipulations, (CEASA, 2003).

In Ghana, few people have bought life assurance policies such as education for themselves or for their children. This may be due to the fact that most Ghanaians have little or no idea about insurance cover. Some people also have the notion that insurance companies can experience bankruptcy and collapse just like the micro-finance institutions in the country, hence would not pursue any insurance policy. Above all, the life insurance companies lack the expertise like actuaries to estimate desirable premiums to earn the company profit, (KPMG, 2005).

When proper estimation of premiums is carried out, the company could realize enough revenue to settle liabilities promptly and accrue profit.

1.3 Objective of the Study

The reserve for any company gives the company the least amount of money it intends to hold during the policy period. When diligent estimation of premiums are carried out, the insurance company could gather enough fund to settle

unforeseen liabilities immediately and accrue profit. The research, therefore, seeks to model the amount of physical cash (premium) needed to put aside in order to purchase educational contract in advance for a whole year and test the profit margin of SIC- Life Insurance Company within a year as a result of sustaining the insurance company. The objectives of the study are

1. To determine the Net Premium of SIC-Life Insurance Company.
2. To perform the Profit test analysis of the SIC-Life Insurance Company

1.4 Methodology

Secondary data will be obtained from life assurance Company; that is, State Insurance Company in the country and modelled for various calculations. It is well noted that a reserve is money that an insurer set aside to meet its future payment that is benefit to policyholder and expenses. Hence the principle of equivalence formula for reserves is denoted by:

$$(t_v + P - e)(i + 1) = (s)q_{x+t} + P_{x+t}V_{t+1} \quad (1.1)$$

Where t_v is the reserve at the beginning of the year

P = the premium e = the expenses + commission

$(1 + i)$ = the accumulation over one year

$(s)q_{x+t}$ = to pay benefit if event occurs

$P_{x+t}V_{t+1}$ = to set up another reserve at the end of the year

To calculate the profit of the Assurance Company, subtract the right hand side from the left hand side of equation 1.1. i.e.

$$(t_v + P - e_t)(i + 1) = -(s)q_{x+t} - P_{x+t}V_{t+1} \quad (1.2)$$

The net premium reserves can be calculated using two approaches; Prospective and Retrospective. The research will concentrate on Prospective.

$${}_tV_{x:n} = A_{x+t:n-t} - P_{x:n} \times \ddot{a}_{x+t:n-t} = 1 - \frac{\ddot{a}_{x+t:n-t}}{\ddot{a}_{x:n}}$$

The net premium reserves are calculated as the value of future benefits, less the value of future net premium (Prospective)

The net premium reserve at time t for an n-year endowment assurance policy is:

The net premium reserves at time t for a whole life assurance are:

$${}_tV_x = A_{x+t} - P_x \ddot{a}_{x+t} = 1 - \frac{\ddot{a}_{x+t}}{\ddot{a}_x} \quad (1.3)$$

Gross premium (office premium) allows for expenses and may allow for profit (using equivalence principle). EPV benefits + EPV expenses + (EPV profit) = EPV Premiums. Lastly, profit test analysis will be carried out to determine the profit margin of the company.

1.5 Justification of the Study

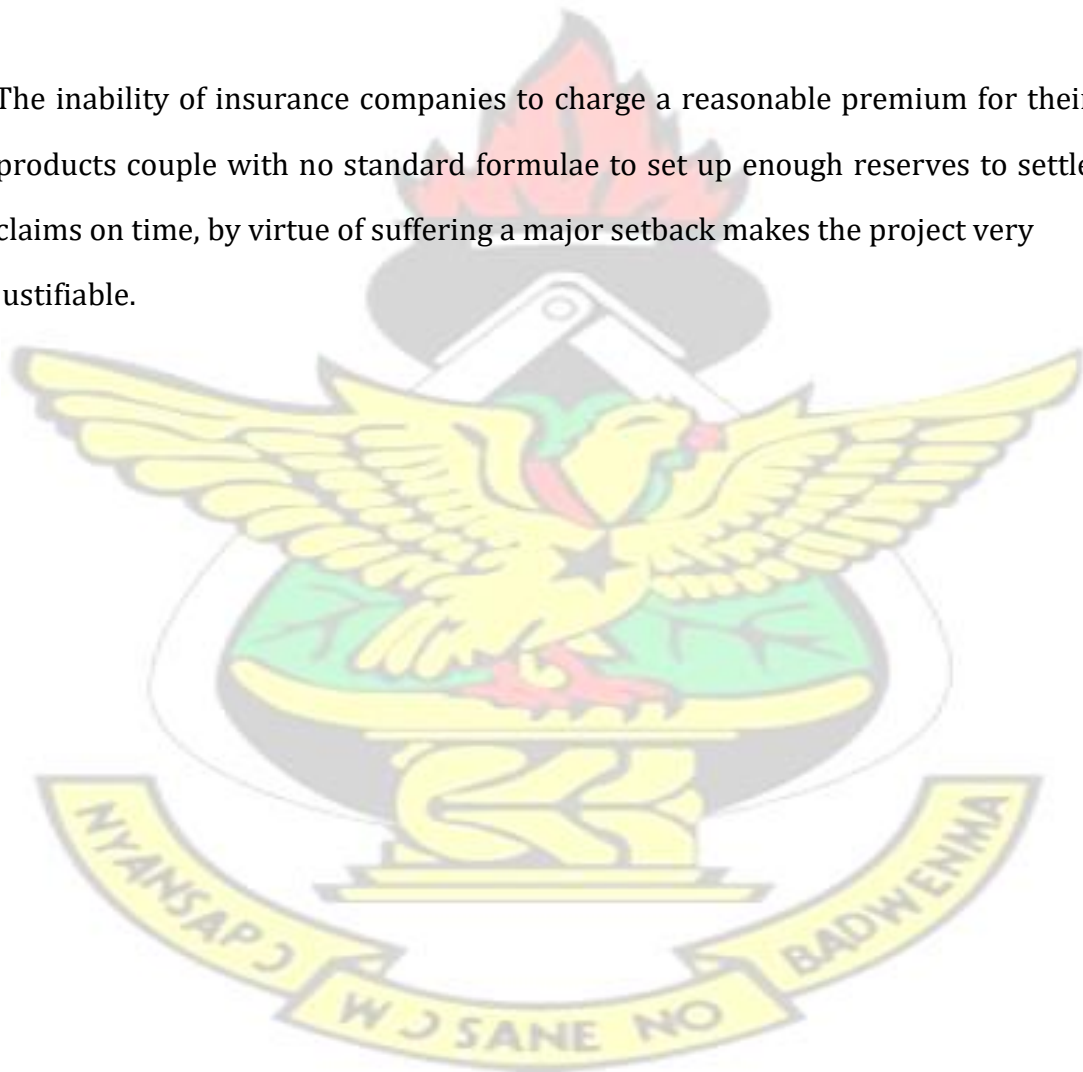
The premium rates for the various Life Assurance policies vary from one insurer to another. This is due to lack of standard premium rate and its corresponding incident rate for the various products sold which largely have effects on the reserves and for that matter the profit.

Some insurers charge higher premiums which results in the low uptake rates of the product whereas others charge relatively low premium which also results in the company running at a loss. This calls for the need to find a vigorous and

accurate actuarial formula for computing a life assurance premium and profit margin. This has necessitated the determination of an accurate pricing actuarial formula.

Pricing life assurance policies like education or pension is a key objective of any insurance industry that sells such policies. The product which considers the various premium and profit will serve as a platform for insurers to know the kind of premium to charge and the profit to derive from reserves.

The inability of insurance companies to charge a reasonable premium for their products couple with no standard formulae to set up enough reserves to settle claims on time, by virtue of suffering a major setback makes the project very justifiable.



Chapter 2

Literature Review

2.1 Introduction

This chapter will focus on reserves of the life assurance companies in Ghana, Premium, Profit, Education policy and the holistic view of the assurance company itself. The rules and regulations governing the industry set by National Insurance Commission (NIC).

2.2 Why Hold Reserves

With reference to (Act Study Material CT5, 2011), in many life insurance contracts, the expected cost of paying benefits increases over the term of the contract consider an endowment assurance, for example. The probability that the benefits will be paid in the first few years is small - the life is young and in good health. Later the expected cost increases as the life ages and the probability of a claim by death increases. In the final year the probability of payment is large since the payment will be made if the life survives the term, and for most contracts (which often matures when the policy holder is in his/her 50s/ 60s) the probability of survival is large.

Although, on average the cost of the benefits is increasing over term, the premiums that pay for these benefits are level. These means that the premiums received in the early years of a contract are more than enough to pay the benefits that fall due in those early years. But in the later years, and particularly in the last

year of an endowment assurance policy, the premiums are too small to pay for the benefits.

It is therefore prudent for the premiums that not required in the early years of a contract to be set aside, or reserved, to fund the short fall in the later years of the contracts. While funds are reserved, they are invested so that interest also contributes to the cost of benefits.

If the life assurance company was to spend all the premiums received, perhaps by distributing to share holders the premiums that were not required to pay benefits, then later in the contract the company may not be able to find the money to pay for the excess of the cost of benefits over the premiums received. We set up reserves to ensure (as far as possible) that this does not happened and that the company remains solvent.

2.3 Claim Reserve

According to (Wuthrich & Merz, 2008), an insurance policy provides in return for the payments of premiums, acceptance of the liability to make payments to the insured person on the occurrence of one more specified events (insurance claims) over specific time period. The occurrence of the specified events and the amount of the payments are both usually modeled as random variable.

In general, there is a delay in the insurer's settlement of the claim, typical reasons are;

- Reporting delay (time gap between claims occurrence and claim reporting at the insurance company)

- Settlement delays because it usually takes time to evaluate to whole sides of the claim.

The time difference between claims occurrence and claims closing (final settlement) can take days (example in property insurance) but it can also take years (typically in liability insurance). Claim reserving now means that insurance company puts sufficient provisions from the premium payments aside, so that it is able to settle all the claims that are caused by these insurance contracts. This is different from social insurance where one typically has a pay-as-you-go system which means that premium payments are not matched to the contracts that caused the claims.

(Vera, 2003) indicated that methods of estimating insurance products started off as deterministic algorithms. Later actuaries started to develop and analyze underlying stochastic model that justify these algorithms. Probably, the most popular stochastic model is the distributive-free chain ladder method which was developed by (Mack, 1993). This stochastic method allows analyzing and quantifying the prediction uncertainty, whereas recent research (under the influence of solvency 2) also studies the one year uncertainty, called claims development result (CDR).

2.4 The Insurance Premium and Investments

Insurance is viewed as an economic devise whereby individuals pay a premium to protect them against large financial loss. It provides a sense of security, the counter part of risk, (Chow-Chua & Lim, 2000). The essence of insurance is to insulate the insured from the risk of loss through the pooling risks of a large number of similarly exposed persons into a common premium fund from which the few members who suffer large losses are compensated (Ngobi, 2000).

(Irukwu, 1991) observed that in Morden life man lives in an environment heavily infested with risks. These risks extend from risk of damage to property to risk of injury to life and loss of life through accidents. He further noted that this risky environment has made the need for insurance much more important today than ever before.

(Lowe, 1999) also explained the workings of insurance adding that for a small premium, the insured are protected against a potential risk by transferring it to an insurer who specializes in the bearing and managing of risks. The insurer collects premiums from very many people and creates an insurance fund. If the amount of premium for a given insurance period exceeds the amount of claims made on the pool, the insurer makes an underwriting profit, which he uses to pay his overhead costs and dividends to the shareholders Byamugisha (1974).

(Mukasa, 1996) was of the view that the premium should not be kept idle on the insurance premium account to await claims being lodged. The insurance companies should be pro-active and forward-looking and should invest this money through creating a float. A float is the process where the insurance company acts as an institutional shareholder and uses the premium to buy shares in listed companies with a view of getting dividends.

The firm may also buy other securities such as debentures, government bonds and Treasury bills. The effect will be to diversify the firm's capital: base and hence enhance its ability to settle claims when they occur, (Chow-Chua & Lim, 2000).

(Cockrell, 1982) demonstrated how insurance companies' work as a medium through which the insured relieves himself of his own financial burden of some potential misfortune to an insurer who accepts to bear the burden in consideration of the insured paying a small fee called a premium.

(Millington, 2004) solved problem of profit testing using spread sheet . he stated among other things that life insurance office usually sets internal rules determining the minimum profit to be emerging from a new life policy or new block of life policies written. One such rule could be that the present value of the premiums should exceed the present value of the benefits by a certain percentage. Another way of expressing profit requirements for a life policy is to state when the initial expenses are repaid at a stated internal discount rate.

2.5 Insurance

(Melnikov & Skornyakova, 2004) defines insurances as a contract (policy) according to which one party (a policyholder) pays an amount of money (premium) to another party (insurer) in return for an obligation to compensate some possible losses of the policyholder. Insurance provides economic protection from identified risks occurring or discovered within a specific period. Insurance is a unique product in that the ultimate cost is often unknown until long after the coverage period, while the revenue - premium payments by policyholder - are received before or during the coverage period.

2.6 Classification of Insurance Contracts

Ceasa (2010), classified Insurance contracts as either property and casualty (PC) or life and health (LH) policies. PC Insurance - Contracts providing protection against

1. damage to or loss of property caused by various perils, such as fire, damage theft.
2. legal liability resulting from injuries to other persons or damage to their property

3. losses resulting from various sources of business interruption
4. due to accidents or illness

LH Insurance - Contracts that pay off in lump sums or annuities upon the insured death, disability, or retirement. Some insurance policies, primarily health-related policies, have both PC and LH characteristics and can therefore be classified as either PC or LH. Most insurance companies specialize in either PC or LH insurances but some have significant operations in both segments. In addition, while many insurance underwrite reinsurance policies (insurance sold to insurers). Some focus on reinsurance as their core activity. Insurers increasingly offer products and services that involve little or no insurance protection such as investment products and fee-based services. The industry also includes companies that provide insurance, brokerage services (sourcing of insurance contracts on behalf of customers).

2.7 Life and Health Products

Traditional life policies provide primarily death benefits, although many contracts have significant saving elements or contain living benefit clauses. The products offered by life insurers also include life-contingent annuities as well as pure investment contracts. Health insurance contracts provide reimbursements for medical expenses or income in the case of disability.

Life Insurance Policies

There are many variants of life insurance contracts. Some contracts-including term and whole life - are used exclusively or primarily to provide protection against premature death. Others - such as endowment and universal life-combine protection against premature death with a type of savings vehicle.

Term insurance - provides protection for a fixed term (e.g., 1, 5, or 15 years). If death occurs during the policy's term, a fixed amount is paid to the beneficiary. There are no other benefits or cash value build-up. Guaranteed renewable term insurance can be renewed without proof of insurability (but often at much higher rates), while under other types of term insurance the insured must once again undergo an underwriting process (e.g., a medical examination).

Whole life - provides for the payment of the face value of the policy upon death of the insured, regardless of when it may occur. Premium payments are typically level during the insured's life. Because life risk increases with age, whole life contracts involve overpayment of premiums in the early years and underpayment in the latter years, and so accumulate cash value that may be borrowed against.

Endowment insurance - the face value of the policy is paid to the insured or beneficiaries either at the end of the contract period or upon the insured's death. Universal life - a flexible premium policy that combines insurance protection with a type of savings vehicle (cash value account), which typically earns a money market rate of interest. Death benefits can be changed during the life of the policy within limits, generally subject to a medical examination. The cash value account is reduced periodically by mortality and administrative charges, and the policy lapses if the account balance is not sufficient to cover the charges.

Variable life - contracts that allow the insured to invest the premiums in one or more underlying portfolios offering different levels of risk and growth potentials, which are usually held in separate accounts. Unlike whole life, the cash value of the policy is not guaranteed, and poor investment performance can lead to a reduced cash value, a lower death benefit, and possible lapse of the policy without value. Some life contracts combine fixed and variable features.

Variable universal life - a universal life policy that allows for flexibility in investing the premiums (see variable life).

2.8 Life-Contingent Annuities and investment

Products

Annuities are either life-contingent or pure investment contracts. Annuities can also be classified as either fixed versus variable, immediate versus deferred, or qualified versus non-qualified.

Annuity contracts also differ in the guarantees that they offer. In addition to annuities, insurers sell investment contracts which take on various forms. The following is a short description of the primary forms and classifications of annuities and investment contracts.

Life-contingent annuity - a contract that pays a periodic benefit over the remaining life of a person (the annuitant) or the lives of two or more persons (joint and Survivor life). Life contingent annuities are essentially the reverse of life insurance. These contracts expose the insurer to longevity risk, which can be used to offset the mortality risk exposure of life insurance.

Investment contract - a contract that does not subject the insurer to a significant insurance risk of contract holder mortality or morbidity. Annuities with specified periods of payment (period certain annuities) are an example of investment contracts sold by insurers. Guaranteed Investment Contracts (GICs), which are similar to banks' certificates of deposits, are another example.

Fixed annuity - an annuity whose premiums paid earn a pre-determined rate of return (during the accumulation phase) and which pays predetermined income amounts (during the disaccumulation phase).

Variable annuity - an annuity whose value or income payments vary according to the performance of investment funds that are selected by the contract owner from a list offered by the insurer (typically separate accounts). Some annuity contracts combine fixed and variable features.

Deferred annuity - annuity during the accumulation stage or when payments are not scheduled to start in the near term.

Immediate annuity - an annuity designed to begin making payments right away or within a short time after purchase.

2.9 Accident and Death

Accident and health insurance contracts are generally classified as either medical indemnity contracts or disability income contracts.

Medical indemnity contracts - provide benefits for medical expenses.

Disability income contracts - provide periodic benefit payments for a fixed period or for life in the event the insured is unable to work due to disability resulting from illness or injury.

2.10 Types of Insurance Companies

Opoku S. (2009) wrote, insurance companies may generally be classified into two groups; these are Life Insurance Companies, which sell life insurance, annuities and pensions products and Non-Life, General or Property/Casualty Insurance Companies, which sell other types of insurance. General insurance companies can be further divided into the Standard Lines and Excess Lines sub categories.

2.11 General (Non-life) Insurance Companies

In the United States, Standard Line insurance companies are "mainstream" insurers. These are the companies that typically insure autos, homes, or businesses. They use pattern or "cookie-cutter" policies without variation from one person to the next. They usually have lower premiums than excess lines and can sell directly to individuals. They are regulated by state laws that can restrict the amount they can charge for insurance policies. Excess Line insurance companies (a.k.a. Excess and Surplus) typically insure risks not covered by the standard lines market. They are broadly referred to as being all insurance placed with non-admitted insurers. Non-admitted insurers are not licensed in the state where the risks are located. These companies have more flexibility and can react faster than standard insurance companies because they are not required to file rates and forms as the "admitted" carriers do.

However, they still have substantial regulatory requirement placed upon them. State laws generally require insurance placed with surplus line agents and brokers not to be available through standard licensed insurers.(source: Insurance Information Institute).

2.12 Life Insurance Companies

These are insuring organizations that assume the risk of death of a policyholder. Unlike loss in insurance on property, loss in life insurance is certain to occur and is total. The element of uncertainty is when death will occur.

Mortality is subject to the laws of probability, however, and life-insurance premiums can be calculated from mortality tables, which indicate the average number of people in each age and gender group that will die each year.

2.13 Reinsurance Companies

These are insurance companies that sell policies to other insurance companies, allowing them to reduce their risks and protect themselves from very large losses.

In order to avoid retaining the full amount of insurance on risks, insurers frequently resort to reinsurance, that is, they pay a premium to another insurer, who then assumes part of risk. Based on the same principle as insurance itself, reinsurance is a mechanism to provide for a further sharing of the risk so as to help insurance companies meet their obligation to policyholders. The reinsurance market is dominated by a few very large companies, with huge reserves. A reinsurer may also be a direct writer of insurance risks as well.

2.14 Captive Insurance Companies

These may be defined as limited-purpose insurance companies established with the specific objective of financing risk emanating from their parent group(s). This definition can sometimes be extended to include some risks of the parent company's customers. It is an in-house self-insurance vehicle. Captives may take the form of a "pure" entity, (which is 100% subsidiary of the self-insured parent

company). A “mutual” captive (which insures the collective risks of members of an industry) and “associative” captive (which self-insures individual’s risks of the members of a professional, commercial, or industrial association).

2.15 Regulation of Insurance Companies

Chen and 2004 among other things that the insurance industry in different Asian economies is at different stages of development and therefore required different regulatory guidelines to enable them serve their clients more efficiently and effectively. (Source:

<http://www.blackwellsynergy.com/links/doi/10.1111/j.00224367.20.> April 2015)

According to the insurance information institute in the United States, regulation of the insurance industry is a primary responsibility assumed by individual state insurance departments. Whereas insurance markets have become centralized nationally and internationally, state insurance commissioners operate individually, though at times in consent through a national insurance commissioner’s organization.

In recent years, some have called for a dual state and federal regulatory system (commonly referred to as the Optional Federal Charter, OFC) for insurance similar to that which oversees state banks and national banks.

In most countries, life and non-life insurers are subject to different regulatory regimes and different tax and accounting rates. The main reason for the distinction between the types of companies is that, annuity, and Poisson business is very long-term in nature-coverage for life assurance or a person can cover risks

over many decades. By contrast, non-life insurance cover a shorter period, such as one year.

2.16 Regulations in Ghana

According to Quarshie (2008), the National Insurance Commission (NIC) is the sole regulatory agency tasked with supervisory responsibility to ensure that all insurance companies do not incur excessive insolvency risk, nor treat policyholders unfairly. The role of the commission is essentially expected to be two folds, solvency regulation and market regulation.

In respect of solvency, the NIC is supposed to regulate insurer's activities aimed at providing protection to policyholders against the risk that insurers will not be able to meet their financial obligations.

The commission is expected to concern itself with areas like capitalization, pricing products, investments, reinsurance, reserves, asset liability matching, transactions with affiliates and management.

The market regulatory activity of the commission is to ensure that there exists fair and reasonable insurance prices, product and trade practices within the industry. These two responsibilities of the commission are inextricably interrelated in the sense that the market regulatory aspect tries to monitor rates and market practices which affects the financial performance of insurers, whereas solvency regulation sets standard that constraints the products and prices that insurers can offer reasonably. According to the insurance law, Act 724 of 2006, and section 26:

The commission shall not insure a licensed insurer that a theories the insurer to operation a composite insurance business.

A company licensed to operate Life Assurance business as a specialty shall not be licensed, subsequently to operate a Non-Life Assurance business and Non-Life Assurance business as a specialty shall not be licensed subsequently to operate a Life Assurance business.

Despite subsection 2, a company (a) licensed to operate a life assurance business may acquire substantial shareholding in a non-life insurance company, and (b) licensed to operate non-life insurance may acquire substantial shareholding in a life assurance company. The law makes it mandatory for all composite companies to separate their life operations from non-life creating two distinct composite companies. The Law also requires insurance companies to raise their capital base to USD 1million or its equivalent.

2.17 Distribution

In their annual report, (NIC 2012). In Ghana, insurance products are distributed through agents, brokers, banks, micro-finance institutions (MFIs), mobile, etc.

- Individual agents are the key distribution channel for insurance in Ghana. According to the NIC website, there are 4,537 licensed agents currently operating in the country
- The licensed corporate agents (banks and MFI) distribution channel is expected to witness a high growth, driven by regulatory support and increased customer base

- The licensed corporate agents (banks and MFI) distribution channel is expected to witness a high growth, driven by regulatory support and increased customer base
- The mobile insurance distribution channel is expected to witness significant growth, driven by increasing mobile penetration, acceptance of micro insurance, lower costs and large untapped market in rural areas

The telecommunication providers, such as Tigo and MTN, offer life insurance products to their customers. According to MTN, premiums are significantly cheaper than competitors driven by mobile-based administration, which results in cost savings. Additionally, insurance companies are expected to focus on the most suitable distribution channel for various insurance products. This would ensure high conversion rate and maximum utilization of the marketing / distribution

expenditure.

2.18 Performance of Ghanaian life Insurance Companies

National Insurance Commission(2012) report shown that Ghanaian life insurance market is consolidated with the top five companies accounting for about 80% share in 2012 (up from 78% in 2011). These companies are: Provident Life Assurance,

Starlife Assurance, Glico Life Assurance, Enterprise Life Assurance, SIC Life. There were 19 life insurers as at May 2014. In 2012, the life insurance gross written premium (GWP) stood at GHS355.8 million, witnessing a growth of 31.7%. Ghana's top three life insurers' performance in 2012 is summarized below:

- SIC Life Insurance collected GHS100.3 million representing a premium growth of 39% . SIC is listed on the Ghana Stock Exchange and owned by government (40%) and others including institutions and individuals (60%)
- Enterprise Life Assurance reported total premium collection of GHS89.1 million, representing a growth of 45%.
- Glico Life Insurance reported a gross premium of GHS36 million witnessing 4.65% growth.

2.19 Review of the Ghanaian Insurance Industry

In their report, KPMG July 2014 outlook the market of the Insurance Companies. According to KPMG (2014), In 2013, insurance industry stakeholders reviewed the draft insurance bill which would address limitations of the existing Insurance Act 724 (2006)

- The draft bill would support product development for critical sectors, and would prioritize licensing for specialized insurers dealing in micro-insurance and agriculture insurance

In 2013-14, the government directed the Ministries, Departments and Agencies (MDAs) to cover risks only through wholly or partially owned state insurance companies

- The directive would favour SIC Insurance and SIC Life Insurance companies, and would intensify competition for private players. As a result, the private insurers are planning to take legal action against the government's directive.

2.20 Solvency/Capital

The minimum paid up capital requirement for an insurance company (both life and non-life) is USD 1.0 million.

- Additionally, NIC has directed the insurers to deposit 10% of the minimum capital requirement in an escrow account with Bank of Ghana. This would ensure sufficient resources to absorb liquidity shocks
- - The NIC is planning to shift towards a risk-based management system (in-line with the global trends in insurance regulations) by 2015 . The minimum paid up capital requirement for reinsurers is USD 2.5 million while, for insurance intermediaries, insurance brokers and loss adjusters, the requirement is USD 250.

Looking at what others have discussed, none of these studies have considered estimating of net premium using principles of equivalents nor test for profit by using unit-linked approach, the Spreadsheet, internal rate of returns and normal accounting procedure among others were used to estimate the net premium and test a profit of insurance contracts.

Chapter 3

Methodology

3.1 Introduction

This chapter explains in details, the mathematical and actuarial tools needed in calculation of reserves, annuities or perpetuity in the life insurance companies worldwide.

This section also presents methods, which were used to carry out the study. It describes the research design, study area, study population, sample size and data collection procedure.

3.2 Data

Secondary data were collected from State Insurance Company in the country. Seven years period data, starting from 2008-2014 is purposely obtained for the analysis.

Some of the components found in the data are:

- Gross premium of the year
- Premium of the year
- Expenses + Commission of the year
- Claims incurred during the year
- Sums assured if possible

- Interest rates for the respective years
- Standard life table

3.3 Descriptive Models

3.3.1 Computations of Reserves

Reserves for Life Insurance companies as described earlier, is the money set aside by the insurer, for the policyholder, to pay policyholder's benefits and, where appropriate, future expenses.

The principle of Equivalence is often used in the computation of reserves, its therefore illustrated below:

$$(t_v + P - e_t)(i + 1) = -(s)q_{x+t} - P_{x+t}V_{t+1} \quad (3.1)$$

Where t_v = Gross premium provision at time t P

= office premium e_t = expenses incurred at time t

i = interest rate in premium/valuation basis

s = Death strain at risk

V_{t+1} = Reserve calculated at the end year $t + 1$

P_{x+t} = the probability that a life aged $x+t$ survives one year on the premium or premium mortality q_{x+t} = the probability that a life aged $x+t$ dies within one year on the premium or valuation mortality basis V_{x+t} = discount factor

$$P_{x+t} = d_{x+t}/l_{x+t}$$

$P_{x+t} = q_{x+t}$ Besides, to find profit/loss on the reserves of the life insurance company, the right hand side is subtracted from the left hand side .This is indicated below:

$$(t_v + P - e_t)(i + 1) - (s)q_{x+t} - P_{x+t}V_{t+1} \quad (3.2)$$

3.4 Prospective Reserves (Forward Looking)

The prospective for a life insurance contract that is in force (that is, has been written but has not yet expired through claim or reaching the end of the term) is defined to be, for a given basis: The prospective reserve is given by; The expected present value of the future outgo

Less

The expected present value of the future income.

This is the prospective reserve because it looks forward to the future cash flows of the contract. The prospective reserve is important because if the office holds funds equal to the reserve, and the future experience follows the reserve basis, then, averaging over many policies, the combination of reserves and future income will be sufficient to pay the future liabilities.

Reserves are also calculated for other reasons, such as the calculation of surrender values. The insurer may set the surrender value (i.e. the amount pay to the policy holder) by reference to the reserve. Symbolically, the formula for prospective reserve is denoted by:

$$E[L] = SA_{x+t:n-t} - P\ddot{a}_{x+t:n-t}$$

where:

$E[L]$ = EPV of future outgo - EPV of future income

SA_{s+t} = sum assured for life aged $s + t$ P =

Premium

a''_{dx+t} = annuity due at age $x + t$

3.5 Retrospective Reserves (Backward Looking)

The retrospective reserve on a given basis tells us how much the premiums less expenses and claims have accumulated to, averaging over a large number of policies. The retrospective reserve for a life insurance contract that is in force is given by: The accumulated value allowing for interest and survivorship of the premiums received to date

Less

The accumulated value allowing for interest and survivorship of the benefits and expenses paid to date.

Symbolically, the formula for retrospective reserve given below:

$${}_tV_x^{retro} = \frac{1}{V_t P_x} [P \ddot{a}_{x:t}] - SA_{x:t}]$$

The reserve has been calculated by looking backward as accumulated money in, less accumulated money out. The accumulated value of benefits, sometimes called the cost of assurance, for life who purchased a life insurance policy at age x , and is now age $x+t$, where the sum assured for the t years of past cover was, payable at the end of the year of death is:

$$SA_{x+t}(1 + t) \quad (3.3)$$

The accumulated premium for the life, assuming premium of P per annum payable annually in advance is: $Pa_{x+t}(1 + t)$

3.6 Conditions for retrospective reserve Equal to Prospective Reserve

- The Prospective and Retrospective reserves are calculated on the same basis
- This basis is the same as the basis used to calculate the premium and also used in the reserve calculation.

Reserve as explained earlier is the money that an insurer sets aside to meet its future payment. Thus, benefit to policy holders and expenses. For instance, consider an n – year endowment assurance with some assured S and premium P , originally issued to a life aged x . the benefit is payable on maturity or at the end of the year of earlier death. At an inter time t (just before the premium is paid), the net future loss random variable is;

$$L = Sv^{\min(k_{x+1}+1, n-t)} - P\ddot{a}_{\min(k_{x+1}+1, n-t)}$$

$$E[L] = SA_{x+t:n-t} - P\ddot{a}_{x+t:n-t}$$

Retrospective Reserve:

$${}_tV_x^{retro} = \frac{1}{V_t P_x} [P\ddot{a}_{x:t}] - SA_{x:t}$$

Recursive formula for reserve:

Reserves of successive values of time t are related by the relation:

$$({}_tV^f + G - e)(1 + i) - q_{x+t}(s + f) = (1 - q_{x+t})_{t+1}V^f \quad (3.4)$$

3.7 Determining Gross Premiums using the Equivalence

Principle

The gross premium is the premium required to meet all the costs under an insurance contract, and is the premium that the policyholder pays. Talking of "premium" for a contract, I mean the gross premium. It is also sometimes referred to as the office premium.

The net premium already discussed in this thesis makes no explicit allowance for expenses. The gross premium for a contract, given reasonable mortality, interest and expenses assumptions would be found from the equation of expected present value. Equation of Value;

The expected present value of the gross premium income

=

The expected present value of the outgo on benefit

+

The expected present value of the outgo on expense

Gross Future Loss Random Variable = PV of Benefits + PV of Expenses – PV of premium. Symbolically;

$$-SV Tx + Ieatx + fV tx - GaTx \quad (3.5)$$

$$-SV Tx + t + eaTx + tFV Tx + t - GaTx + t \quad (3.6)$$

Where;

I = initial expenses in excess of those occurring regularly each year

e = level annual expenses f = additional expenses incurred when the contract terminate

S = sum assured

G = gross premium

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3.8 Prospective Gross Premium Reserve

This is calculated as EPV of benefit + EPV of expenses – EPV of premium. For instance, whole of life benefit payable at end the of the year of death, premium paid annually in advance throughout the term, I = expenses, e = renewal, payable from second year onwards, f = claim expenses payable at death at time t . Where $t \geq 1$.

$${}_tV_{gross} = SA_{x+t} + e\ddot{a}_{x+t} + fA_{x+t} - Ga_{x+t} \quad (3.7)$$

3.8.1 Retrospective Gross Premium Reserve

This is also calculated as Accumulated Premium (pass) - Accumulated of benefit (pass) + Accumulated of expenses (pass). Annually in advance throughout the term, I = expenses, e = renewal, payable from second year onwards, f = claim expenses payable from first year at time t .

$${}_tV_x = \frac{(1+i)^t}{{}_tP_x} (G\ddot{a}_{x:t} - SA_{x:t} - I - e\ddot{a}_{x:t} - fA_{x:t})$$

where

$$t \geq 1$$

3.9 Profit testing

Profit testing as defined in the "Encyclopedia of Actuarial Science", the process of assessing the profitability of an insurance contract in advance of it being written.

Stephen Richards (2006), indicated that profit testing built according to principles of "market consistency" outlined in the solvency and applied to life insurance contracts. The case of profit sharing policies with a mini mum interest rate guaranteed is proposed as a general "reference scheme" and analyzed in detailed (index - linked and unit - linked policies are easily recognized as being a particular case).

He further stated that every business needs to know if its products are profitable. However, it is much harder to determine the profitability of long -term life and pension business than most other industries. One can only know if a tranche of business has been profitable when the last contract has gone off the book, which could take long time for certain kind of contract. Clearing some methodology is needed to assess likely profitability before writing the business in the first place.

3.9.1 Profit test Modeling in the life Insurance

The aim of this brief is to demonstrate the development of profit test models in life assurance using Unit-Linked Approach. The study will work through a typical illustrative example

Step-by-step. It will start with a single policy excluding loadings and gradually work our way to an entire portfolio of education policy where investment return, expenses, bid offer, interest, opening reserve, closing reserves maturity claims and maturity benefits would be included. Next part will build more advanced

models where the research will include surrenders, paid-ups discount factor, mortality risk, profit vector and profit signature.

3.9.2 Profit Testing Steps

According to Jennifer Loftus (2014), profit testing follows a certain procedure as demonstrated below;

Decide on structure of product (Single Premium / Unit-linked / Deferred Annuity etc) Build model to project cash flows for the project

Choose model points (sample policies) with different age, sex, level of cover
Decide on suitable Risk Discount Rate and profit criterion (e.g.NPV)

Choose a Basis (probably best estimate) for all important parameters needed for the profit test, e.g. unit growth, withdrawal rate etc.

For conventional products, decide on some " First Draft Premium" For Unit - linked products, decide on some " First Draft Charges"

Profit Test our sample (Model Point) policies using these premiums / charges. Vary the premiums / charges until your desired profit criterion is met. Always remember that premiums need to be accepted in the market.

Perform sensitivity test by varying key parameters. Keep varying premiums / charges / designs until product meets profit criterion, is marketable and is resilient to adverse future experience.

3.9.3 Format of Unit-Linked Contract

Repeating the logic seen in the first year's development of the unit fund and project the fund to the end of the five-year term is illustrated below:

Year	Premium Received	Premium All'd	Cost of All'n	Fund after All'n	Fund before mgt All'n	Mgt charges	Fund at the year end
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
1	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-
5	-	-	-	-	-	-	-

The columns are developed as follows; (b) = premium which runs through all years.

(c) = premium allocation = premium received \times allocation percentage

(d) = cost of allocation = premium allocated (c) \times (1 – bid/offer spread).

(e) = fund after allocation = fund at the end of previous years (h) \times cost of Allocation (d)

(f) = fund on day 364 = fund after allocation (e) \times (1 - unit growth rate)

(g) = fund management charge = fund on day 364 (f) \times management charges (h)
= fund at end year = fund on day 364 (f) - management charge (g).

3.9.4 Revenue Account; Unit-linked Contract

The Revenue Account for a unit linked Contract is made up of two separate components: the Unit fund and Non-Unit fund.

Unit - linked assurances (typically whole life or endowment) have benefits that are directly linked to the value of the underlying investments. Each policy receives the value of the units allocated to the policy. There is no pooling of investments or allocations of the pooled surplus. As each premium is paid, a specified proportion (the allocated percentage) is invested in an investment fund chosen by the policyholder. The investment fund is divided into units which are priced continuously.

3.9.5 Unit-linked Endowment Assurance

The contract is issued to a life aged x and has a sum assured equal to the bid value, at the time of death, of the units purchased, subject to a minimum guaranteed sum assured of s . It is secured by level annual premium of p , of which percentage is allocated to the unit fund at the start of policy year t at the offer price.

The most important thing to bear in mind with unit-linked contracts is that we have two words to keep track of; the unit world and a cash (or non-unit) word. The policyholder pays premium to acquire units, and the eventual benefit is normally denominated in these units, so one needs to keep track of the number of units bought by a policyholder, how they are growing, and what charges we are deducting from them.

However, the policyholder pays the life insurance company in real money. So it's necessary to keep track of each of the cash not used to buy units because such cash is a source of profit to the life insurance company. Conversely, if the policyholder dies there might be a cash denominated sum insured, and so one needs to keep track of the cash outgo on claims.

Another very significant cash outgo to consider is comprised of the company's expenses. These will include expenses incurred in underwriting and maintaining the policy, as well as commission payments to whoever sold it.

3.9.6 Profit Vector

The vector of balancing items in the projected revenue accounts for each policy year is called the profit vector; $(PRO)_{t,t} = 1,2,3$. The profit vector gives the expected profit at the end of each policy year per policy in force at the beginning of that policy year.

3.9.7 Profit Signature

The vector of expected profits per policy issued is called the profit signature. This is obtained by using transition probability from policy duration zero (0) to policy duration $(t - 1)$. e.g. Life Insurance $(PS)_t = t - 1P_x(PRO)_t$.

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Chapter 4

ANALYSIS AND FINDINGS

4.1 Introduction

The purpose of this chapter is to present and discuss the findings of the research. The chapter is divided into two sections; Calculating net premium and testing for profit or loss margin.

The variables that were analyzed are insurance reserves and insurance investment. The presentation of the findings is chronological and discusses findings according to the study objectives namely level of reserve and profit testing of insurance firms, Insurance investments and how they are made and how insurance firms manage risks.

4.2 Educational Policy Reserves

The first objective was to establish the level of educational policy reserves by principles of equivalence of an individual who purchase education policy with State Insurance Company in Ghana. The viability of the reserve to sustain the insurance industry.

The Insurance reserve was established by examining the firms' annual reports and other related financial and operational reports. Secondary data was accordingly extracted.

4.3 Reserve

The data relating to reserves trend for the State Insurance Company was obtained over the seven years and is tabulated in table 4.1 below.

Table 4.1: Reserve Trend for SIC

Year	Gross Premium	Net Premium	Expenses	Claim incurred	Profit after tax	Sum assured	Total number of claims
2008	27,751,000	27,178,565	37,972	7,495,449	54,715	10,000	24579
2009	33,869,675	33,238,745	7,553,033	22,084,458	(1,675,423)	10,000	28041
2010	48,042,703	47,555,527	6,680,934	25,595,915	(924,084)	10,000	37842
2011	72,065,616	7,124,897	11,925,181	30,214,440	4,051,407	10,000	24211
2012	100,301,526	99,700,986	17,627,420	45,196,739	5,077,607	10,000	41711
2013	127,244,626	126,650,109	19,241,325	70,845,574	9,288,162	10,000	37561
2014	158,300,000	157,501,378	25,124,746	95,770,949	12,382,874	10,000	32066

Table 4.2: extraction from an Insurance Company's operation in the country.

END OF POLICY YEAR	AGE OF POLICY HOLDER	EDUCATIONAL FUND (GHC)
1	40	275.91
2	45	544.55
3	50	689.95
4	55	8,562.12
5	60	10,000.00
-	-	-
-	-	-
20	-	-

4.4 Hypothetical Case

Deducing from the tables above, when State Insurance Company wishes to issue a 5-year with profits endowment assurance policy to a life aged 60 exact. The policy has a basic sum assured of *Ghc*10,000.00. Simple reversionary bonuses are added at the start of each year, including the first. The sum assured (together with any bonuses attached) is payable at maturity or at the end of year of death, if earlier. Level premiums are payable annually in advance throughout the term of the policy.

- How can annual premium be estimated using principle of reserve ?

Basis:

Mortality AM 92 select

Interest 6% per annum

Initial expenses 60% of the first premium

Renewal expenses 5% of the second and subsequent premium Bonuses rates A simple reversionary bonus will declared each Year at a rate of 4% per annum.

In order to profit test this policy, if the State Insurance Company assumes that it will earn interest at 7% per annum on its funds, mortality follows the AM 92 Ultimate table, expenses and bonuses will follow the premium basis.

- Assess the expected profit margin on this policy using a risk discount rate of 9% per annum.

4.5 The findings

Let P be the annual premium payable, then the equation of value gives; PV of premiums = PV of benefit + PV of expenses.

$$P\ddot{a}_{[60]:\overline{5}|} = 10,000A_{[60]:\overline{5}|} + 400(LA)_{[60]:\overline{5}|} + 0.55P\ddot{a}_{[60]:\overline{5}|} + 0.55P \quad \text{at 6\%}$$

where:

$$(LA)_{[60]:\overline{5}|} = LA_{60} - \frac{l_{65}}{l_{60}} \times v_{0.06}^5 (5A_{65} + (LA)_{65}) + 5 \times \frac{l_{65}}{l_{60}} \times v_{0.06}^5$$

$$= 5.4772 - 0.7116116(50.40177 + 5.50985) + 5 \times 0.7116116 = 3.684864$$

$$\text{and } \frac{l_{65}}{l_{60}} = \frac{8821.2612}{9263.1422} = 0.95229685668$$

Therefore the net Premium = Ghc 2476.32

Reserves required on the policy at 4% interest are:

$$P(0.95\ddot{a}_{[60]:5} - 0.55) = 10,000A_{[60]:5} + 400(LA)_{[60]:5}$$

$$P(0.95 \times 4.398 - 0.55) = 10,000 \times 0.75104 + 400 \times 3.684864$$

$$P = \frac{8984.3456}{3.6281} = 247632$$

$$\begin{aligned} {}_1V_{60:5} &= 10,000A_{61:4} - P\ddot{a}_{61:4} \\ &= 10,000\left(1 - \frac{\ddot{a}_{61:4}}{\ddot{a}_{60:5}}\right) + 400A_{61:4} = 10,000\left(1 - \frac{3.7222}{4.550}\right) + 400 \times 0.858685 = 2162.52 \end{aligned}$$

$${}_2V_{60:5} = 10,000\left(1 - \frac{\ddot{a}_{62:3}}{\ddot{a}_{60:5}}\right) + 800A_{62:3} = 10,000\left(1 - \frac{2.857}{4.550}\right) + 800 \times 0.89013 = 4432.98$$

$${}_3V_{60:5} = 10,000\left(1 - \frac{\ddot{a}_{63:2}}{\ddot{a}_{60:5}}\right) + 1200A_{63:2} = 10,000\left(1 - \frac{1.951}{4.550}\right) + 1200 \times 0.92498 = 6822.06$$

$${}_4V_{60:5} = 10,000\left(1 - \frac{\ddot{a}_{64:1}}{\ddot{a}_{60:5}}\right) + 1600A_{64:1} = 10,000\left(1 - \frac{1.000}{4.550}\right) + 1600 \times 0.96154 = 9340.66$$

NPV of Premiums = Ghc 10,327.34

Profit margin = NPV of signature / NPV of premium

Profit margin = $\frac{142.28}{10,327.34} = 0.0138$ ie 1.38%

Therefore the profit margin is 1.38%

Table 4.3: Calculation of Profit Margin Using Unit-Linked Fund MTD

year t	Prem	Expenses	Opening Res.	Int	Death Claim	maturity Claim	Closing Reserve	Profit Vector
1	2476.32	1485.79	0	69.34	83.43	0	2145.17	-1168.73
2	2476.32	123.82	2162.52	316.05	97.30	0	4393.04	330.73
3	2476.32	123.82	4432.98	474.98	113.25	0	6753.08	394.13
4	2476.32	123.82	6822.06	642.22	131.59	0	923.20	450.99
5	2476.32	123.82	9340.66	818.52	152.59	11847.41	0	511.68

Table 4.4: Calculation Continued

Year t	${}_{t-1}P$	Profit Signature	Discount factor	NPV Of Profit sign.
1	1.0	-1168.73	0.91743	-1072.23

2	0.991978	338.00	0.84168	284.49
3	0.983041	387.45	0.77218	299.18
4	0.973101	438.85	0.70843	310.89
5	0.962062	492.27	0.64993	319.94

NPV of Profit Signature = Ghc 142.28

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Table 4.5: Calculation Continued

Year t	Prem	$t-1P$	Discount Factor	NPV of Premiums
1	2476.32	1.0	1	2476.32
2	2476.32	0.991978	0.91743	2253.63
3	2476.32	0.983041	0.84168	2048.92
4	2476.32	0.973101	0.77218	1860.73
5	2476.32	0.962062	0.70843	1687.74

Chapter 5

Conclusion and Recommendations

5.1 Introduction

In this chapter, conclusion and recommendations are offered to State Insurance Company-Life Insurance Company and National Insurance Commission to enable them determine appropriate premium and profit margin for insurance products.

5.2 Conclusion

5.2.1 Premiums

According to the findings the study concluded that there is no standard formula for setting insurance premiums laid down by the National Insurance Commission (Ghana) and the governing i. Due to stiff competition, the insurance firms set low premiums in order to attract a large number of low premium paying clients, hence claims increases and so does the demand pressure put on the pool than is contributed. This adversely impacts on the Insurance firm's ability to indemnify clients that suffer loss. It was established that most insurance firms do not have risk managers and nor do they have actuaries personnel to carry out proper risk assessment.

Accordingly the insurance firms fail to put in place risk improvement measures and fail in their legitimate role of protecting the insuring public. The research revealed that although the State Insurance Company have a considerably large number of clients, their contributions in form of premiums are still inadequate compared to the number of claims lodged by the clients. Despite this insignificant premium set by SIC on some its educational policies the firms give cover on credit and the clients either delay to pay premiums or default completely.

The study revealed that most of the insurance claims are not homogeneous, but are rather significantly different. This is not a healthy insurance claim record because it might lead to the insured that make small claims feel they are cheated by those who make big claims and can lead to the collapse of the pool.

It was established that State Insurance Company rely heavily on premium incomes to settle claims rather than the state funding it, this is a very unsatisfactory practice.

The inadequate levels of premiums compared to the corresponding unproportionate rise in claims over the period permitted Private Insurance Companies to lead the insurance market in terms of performance. In summation, the estimated net premium in this piece of work is recommended for State Insurance Company in the country for any life who buys educational policy annually in advance for a whole year.

5.2.2 Profit

It is very common in life assurance companies that the life offices have high initial expenses when writing a new policy. This cost could be commission to the sales agent but could also be internal costs for underwriting or for IT systems. This leads to a negative cash flow or negative result for the life office at the inception of a life policy. The premiums charged by a life office are calculated in such a way that the present value of the premiums should be equal to or exceed the present value of the future benefits and expenses. If not, the policy is written at an expected loss which, if it is done consistently, would threaten the solvency of the life office.

The life office usually sets internal rules determining the minimum profit to be emerging from a new life policy or new block of life policies written. One such rule could be that the present value of the premiums should exceed the present value of the benefits by a certain percentage. Another way of expressing profit requirements for a life policy is to state when the initial expenses are repaid at a stated internal discount rate.

Comparatively, looking at the profit of State Insurance Company earns from selling educational product to an individual per year in the table 4.1 above and the one modelled by this research. It is highly recommend that if State Insurance Company enters educational contracts with an individual's per year at 9% interest rate ,its profit margin will still be hovering around 1.38%

5.3 Management of Risk

On how the State Insurance Company-Life Insurance manage its risk, it was found that the company has maintained adequate Re-insurance and Co-insurance portfolios hence spreading the sharing of the risks. The study established that the SIC-Life Insurance Company did not have professional risk managers, an actuaries in the branches. This is indeed a big loophole given that insurance business pivots around the management of risk.

This partly explains the increasing trend of claims that create a charge on the underwriting profits arising out of premium income. The lack of professional risk managers therefore makes it difficult for the firm to fully calculate the premiums for the given underwritten risks with reasonable accuracy which ends up with firm getting small premium pools that are unable to cope with the growth rate of claims against the said pools, hence delaying payment to clients.

5.4 Recommendations

I recommend that the SIC-Life Company should carefully adhere to the standard criteria for setting premiums as recommended by the National Insurance Commission.

In so doing they would ensure that adequate premiums are charged which will be proportionate to the likely claims to be charged against the premium pools. The NIC should set and approve minimum premium rates and maximum commissions so that there are realistic standard rates. This would ensure that the size of the premium pool is proportionate to the likely amount of range for a given insurance period. The NIC should ensure that the statutory requirement for insurance firms to carry out investment under the provisions of Acts 724 of 2006, and section 26 of the Ghana's Insurance Act.

This will ensure that the insurance firms do not rely purely on underwriting premiums but are cautioned by the return on investment from the various investments. Such returns on investments would enable insurance firms to settle claims even in the event of adverse claims and underwriting losses. The insurance firms should be obliged to hire risk managers and Actuaries who will help the firms to accurately calculate the risks and therefore decide on the appropriate premium chargeable per given covered risk in order to maximise profit.

To supplement re-insurance and co-insurance as strategies of risk management, insurance firms should apply professional risk management principles which would assist in avoiding and mitigating their exposure to risk. This can be done by offering after sales services to clients for example advising them to install fire fighting equipment, to train their drivers in defensive driving, to install speed governors and to put in place health and safety measures at work places.

This would reduce escalating trends of claims and enable firms to save premium funds for investment which would ultimately improve their performance. Finally it is recommended that SIC-Life Company should appreciate the fact that indemnity is the basic essence of an insurance contract. Accordingly they should

strive to settle their client's claims adequately and promptly without resorting to trivial technicalities to deny their contractual liability.

5.5 Other Sources of Revenue to the Insurance

Companies

The discovery of oil in Ghana is expected to transform the economy in the years ahead. The insurance industry is expected to position itself by enhancing its balance sheet size in order to underwrite huge oil and gas related policies. Large demand capacities exist in corporate institutions, government agencies, professional and other bodies, new companies being established, and among high net-worth individuals.

Moreover, a large number of shops do not have any insurance policy. The informal sector (workers who are mostly self employed and engaged in trading or other business outside the formal stream) has been largely ignored by insurance companies who usually target only the formal sector (government and privately employed workers who are captured on the national tax database and also on the social security and national insurance scheme. The formal sector is more attractive due to the stable and predictable flow of income).

With the introduction of agricultural insurance and the implementation of compulsory insurance of commercial buildings, the industry is expected to grow significantly, going forward. Agricultural insurance which currently covers the production of maize in northern Ghana is expected to be extended to cover other crops like rubber and cocoa as well as livestock. The new draft bill which is pending approval from parliament has a provision for an appropriate micro

insurance regulatory framework. This aims at targeting low income households in the informal sector by providing them with affordable insurance products that will meet their needs. All these initiatives are expected to lead to growth in the insurance industry and increase insurance penetration. With this, the contribution of insurance services to gross domestic product will also increase.

(Fagan, 1991)

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