

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND
TECHNOLOGY**



**OPTIMAL PROVISION OF LIFE ASSURANCE POLICY LOANS:
SIC LIFE COMPANY LIMITED AS A CASE STUDY**

By

ROLAND NAAB TIMBIL

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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 acknowledgment had been made in the text.

Roland Naab Timbil (PG8738012)

Student

Signature

Date

Certified by:

D. Asamoah Owusu

Supervisor

Signature

Date

Certified by:

Dr. Richard K. Avuglah

Head of Department

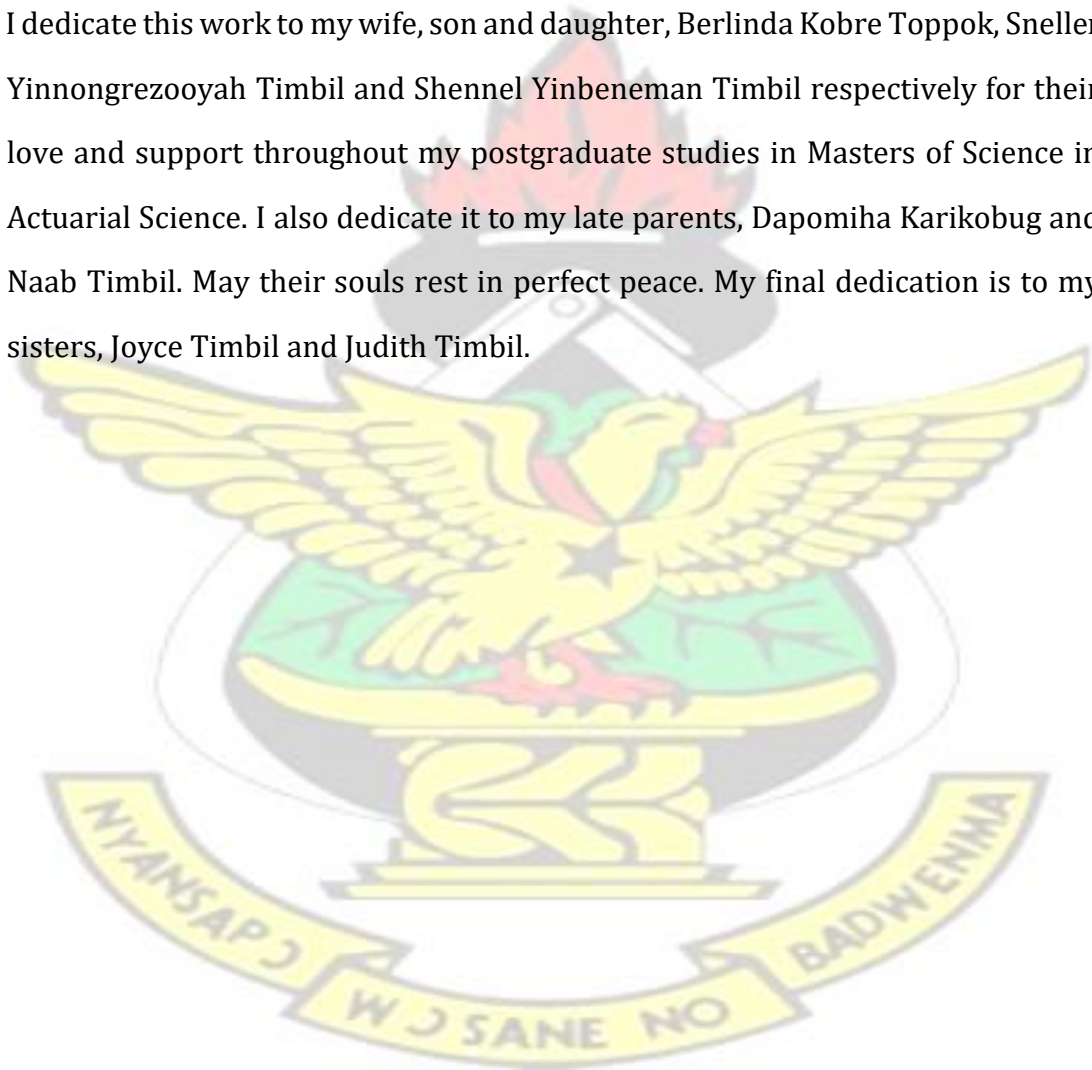
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Dedication

I dedicate this work to my wife, son and daughter, Berlinda Kobre Toppok, Sneller Yinnongrezooyah Timbil and Shennel Yinbeneman Timbil respectively for their love and support throughout my postgraduate studies in Masters of Science in Actuarial Science. I also dedicate it to my late parents, Dapomiha Karikobug and Naab Timbil. May their souls rest in perfect peace. My final dedication is to my sisters, Joyce Timbil and Judith Timbil.



Abstract

The purpose of the research was to explicitly analyze the provision of Life Assurance policy loans using SIC Life Company Limited as a case study. The Poisson distribution being one of the exponential families as well as the deviance of model fitting was employed in analyzing the data. Microsoft excel programs especially the use of the development year concept, bar chart and curves were used in analyzing the data. It was revealed that policies with loans outstanding are more surrendered than those without loans. The Family Security as one of the classes of policies without loans outstanding is mostly surrendered as compared to the other classes of policies. From 1998 to 2013, the total numbers of policies surrendered without loans outstanding were 44,889 whilst those with loans outstanding were 55,854; hence policies with loans outstanding are mostly surrendered as compared to those without loans.



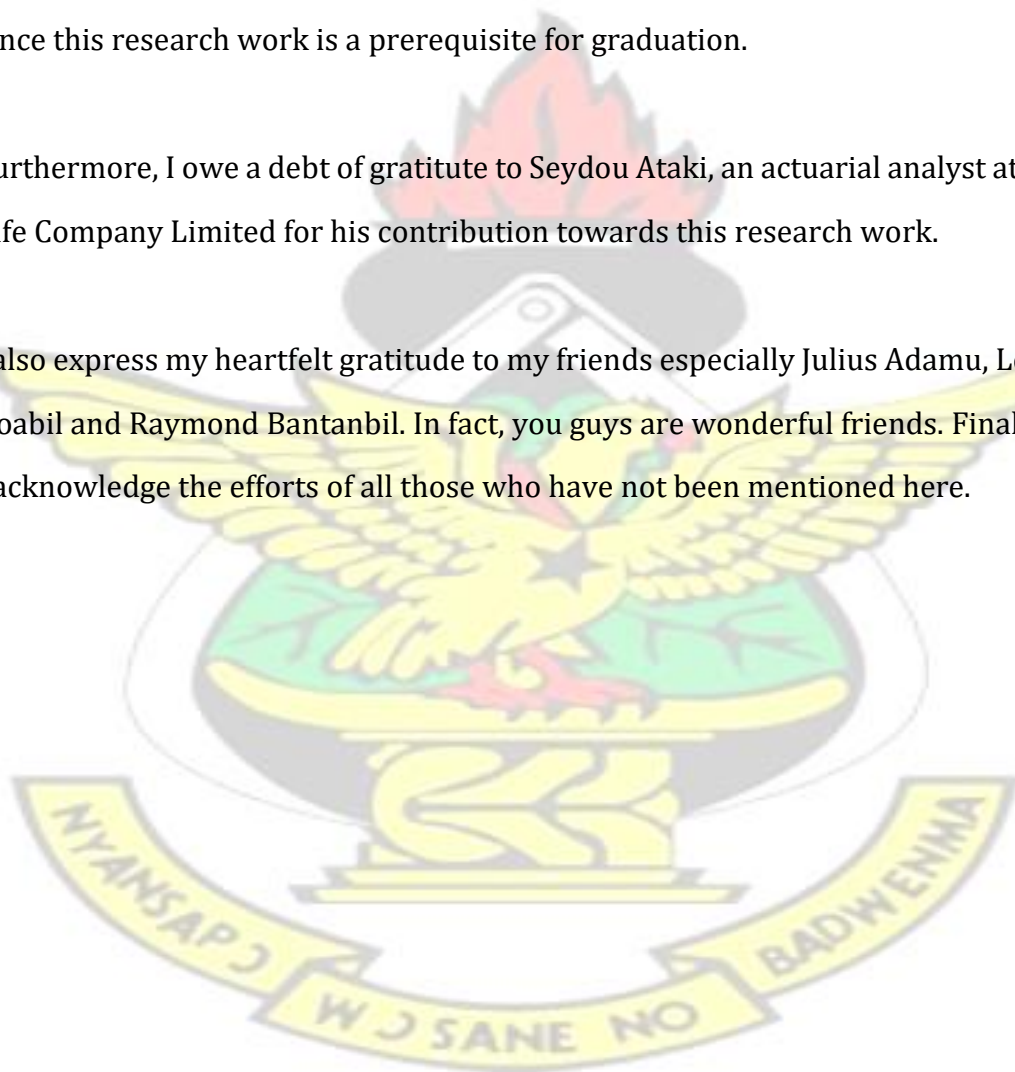
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Contents

Declaration	i
Dedication	ii
Abstract	iii
Acknowledgments	iv
Table of Contents	v
List of Acronyms	vii
List of Tables	ix
List of Figures	x
1 Introduction	1
1.1 Background of the Study	1
1.2 Problem Statement	2
1.3 Research Objectives	3
1.4 Significance of the Study	4
1.5 Limitations	4
1.6 Organisation of the Study	5
1.7 Methodology	5

1.8 Hypothesis	6
2 Literature Review	7
2.1 Introduction	7
2.2 Modifications of conventional policies	7
2.3 Cash values of universal policies used as security for policy loans .	8
2.4 Policy Loans and Surrender Rates	11
2.5 Selling Out Cash Values After Surrender	12
2.6 Surrender as a Result of Other Factors	12
2.7 Borrowing Against Life Insurance Policies	14
2.8 Modernization of life insurance policies	14
2.9 Insurance as Future Security	15
2.10 Life Insurance Serves as a Guarantee for Loans in Ghana	16
2.11 Life Insurance Industry in Ghana	16
2.12 Fund Management of Life assurance	17
3 Methodology	18
3.1 Introduction	18
3.2 Source of data	18
3.3 GLM Specification	19
3.3.1 The Normal Distribution	20
3.3.2 The Binomial Distribution	20

3.3.3	The Gamma distribution as an example of exponential family	21
5.2	Key Outcomes of the Research work	34
5.2.1	Policies with loans outstanding are mostly surrendered . .	34
5.2.2	Family Security Policy	34
5.2.3	The Poisson and Scaled Deviant values calculated	35
5.3	Average rate of surrender	35
5.4	RECOMMENDATIONS	35
5.4.1	New threshold for policy loans	35
5.4.2	Recommendations for future research	36

List of Acronyms

CSV- Cash Surrender Value

CV- Cash Value

GDP - Gross Domestic Product

GLMs- Generalized Linear Models

IDL - Institute of Distance Learning

KNUST- Kwame Nkrumah University of Science and Technology

LO= Loan Outstanding

MLE- Maximum Likelihood Estimate

3.3.4	The Lognormal Distribution	22
3.3.5	The Poisson distribution as a tool for analysis	22
3.4	Deviance of Model Fitting	24
4	Analysis and Findings	25
4.1	Introduction	25
4.2	Saturated Models	31
4.3	Decision	33
5	Conclusion and Recommendations	34
5.1	Introduction	34

NDB- Net Death Benefit

SIC- State Insurance Company

UL- Universal Life

VUL- Variable Universal Life

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List of Tables

4.1	Surrendered Policies With Loans Outstanding	25
4.2	Policies Surrendered Without Loans	26
4.3	The Rate of Surrender of Policies With Loans Outstanding	30
4.4	Surrendered Policies Without Loans Outstanding With Respect to Classes of Policies	31
4.5	The Calculated Values of λ_i	32



List of Figures

- 4.1 A graph illustrating the number of policies surrendered without loans with respect to classes of policies 28
- 4.2 A curve showing policies surrendered with loans versus those without loans 29



Chapter 1

Introduction

1.1 Background of the Study

In recent years life assurance companies have witnessed tremendous growth. In Ghana, there are about 22 life assurance companies underwriting life assurance products. Each company comes out with innovative measures in order to woo clients into patronizing their products (Abdullah, 2011).

SIC Life Company Limited (SIC Life), originally existed as the life division of the erstwhile reputable multi-line insurer, the State Insurance Company of Ghana Limited (SIC). The provision of the Insurance Act 2006, Act 724 made SIC Life to conform to and was therefore established as a fully licensed life insurance company in 2007. It is currently the largest and most reputable life insurance company in Ghana controlling the largest share of life insurance market (Abdullah, 2011). Some of the products of SIC Life include: traditional policies (endowment policies, whole life policies, riders, mortgage protection policy), Universal life policies (family security plan, Flexi-child education plan, Ultimate life plan and Education plan), Group life insurance schemes (Group security plan, Group term with investment, Group term with personal accident and Group term only), Others (Sika plan (okum-ka), loan protection plan, funeral insurance, school fees protection plan, Guaranteed Endowment plan).

At SIC Life, a claim can be made in the following ways: Partial withdrawal, policy loans, paid-up, personal accident, maturity, surrender, among others. Partial withdrawal is accessing part of one's cash value up to 60 %. Policy loan is using one's cash value as a guarantee to borrow a loan facility from the company up to 85% of the cash value. When a policy holder stops with the payment of premiums,

meanwhile, he has not closed down his policy, it is termed as paid-up. Maturity is the date the policy pays the cash value to the policy holder. The surrender is the sum of money an insurance company pays to the policy holder or annuity-holder if he/she voluntarily terminates it matures. Personal accident cover is an added benefit to the policy that caters for part of the assureds' medical bills in the event of an accident. This project work seeks to help address how effectively policy loans at SIC Life should be administered.

1.2 Problem Statement

Every limited company has the aim of making profit in order to stay in business. Companies therefore raise capital using various means by ensuring the risk of incurring substantial debts are made minimal. SIC Life invests the premiums it receives in so many ways. One of the ways is giving out policy loans to policyholders. A policy loan means using one's policy cash value as a collateral to assess a loan. The Cash Values(CV) of policyholders are used as collaterals and this allow policyholders to borrow up to a maximum of 85% of the CV at 15% per annum rate of interest.

Repayment of the policy loans is either by cash or an additional deduction to premium at source where the assured works and/or is paid. In as much as the cash value remains positive, the assured can continue to assess as many policy loans as desired. Technically there is no insurance cover when the cash value turns negative hence cannot thus service the premium required for the sum assured. Most policyholders at this point upon seeing a negative CV are challenged to surrender their policies due to the inability to repay huge loans outstanding.

Some do so and immediately reinstate whilst others feel disgruntle and opt out completely thereby making the company lose premiums inflows which directly have a financial implication for the company in the long run. If this is allowed unchecked, it negatively affects the company and thereby has the potentialities of diminishing the financial fortunes. Most clients complain that the company should have deducted the outstanding loans outright from their premiums which too is not the practice of the company and is even debatable as to whether it is the approach to go by. There should therefore be limitations as to how policy loans should be granted out so that policy holders do not end up surrendering their policies prematurely as a result of policy loans. It constitutes ineffective investment management if the company continues to lose huge number of valued clients as a result.

1.3 Research Objectives

The main aim of this study is to examine the essence of using assureds' cash values as collaterals for insurance policy loans.

The specific objectives seek the following:

- To investigate the rate of surrender of policies with loans outstanding;
- To compare surrender of policies with loans outstanding to those surrendered without loans outstanding;
- To suggest a new threshold for new policy loans.
- Research Hypothesis:

$$H_1 : CWL_1 \neq CWL_2 \neq \dots \neq CWL_n \quad H_0 :$$

$$CWL_1 = CWL_2 = \dots = CWL_n$$

where $CWL_i = i^{th}$ = class rate of surrendered policies without loans; $i =$

1,2,...,n.

1.4 Significance of the Study

According to Abdullah(2011), life assurance in Ghana is currently witnessing financial growth although not as compared to the banking industry. Nonetheless, there is no doubt that it contributes significantly to the Gross Domestic Product (GDP) of this country. If the premiums received are invested prudently, there is no doubt that the returns will go a long way to boost the growth of these companies in particular and the country at large. The study will assist SIC Life Company Limited to assess whether using assureds' cash values as collaterals for policy loans constitute prudent investment decision. More so, it will add to knowledge and the available literature on provision of life assurance policy loans in the country. It can also serve as a point for further research work in the area of the study.

1.5 Limitations

Time and resource are the main constraints in this research. The time frame to complete the work was too limited hence the research work was exclusively on SIC Life Company Limited . Even with this, not so much data was obtained for the analysis in order for more accurate inferences to be strengthened and generalized as a representation. Data could have been obtained on policies which premiums are paid directly by source through Controller and Accountant General's Department that have been surrendered but reinstated. This is because of the uniqueness of the staff numbering system which can make this exercise a success for analysis with respect to reinstatement of policies after surrender . Other insurance companies could have been considered for this research work in order to make the study more representative. Thus, SIC Life Company Limited has been considered as a case study due to time constraint. Obtaining data was

seen as another challenge. Although clearance was obtained from the company to solicit for data from the appropriate department, there were challenges of being provided with the data as staffs from the department I needed the data complained that they had tight schedules and could not have extra time to extract the information from the system for me. This restricted the analysis since there was insufficient data for the analysis of this piece of research work.

1.6 Organisation of the Study

There are five (5) chapters captioned in this piece of research work. The first chapter takes into account the aspects such as background of the study, problem statement, research objectives, significance of the study, limitations, organisation of the study and methodology. Also included in this chapter is the hypothesis and organisation of the study. Chapter two elaborates on the relevant literature review to the study. This discusses related works executed or investigated. Chapter three deals with the methodology employed in the analysis of the data obtained for discussion and recommendations. To conclude, in addition is chapter four and five address data analysis, conclusion and recommendations.

1.7 Methodology

The data is such that there are four classes of policies; Education, Family Security, Flexi child and Ultimate. The number of years for which each policy type was surrendered is 16, starting from year 1 to 16. To achieve the objectives of the study of his research work, the Poisson distribution model being one of the exponential families as well as the Deviance of model fitting was considered. The Poisson distribution is more suitable in measuring life insurance claim rates. The

other distributions are more suitable for measuring the claim rates of general insurance.

$$f(y) = \exp\left[\frac{y\theta - b\theta}{a(\varphi)} + c(y, \varphi)\right] \quad (1.1)$$

$a(\varphi), b(\theta)$, and $c(y, \varphi)$ are functions. Two parameters are considered in the above density function; let θ represent the "natural" parameter. It is the important parameter to the model. Additionally, ϕ is known as the scale parameter and or/ dispersion parameter. The Poisson distribution as one of the exponential families is considered for the purpose of this study. The rest of the distributions of the exponential family include: the Normal, Binomial and Gamma distributions (Core reading, Statistical Methods, 2013 examination by Institute and Faculty of Actuaries).

1.8 Hypothesis

According to Bowerman and O'connell (2003), hypothesis is considered to be an initial supposition that the independent variable has an effect on the dependent variable. The hypothesis to be tested on the data regarding policies surrendered without loans outstanding is as follows:

$$H_1 : CWL_1 \neq CWL_2 \neq \dots \neq CWL_n \quad H_0 :$$

$$CWL_1 = CWL_2 = \dots = CWL_n$$

where $CWL_i = i^{th}$ = class rate of surrendered policies without loans; $i = 1, 2, \dots, n$.

Chapter 2

Literature Review

2.1 Introduction

Chapter two takes into account the various important literature as well as their concepts and views relevant to the study. According to Angko (2013), there is no doubt that the penetration and performance of life assurance companies in Ghana is improving since 2007 when an act of parliament detached the operation of life assurance companies from general insurance companies. However, the performance of these companies may be short-lived if prudent management and measures are not put in place. Related literature depict that surrender rates of life assurance policies increase due to replacement of insurance policies activities, due to economic hardships , interest rates fluctuations, among others. According to Carson and Hoyt(1992), the demand for policy loans have changed since the introduction of variable loan rates and the re-design of policies. He concluded that the demand for policy loans driven by arbitrage potential has been reduced. If the practice is not carefully considered and researched into for appropriate measures to be put in place to govern the administration of insurance policy loans in the company, surrender rates will continue in the ascendancy which may adversely affect its finances . Some other researchers have carried out related studies on this subject area and hence their works have duly been reviewed as follows:

2.2 Modifications of conventional policies

Angko (2013) in his research work carried out in four top life performing insurance companies in Ghana, cited various insurance products traditionally sold by them. The initial products were not marketable so these insurance companies had to modernize their policies by incorporating investment components to the life sum assured. In his research, Angko (2013) indicated that there is no denying fact that these life insurance companies contribute in diverse ways towards the growth of the economy of Ghana. They at times discharge their

corporate social responsibilities by doing some donations to deserving persons and institutions. According to Angko (2013), there has been an improvement in terms of growth in the life insurance industry. This Angko (2013) attributes to the detachment of life insurance operations from that of general insurance. Angko (2013) opined that life insurance companies have experienced financial growth as a result of the attention on them unlike at first when they were attached as units to general insurance companies. The outcome of Angko (2013) research work indicate that only few people in Ghana have life insurance policies. The excuse of the public is that insurance is meant for the noble/ rich people. He emphasized that the growth is as a result of a lot of marketing activities being embarked upon by these companies to entice more people at patronizing insurance products in Ghana.

In the quest to make life insurance products more attractive, SIC Life has incorporated policy loans as a form of incentives to clients. They can use their life insurance policies cash values as collaterals for loans at reduced interest rates as against the higher interest rates. The commercial banks and other financial institutions in Ghana charge very high interest rates on loans. Policy holders can either repay the policy loans by cash or by source deduction in instalments in addition to their premiums being deducted and remitted to the company.

2.3 Cash values of universal policies used as security for policy loans

According to Angko (2013), Universal Life (UL) insurance is a type of policy where premium payment is flexible. This leads to potential growth of cash values.

He cited varieties of UL insurance policies such as "interest sensitive" , Variable Universal Life (VUL), guaranteed death benefit and equity indexed universal life

insurance. UL insurance policies are different from the whole life because of the alteration of the death benefit. A UL insurance policy has a cash value which can grow by payment of regular premiums. Charges on the policy decreases cash value. These charges are among other things the cost of providing life insurance protection. When the policyholder surrenders a policy, the surrender values less administrative charges are paid out to the assured. Because premiums and benefits are kept constant in whole life, UL seeks to address this. In addressing the benefits of Life Insurance policies, Angko (2013) revealed that apart from surrendering the policy (say 3 years from the issue date) for a cash value, it can also serve as a collateral for a loan. According to Angko (2013), most people understand that the economy cannot function without insurance. Insurance serves as basis for loans since no bank would give out loans for one to embark on high risk trading ventures.

Januario and Naik (2013) held the view that policyholders could sell the cash values of their life insurance policies to some other people for higher values exceeding what the insurance company would have given them if they were to surrender . In that case, the new owner of the policy continues to pay the premiums required in order to merit the benefit when it's due. They indicated that there are more avenues that never existed whereby policyholders could sell with the cash values of their life assurance policies. When assureds are faced with financial challenges and cannot pay premiums, they are at liberty to sell out the cash values of their policies. Money received out of these could be invested in other investment avenues.

Januario and Pritchette (2013) made it clear that individuals demand for life insurance for varied reasons. Paramount among these is the bequest motive, mortgage, serving as collateral for a loan, family security, embarking on trading, one's own or he/her children or grandchildren education, savings habit inculcation and many more. They further emphasized that a term policy could be

signed for the purpose of mortgage whilst policies that have cash values could serve as future savings for building a house. In their analysis, they propounded a regression model with respect to a policyholder who wishes to surrender his/her policies for the purpose of the Net Surrender cash Value. Verstein (2011) revealed that in America, many Life Assurance policies prefer selling their insurance in the market than considering surrendering them with the company that issued the policy. He added that if one surrenders or sells out his /her life insurance policies, he may temporarily benefit but may later regret doing so. He further indicated that instead of selling the policy, the assured can exercise the option of borrowing against it. He acknowledged that there are associated challenges in borrowing, nonetheless, many assureds prefer this aspect of it to selling the policy.

Verstein(2011) further added that borrowing against life insurance policy cash value is predominately practiced in America. He indicated that at the time he carried out the research work, about USD 121 billion dollars worth of loans were secured by Americans from their life insurance policies. In his publication, in which he reviewed other literature works, he indicated that premiums will have to be paid for a prescribed number of years (at least 3 years) before one can merit a benefit. The loan to be approved should not exceed the loan value which the policy approves.

Russel *et al* (2013) surrender rates are largely encountered due to high interest rates, lack of jobs, income and policy replacement. In their research work, they indicated that Walden (1985) argued that life assurance meant for life time could be seen as an option to policy surrender, policy loan option, among others. He further indicated that life assurance regarding policy loan and surrender activity are as a result of urgent demand for funds during a time of need or crises. Russel *et al* (2013) then predicted an increase in lapses, loans and surrender activities

especially in the following: prolonged/severe unemployment, or during periods where income levels decrease. In their opinion, assureds could keep their policies active by not surrendering instead, their cash values could be used to secure them with policy loans.

2.4 Policy Loans and Surrender Rates

On modelling of policy loan flows, Scott (1971) indicated that there was the increase in the request for policy loans. Hoyt(1994) took into consideration how policy loan flows were carried out and concluded that there has been a demand for policy loan in recent times. A comprehensive research on insurance policies loan and how loans were administered were investigated by by Carson et al (1979). Carson and Hoyt (1992) researched on the impact that redesigned policy loan provisions in life insurance industry and the transformation that it has had on the demand for policy loans. They revealed that if prices/ inflation hypothesis remains fluctuating, it will lead to similar increase in the amount of new loans demanded.

Miyazaki and Saito (1990) indicated that the increase of spot rates lead to the duration of liabilities becoming short with the expectation of early withdrawals. Kim(2005) considered the difference between reference and crediting rates, the age of policy since issue , poverty, unemployment and economic growth rates and seasonal effects, indicating that the models he employed generally perform better than the existing models(the arctangent model). It brought to light that there exist different surrender rates among the different insurance policy types. It further came out with the proper surrender rate models for four insurance policy types

2.5 Selling Out Cash Values After Surrender

Januario et al (2013) found that policyholders could surrender their life insurance policies for its market value. They indicated that this window of opportunity of life insurance policies developed could increase the option of people having to choose how they will plan towards their retirement. A claim could be arranged such that a life insurance policyholder could sell a policy exceeding the cash surrender value (CSV) by the life assurance company. In this arrangement, the buyer continues with the payment of future premiums in order to merit the Net Death Benefit (NDB) of the policy at its maturity. This affords policyholders to realise the market value of their policies. This never existed before. The benefit of this market enabled assureds to be relieved of the burden of payment of future and often increasing premiums. The lump sum as a benefit to the policyholder is to enable him or her have better attention to a better health care, long term care and to have the option of planning ones retirement.

2.6 Surrender as a Result of Other Factors

David *et al.*, (2013) carried out an analysis on life insurance activity to verify whether surrender was a function of certain variables and hence highly correlated across policies. It came to light that termination of policies were mostly related to the reinstating the policy. They indicated that insurers were exposed to hardships if surrender of life assurance policies persisted. This could lead to disintermediation and possible financial crises in the future. It was made clear that the rate at which insurance policies were being surrendered could trigger the importance to assess the degree to which economic factors such as adverse economic conditions and changing interest rates to policy surrender activity.

They focused on the surrender analysis for 4 years on economic factors. The outcome of their study depicted that surrender activity significantly related to interest rates, unemployment, and income and policy reinstatement. These outcomes were to assist actors in the insurance industry to be careful not to go into financial challenges. They reviewed researches including policy surrenders and loans. They indicated that policy surrender option was unhealthy to the insurer because it results in a significant drain on insurer assets and income. They further revealed that policy surrenders were steady until the introduction of universal policies in the late 1970s and early 1980s. They suggested that policies are surrendered when market interest rates increase, when real per capita income decrease and when policy replacement activity increases.

The outcome of their findings depicted that surrender activity appears to be correlated with several macroeconomic variables that could produce cash flow problems for life insurers in certain economic environments. Although the cash flows were not death claims, the correlation violated the basic tenet of insurance that cash flows be random and that the uncertainty surrounding the expected cash outflows be minimal or manageable.

Browne et al (2001), Emergency Fund Hypothesis and Outreville (1990) indicate that policy surrender are likely to increase during financial challenging years. They found that the surrender rate largely experienced related to lack of jobs by the people. When other investments are more attractive, policy surrenders (Outreville, 1990) or policy loans (Carson and Hoyt, 1992) also increases.

Mojekwu (2011) in his research indicated that due to lost in value of the policy with time and when premiums are not paid, policies either lapse , surrendered or converted to paid-up. Life assurance companies are strongly recommended to

educate the general public on the benefits of life assurance and devise some incentives to avoid the negative impact of decrement on life assurance portfolios.

2.7 Borrowing Against Life Insurance Policies

Verstein (2011) in his study confirmed that there has been an exponential growth in using insurance policies as guarantees for loans. He was of the opinion that there are less statutory laws put in place to govern the practice. His argument stemmed from the fact that there is inadequate operation of the law in security interests in life insurance policies. His emphasis was basically on the absence of statutory laws as there is currently only common law in place to check the operation. He further enumerated so many reasons that account for one borrowing against his or her life insurance policy. One instance is when an individual cannot continue with the payment of premiums although he/she still wants the policy to be in force. Some triggering factors according to him include: inadequate premiums paid on the policy, the need to urgently fund certain expenses especially when the policyholder is facing economic constraints. The law in that regard recognizes the transaction.

2.8 Modernization of life insurance policies

Gephart (1914) was of the concern that life insurance loans are adversely affecting the provision of insurance as a life cover. The situation he cited had laws governing the practice. The law making body even encourages the idea of giving out policy loans. The practice was gaining grounds because insurance companies use it as a tool for marketing their products. At first, one could not directly assess an insurance loan until in 1885 when the provision of policy loans started. The loans granted were such that one did not directly have to borrow from the accumulated premiums but rather had to do so from the cash values.

The practice of providing policy loans for policyholders proved as a good marketing tool as insurance companies readily gave out loans to their clients. He further indicated that all interested parties involved in ensuring the industry flourishes, encourage insurance policy loans to be given out to prospective policyholders. This has gone a long way to inculcate modern practices to the industry. By this, it has positioned the industry in that it can incorporate some operations of the banking sector thereby making it vibrant and robust. This way makes one doubt if insurance as an industry is not purposefully up for profit making avenues and thus must not merit tax exemption.

Although, the incorporation of loans has tremendously improved the sector, it cannot nonetheless compete with the banking industry as most people are much aware of savings and investment rather than the provision of life cover that only deals with assumptions and risk spreading. He was again of the view that the component of interest on the insurance policy makes the focus of insurance by way of providing life cover displaced. A system of check should therefore be put in place to revert insurance companies to their original attention.

2.9 Insurance as Future Security

Mulholland and Finke (2014) identified life insurance as an important investment venture. They attested to the fact that when policies are surrendered, it is the insurance company that faces the consequences of facing financial challenges in future. Their research was much focused on the individual person as a policyholder. It was found out that the poor in society are those who will easily surrender their policies whilst the rich are willing to keep their life insurance in force for as long as possible. It was also found out that those who have just retired from work are also among the category of people who are likely to terminate their life insurance

policies

2.10 Life Insurance Serves as a Guarantee for Loans in Ghana

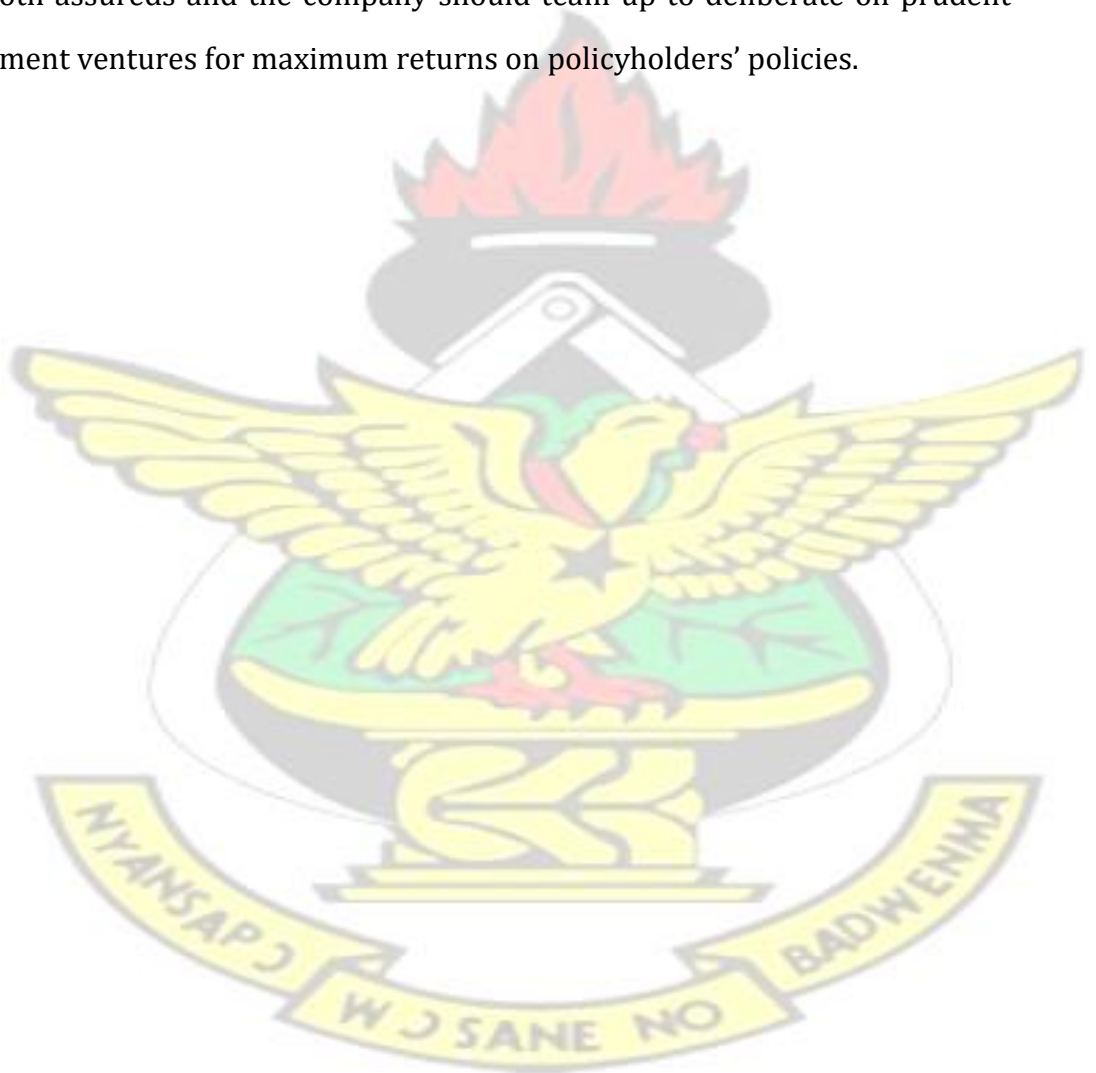
Bruce-Twum *et al* (2013) were of the view that any financial company that is into the business of giving out loans requires collateral so that they can fall on should the borrower default. The collateral to them protects the financial institution from going at a bust should there be a default. Life assurance is one of the several securities that financial institutions approve as collaterals. The main purpose of their research work was to prove for a fact that the level of acceptance of guarantees and life assurance policies as acceptance of guarantees and life assurance policies as collaterals for personal and SME credit in Ghana. They had wanted to know the extent to which life assurance is acceptable as collateral and whether the practice requires some qualification of these policies. Although the banks do not totally rule out the practice of using life assurance as collateral for loans, the practice is rare. The non-bank financial institutions don't just accept life assurance as collaterals, according to the research.

2.11 Life Insurance Industry in Ghana

Boadu *et al.*, (2014) assessed the life insurance industry in Ghana. They alluded to the fact that insurance is of paramount importance in every economy of which Ghana is not excluded. Through their research, it was revealed that some life insurance companies take a long time to settle claims. Some of the clients take these companies to court for judgment on the matter. They also established that for receiving premiums, the life assurance companies are very good at it but very poor at delivery when it comes to settlement of claims, a situation that is worrying.

2.12 Fund Management of Life assurance

Abdullah (2011) in his dissertation established that the development of the economy in Ghana cannot be achieved without the contribution of the twenty-two (22) companies in Ghana that underwrite life assurance. The brokers, agents and life assurance companies sell life assurance products. Between 2000 and 2005, life assurance premium grew over 100%. Funds are invested in short and long terms depending on the returns on investment. The recommendation was that both assureds and the company should team up to deliberate on prudent investment ventures for maximum returns on policyholders' policies.



Chapter 3

Methodology

3.1 Introduction

This chapter takes into accounts the methodology employed to achieve the objectives of the research. The study aims to assess the surrender rates of SIC Life Company Limited insurance products.

For a decision to be made, the data obtained was subjected to analysis. Predominantly, Microsoft excel programs were used in the analysis of the data. The use of the development year concept as well as pivot tables was utilized .The development year concept took into consideration how the policies were surrendered as the years go by. The rates of surrendered policies were also calculated through this same concept. More so, pie charts and bar charts as well as curves were drawn to illustrate the data gathered pictorially.

3.2 Source of data

The company was officially informed with an introductory letter I applied for from the Institute of Distance Learning (IDL) of the Kwame Nkrumah University of Science and Technology (KNUST).I was therefore given the go ahead to request for the data relevant for my analysis from the appropriate department of the company by the Human Resource and Administration department.

The research made use of only secondary data extracted from the company's database. SIC Life Company Limited Universal Policies can be assessed in the following forms: Partial withdrawals, Policy loans, Surrenders, Paid ups and

Maturities The interest of this research was only focused on the aspect of policy loans. The cash values of the universal policies serve as collaterals for policy loans and a policyholder can assess up to a maximum of 85% of the cash value as loans.

The data of the surrendered policies with loans outstanding from 1998 (when the company started with its universals policies) to 2015 were extracted from the company's software (Technical Life Systems).The data extracted comprised policies surrendered with loans outstanding with respect to the number of policies surrendered without loans outstanding for each year.

3.3 GLM Specification

The Generalized Linear Models (GLMs) is necessary for applications such as to decide which variables or factors are important predictors for the risk being considered. It also quantifies the relationship between the predictors and the risk so as to assess the appropriate premium levels. The general form of distribution (known as exponential families) used in GLMs include Normal, Binomial, Gamma and Poisson distributions. The ability of GLMs to allow modelers to combine many predictors into one model and consider their effects simultaneously makes it more efficient to construct actuarial models. GLMs of which the Poisson distribution is an example, are applied in areas such as claims analysis, reserving, among others by actuaries hence my decision to employ the idea in the analysis of the data.

The Poisson distribution was considered in the analysis of the number of policies surrendered without loans outstanding taking into consideration the classes of policies and the number of years they were surrendered.

3.3.1 The Normal Distribution

The density function is given as:

$$f_Y(y; \theta, \varphi) = \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left[-\frac{(y - \mu)^2}{2\sigma^2}\right] \quad (3.1)$$

$$= \exp\left[-\frac{(y - \mu)^2}{2\sigma^2} - \frac{1}{2}\left(\frac{y^2}{\sigma^2} + \ln 2\pi\sigma^2\right)\right] \quad (3.2)$$

This is in the form of equation (1.1) above with the following:

$$\theta = \mu$$

$$\varphi = \sigma^2$$

$$a(\varphi) = \varphi$$

$$b(\theta) = \frac{\sigma^2}{2}$$

$$c(y, \varphi) = -\frac{1}{2}\left(\frac{y^2}{\sigma^2} + \ln 2\pi\sigma^2\right)$$

Thus, for the normal, the natural parameter is μ whilst the scale parameter is given as σ^2

$$\text{let } E\left[\frac{\delta l}{\delta \theta}\right] = 0 \quad (3.3)$$

$$E\left[\frac{\delta^2 l}{\delta \theta^2}\right] + E\left[\frac{(\delta l)^2}{\delta \theta^2}\right] = 0 \quad (3.4)$$

By putting (1.4) and (1.5) into (1.3), the mean and variance of Y are given as $E[Y] = b^0(\theta)$ and $\text{var}(Y) = a(\phi)b^{00}(\theta)$ in that order

3.3.2 The Binomial Distribution

The distribution density function is slightly more difficult to deal with since we will first divide the binomial random variable by n. Let the Probability Density

Function be given as

$$f_Y(y; \theta, \varphi) = \binom{n}{ny} \mu^{ny(1-\mu)^{n-ny}} \quad (3.5)$$

$$= \exp[n(y \ln \mu + (1 - y) \ln(1 - \mu)) + \ln \binom{n}{ny}] \quad (3.6)$$

$$= \exp[n(y \ln(\frac{\mu}{1-\mu}) + \ln(1-\mu)) + \ln \binom{n}{ny}] \quad (3.7)$$

This is in the form of the initial equation(1.1) with

$$\theta = \ln(\frac{\mu}{1-\mu})$$

Note that the reverse is $\mu = \frac{e^\theta}{1+e^\theta}$

$$\phi = n$$

$$a(\varphi) = \frac{1}{\varphi}$$

$$b(\theta) = \ln(1 + e^\theta)$$

$$c(y, \varphi) = \ln \binom{n}{ny}$$

Hence, the binomial distribution function has a natural parameter as $\ln(\frac{\mu}{1-\mu})$

The mean is given as $E[Y] = b'(\theta) = \frac{e^\theta}{1+e^\theta} = \mu$ whilst the variance is denoted as $V(\mu) = b''(\theta) = \frac{e^\theta}{(1+e^\theta)^2} = \mu(1-\mu)$

3.3.3 The Gamma distribution as an example of exponential family

To ensure that the Gamma distribution is simple, the parameters should be changed from α and λ to α and $\mu = \frac{\alpha}{\lambda}$

its density function is also given as

$$\begin{aligned} f_Y(y; \theta, \varphi) &= \frac{\lambda^\alpha}{\Gamma(\alpha)} y^{\alpha-1} e^{-\frac{y\mu}{\mu}} = \frac{\alpha^\alpha}{\mu^\alpha \Gamma(\alpha)} y^{\alpha-1} e^{-\frac{y\alpha}{\mu}} \\ &= \exp\left[-\frac{y}{\mu} - \ln \mu \alpha + (\alpha-1) \ln y + \alpha \ln \alpha - \ln \Gamma(\alpha)\right] \end{aligned} \quad (3.8)$$

This is also in the form of the previous equation with

$$\theta = -\frac{1}{\mu}$$

$$\phi = \alpha$$

$$a(\varphi) = \frac{1}{\varphi}$$

$$b(\theta) = -\ln(-\theta)$$

$$c(Y, \phi) = (\phi - 1)\ln y + \phi \ln \phi - \ln \Gamma(\phi)$$

Therefore, the gamma distribution has a natural distribution as $1/\mu$ (the minus sign is ignored). Its mean is $E(Y) = b^0(\theta) = -1/\theta = \mu$. That of the Variance function is $V(\mu) = b''(\theta) = \frac{1}{\theta^2} = \mu^2$ hence the variance is $\frac{\mu^2}{\alpha}$

3.3.4 The Lognormal Distribution

This Distribution is often used in general insurance to model the distribution of claim sizes. It can be incorporated in the framework of GLMs since if $y \sim \log - normal$, $\log y \sim normal$. Therefore, if the log normal distribution is to be used the data should first be logged and then the normal modelling distribution applied

3.3.5 The Poisson distribution as a tool for analysis

This was employed by considering the surrendered policies without loans outstanding for each year, making assumption that it had a Poisson distribution with unknown parameter, U_i . Poisson distribution belongs to an exponential family with density of the form:

$f(x) = \left[\frac{(x(\theta) - b(\theta))}{a(\varphi)} + c(x, \varphi) \right]$, where $a(\phi)$, $b(\theta)$ and $c(x, \phi)$ are functions. This form must not be seen as being unique as one may see an exponential family defined in slightly different from the above.

From $F_Y(y; \theta, \varphi) = \frac{\mu^y e^{-\mu}}{y!} = \exp[y \ln \mu - \mu - \ln y!]$ This is in the form of equation (1.1) above with

$$\theta = \ln \mu$$

$$\phi = 1, \quad \text{so} \quad a(\phi) = 1$$

$$b(\theta) = e^\theta$$

$$c(y, \phi) = -\ln y!$$

It is again realized that the natural parameter for the poisson distribution is $\ln \mu$. The mean is $E[Y] = b^0(\theta) = e^\theta = \mu$. $V(\mu) = b^{00}(\theta) = e^\theta = \mu$ is the variance function. This illustrates that the variance is proportional to the mean. The variance is indeed equal to the mean since $a(\phi) = 1$

The Generalized Linear Model(GML) P, which assumes a Poisson distribution

$$f(y_i) = \frac{\mu_i^{y_i} e^{-\mu_i}}{y_i!}$$

for response variable y_i .

The distribution for that of the response variable y_i can be considered as follows:

$$f(y_i; \theta_i) = \exp \left[\frac{y_i \theta_i - e^{\theta_i}}{1} - \ln y_i! \right]$$

Where $\Phi_i = \ln \mu_i$ and the distribution means μ_i but in the standard model $\hat{\mu}_i = y_i$ so $\theta_i = \ln y_i$ in the formula of the deviance. The Poisson distribution was employed because the estimated parameters are consistent. The advantage is that the estimates can be used. Unlike the other distributions that are employed in calculating claim rates of general insurance/property insurance, the poisson distribution is suitable for estimating claim rates of life insurance claims.

The multiplicative factor ϕ is added to the variance of the Poisson to correct the over dispersion of the Poisson distribution.

$$\phi = \frac{\sum_{i=1}^n (y_i - \lambda_i)^2}{\sum_{i=1}^n \hat{\lambda}_i}$$

3.4 Deviance of Model Fitting

This deviance is a statistical measure usually employed at evaluating and comparing GLMs. It is relevant at comparing nested models by employing the application of χ^2 test. It is based on log-likelihoods such as:

$$l(x; \theta) = \sum_i^n \left[\frac{(x\theta_i - b\theta_i)}{a_i(\varphi_i)} + c_i(x_i, \varphi) \right]$$

$\theta = n$ canonical parameters $\theta_1, \theta_2, \dots, \theta_n$

To maximize the log-likelihood, each term of the sum is maximized by taking the partial derivative of the term i with respect to θ_i and setting it to zero.

$$\frac{\delta}{\delta \theta_i} \left[\frac{(x\theta_i - b\theta_i)}{a_i(\varphi_i)} + c_i(x_i, \varphi) \right] = x_i - b'(\theta_i) = 0$$

The mean is $\mu = b^0(\theta)$, so if saturated, the estimated mean is denoted as $\hat{\mu}^{s_i}$ of the distribution whilst i represents the value of observation, i . This was employed in the research at comparing whether the classes of policies without loans outstanding had the same surrender rates or not.

If the model is saturated, $\hat{\mu}^{s_i}$ is the estimated mean of the distribution i and is equal to the value of observation i :

$$\hat{\mu}^{s_i} = b_0(\theta^{s_i}) = y_i$$

The deviance for the model Z is : $D(y; \hat{\theta}^Z) = \sum_{i=1}^n 2 \left[y_i (\ln y_i - \ln \hat{\mu}_i^Z) - (y_i - \hat{\mu}_i^Z) \right]$ with $\hat{\mu}_{iz} = b_0 + b_1 X_{i1} + \dots + b_k X_{ik}$, for $i=1, \dots, n$. It must be noted that the deviance goes to zero as fitted means $\hat{\mu}_i^Z$ approach observations y_i .

Chapter 4

Analysis and Findings

4.1 Introduction

This chapter focuses on the presentation, analysis and discussion on the data gathered for the research. The data is presented in a form of tables, charts and bar graphs. The chapter deals with the findings of the study taking into consideration analysis of the main issues of the study. This includes analysis of policies surrendered with or without loans outstanding, analysis on the rate of surrender of classes of policies without loans outstanding, etc. The Poisson distribution was employed at analyzing the rate of surrender among the various classes of policies without loans outstanding. The χ^2 test value was compared with the scaled deviance test to test the null hypothesis.

Table 4.1: Surrendered Policies With Loans Outstanding

Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Grand Total
1998						22	15	13	19	14	14	16	4	1	6	4	137
1999					279	325	292	314	227	194	243	48	101	72	102		2,197
2000				447	445	534	458	403	345	402	112	183	143	174			3,646
2001			1,182	323	324	374	274	268	279	68	136	96	117				3,441
2002		362	531	602	645	636	626	498	182	327	224	279					4,912
2003	17	385	696	681	584	646	517	143	257	291	270						4,487
2004	35	474	540	520	567	511	142	363	285	320							3,757
2005	57	447	676	743	726	229	500	385	416								4,179
2006	127	804	1,150	978	255	708	566	562									5,150
2007	95	1,044	1,450	317	795	752	711										5,164

2008	161	1,312	401	1,122	906	1,255											5,157
2009	179	234	1,425	1,627	1,929												5,394
2010		52	2,179	2,869													5,100
2011		46	3,030														3,076
2012	1	51															52
2013	5																5
Total	677	5,211	13,260	10,229	7,455	5,992	4,101	2,949	2,010	1,616	999	622	365	256	108	4	55,854

From Table 1 above, it can be observed that the total number of policies surrendered with loans outstanding is 55,854. The years under investigation ranges from 1998 to 2013. Those policies that were surrendered in 1998 are 137 representing 0.25%. Policies with loans outstanding that were surrendered in 1999 amounted to 2,197 representing 3.93%. From the table above, it is also observed that years 2006 to 2010 witnessed higher surrender rates figures. However, as the years under investigation reduced towards the year of the study, the surrender rates figures become minimal. Examples include 2012 with 52 policies representing 0.09% and 2013 with 5 policies representing 0.01% respectively. The year with the highest surrendered policies with loans outstanding is 2009 with 5,394 policies representing 9.66%.

Table 4.2: Policies Surrendered Without Loans

Issue Year	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1998										14	14	16	4	10	6	4	68
1999									227	194	243	48	101	72	102		987
2000								403	345	402	112	183	143	174			1762

2001							274	268	279	68	136	96	117				1238
2002						636	626	498	182	327	224	279					2772
2003					584	646	517	143	257	291	270						2708
2004				520	567	511	142	363	285	320							2708
2005			676	743	726	229	500	385	416								3675
2006	804	1,150	978	255	708	566	562										5023
2007	95	1,044	1,450	317	795	752	711										5164
2008	161	1,312	401	1,122	906	1,255											5,157
2009	179	234	1,425	1,627	1,929												5,394
2010		52	2,179	2,869													5,100
2011		46	3,030														3,076
2012	1	51															52
2013	5																5
Grand Total	441	3543	10311	8176	5762	4737	3336	2622	1991	1,616	999	622	365	256	108	4	44889

Table 2 depicts the policies without loans outstanding. The total number of policies surrendered from 1998 to 2013 is 44,889. From 1998 to 2007 are policies issued and lasted for a duration of 7 years under the study. The minimum number of policies surrendered is 68 corresponding to 1998 whilst the maximum number of policies surrendered without loans outstanding is 5,164 corresponding to policies issued in 2007. For these group of policies which were issued and lasted for a duration of 7 years under the study, the number of policies surrendered increased from 1998 of 68 policies to 1,762 policies in 2000 and

then decreased to 1,238 policies in 2001. From 2003 to 2007, the increasing order of policies surrendered without loans outstanding resumed, however, policies issued in 2003 and 2004 that were surrendered after being in force for 7 years remained steady without any change in the number of policies surrendered.

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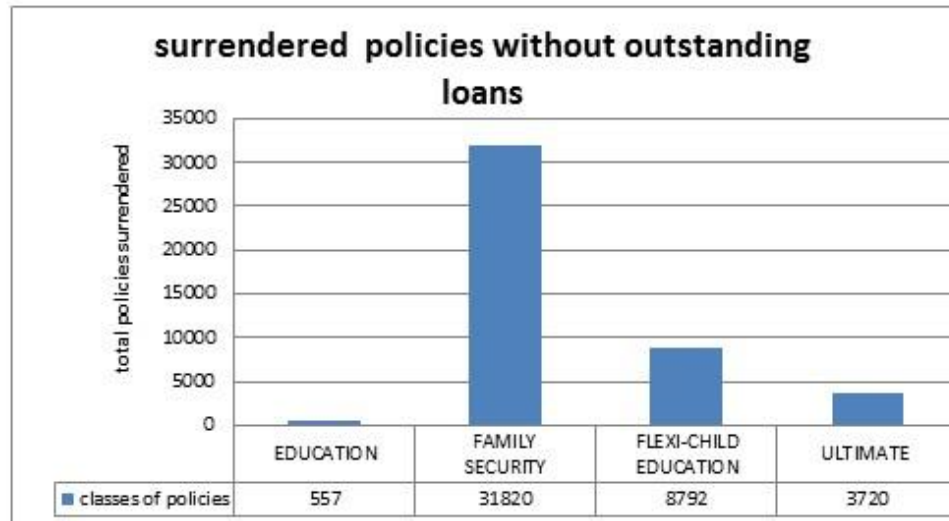


Figure 4.1: A graph illustrating the number of policies surrendered without loans with respect to classes of policies

From the figure above, it is clear that, of the different classes of policies surrendered without loans outstanding, the Family Security policy is leading (3,820 policies) followed by the Flexi-Child Education policies (8792) and then the Ultimate and Education policies with 3,720 and 557 policies respectively. The Education policy is the least among the policies surrendered with loans outstanding.

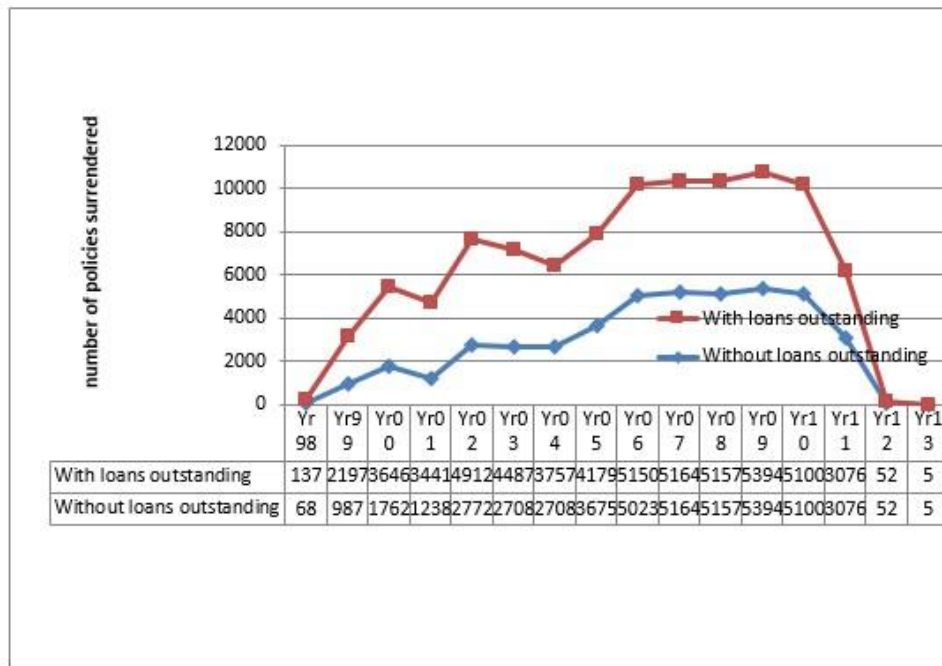


Figure 4.2: A curve showing policies surrendered with loans versus those without loans

The two curves compare the behaviour of policies surrendered with loans outstanding against policies surrendered without loans outstanding. It can be seen that the curves do not intersect except toward the tail end. With the loans outstanding, the surrender rates increased sharply from the years 1998 to 2000. It however decreased marginally in year 2001 and assumed the increasing trend. From 2005 to 2007, the surrender rate for policy with loans outstanding remained constant. The surrender rate started to decline sharply from 2010 to 2013. This is attributed to the fact that there were fewer years towards the end of the study. Hence the numbers of surrendered policies were not as many as the previous years considered.

The curve beneath represents policies surrendered without loans.

Policies that were issued and surrendered after being in force for 7 years covered period from 1998 to 2007.

Table 4.3: The Rate of Surrender of Policies With Loans Outstanding

Issue Year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Total
1998										10.85%	11.11%	14.41%	3.67%	10.42%	8.22%	5.71%	64.40%
1999									4.47%	3.85%	5.49%	1.16%	2.62%	2.21%	3.94%		23.74%
2000								9.29%	8.08%	10.48%	3.22%	5.66%	4.89%	6.76%			48.38%
2001							6.11%	6.05%	6.99%	1.85%	3.98%	2.97%	3.98%				31.93%
2002						6.25%	6.19%	5.33%	2.12%	3.98%	3.07%	4.17%					31.11%
2003					8.05%	9.00%	8.04%	2.38%	4.53%	5.35%	5.58%						42.93%
2004				6.65%	7.33%	7.33%	2.21%	6.07%	4.81%	5.95%							40.34%
2005			6.22%	6.96%	7.67%	2.65%	6.31%	4.89%	5.83%								40.52%
2006		5.51%	8.14%	7.85%	2.23%	6.72%	5.47%	6.02%									41.93%
2007	0.50%	5.53%	8.87%	2.10%	5.72%	5.52%	5.81%										34.04%
2008	0.66%	5.88%	1.95%	5.92%	4.58%	7.51%											26.49%
2009	0.64%	0.89%	5.78%	6.84%	9.18%												23.33%

2010		0.14%	6.00%	9.85%													16.00%
2011		0.11%	8.31%														8.42%
2012	0.00%	0.13%															0.13%
2013	0.01%																0.01%
Grand Total	0.25%	2.60%	6.47%	6.60%	6.39%	6.42%	5.73%	5.72%	5.26%	6.05%	5.41%	5.67%	3.79%	6.46%	6.08%	5.71%	84.62%

From Table 4.3, the total surrender rates for the years under consideration is 84.62%. From 1998 to 2013, the year with the highest surrender rate is 1998 with 64.40%. The least surrender rate was in 2013 with 0.01%. As the years under consideration become fewer, the surrender rate becomes minimal. This can be seen from 2011 to 2013 with rates 8.42%, 0.13% and 0.01% respectively.

Table 4.4: Surrendered Policies Without Loans Outstanding With Respect to Classes of Policies

		Number of Policies Surrendered Without Loans Outstanding																
		Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Total
classes	EDU	0	1	17	18	70		20	4	3	5	10	12	46	349	2	0	557
of	FAM	3	90	18	280	449	748	1109	1346	1828	2338	3312	3996	5740	7555	2507	331	31820
policies	FL	1	17	51	670	101	21	327	471	591	733	1018	1236	1716	1584	596	73	8792
	ULT	0	0	0	0	3	40	160	170	200	260	397	518	674	823	438	37	3720

4.2 Saturated Models

A saturated model under the core reading of the Statistical Methods for the 2013 examinations by the Institute and Faculty of Actuaries, is defined as a model in which there are as many parameters as observations, so that the fitted values are equal to the observed values.

The difference between the log-likelihood of the saturated model S and model Z is:

$$l(y; \hat{\theta}^s) - l(y; \hat{\theta}^Z) = \sum_{i=1}^n \left[\frac{y_i(\hat{\theta}^s - \hat{\theta}_i^Z) - (b(\hat{\theta}_i^Z))}{a_i(\Phi)} \right]$$

$l(y; \hat{\theta}^s) \geq l(y; \hat{\theta}^Z)$ is non-negative.

For $a_i(\Phi) = \frac{\Phi}{\omega_i}$ implies the scaled deviance $D^*(y; \hat{\theta}^Z)$ for the model Z is illustrated as:

$$D^*(y; \hat{\theta}^Z) = 2^h l(y; \hat{\theta}^s) - l(y; \hat{\theta}^Z)^i$$

The deviance $D(y; \hat{\theta}^Z)$ drops the dispersion parameter

$$\Phi : D(y; \hat{\theta}^Z) = \Phi D^*(y; \hat{\theta}^Z)$$

That of the saturated model is as follows $0 : D(y; \hat{\theta}^Z) = 0$

If it were a saturated model (number of claims in each year, i have a Poisson distribution with unknown parameter, μ_i) where μ_i 's represent the parameters which are equal to the observed values.

Assuming they were all surrendered at the same rate. (This assumption is made because each policy type has the same chance of being surrendered.)

$$\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6 = \mu_7 = \mu_8 = \mu_9 = \mu_{10} = \mu_{11} = \mu_{12} = \mu_{13} = \mu_{14} = \mu_{15} = \mu_{16} = \lambda_1 \mu_1$$

$$= \mu_2 = \dots = \mu_{16} = \lambda_1 \mu_{17} = \mu_{18} = \dots = \mu_{32} = \lambda_2 \mu_{33} = \mu_{34} = \dots = \mu_{48} = \lambda_3 \mu_{49} = \mu_{50} = \dots = \mu_{64} =$$

$$\lambda_4$$

The Likelihood of the Various Classes of Policies

$$L = \exp\{\sum_{\lambda=i}^n \ln \lambda_i \sum_{\lambda=i}^n y_i - 16\lambda_i + C\}$$

The Estimate of $\hat{\lambda}$ estimates the surrender rates of each policy type.

$$L = \exp\{\ln \lambda \sum_{\lambda=1}^N y_i - 64\lambda + C\}$$

Table 4.5: The Calculated Values of λ_i

λ_i	Values
λ_1	34.8
λ_2	1988.75
λ_3	549.50
λ_4	232.50

The Average Surrender Rate

$$L = \exp\{\ln \lambda \sum_{\lambda=1}^n y_i - 64\lambda + C\}$$

$$\hat{\lambda} = 701.39$$

$$L_A = L_1 \times L_2 \times L_3 \times L_4$$

$$L_A = \exp\{557\ln\lambda_1 + 31820\ln\lambda_2 + 8792\ln\lambda_3 + 3720\ln\lambda_4 - 16(\lambda_1 + \lambda_2 + \lambda_3 + \lambda_4) + c\}$$

$$MLE(L_A) = 557\ln\hat{\lambda}_1 + 31820\ln\hat{\lambda}_2 + 8792\ln\hat{\lambda}_3 + 3720\ln\hat{\lambda}_4 - 16(\hat{\lambda}_1 + \hat{\lambda}_2 + \hat{\lambda}_3 + \hat{\lambda}_4) = 274508.2371$$

$$\ln L_B = \left(\ln \hat{\lambda} \left(\sum_{\lambda=1}^{64} y_i \right) - 16\lambda + C \right) = 311,509.90$$

SCALED DEVIANCE

Model A : 4 parameters

B : 1 parameter

Using the X^2 test with 4-1 degree of freedom at upper 5% significant level = 7.815

$$Scale \quad Deviant = -2(LA-LB) = -2(274508.24-311509.90) = 73,985.32796$$

4.3 Decision

Decision: Since 73,985.32796 is greater than the critical value for $\chi^2 = 7.815$, we reject the null hypothesis and conclude that the classes of surrendered policies without loans outstanding do not have the same surrender rates.

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Chapter 5

Conclusion and Recommendations

5.1 Introduction

The aim of this chapter is to outline the outcome of the study. This is tailored towards achieving the set objectives. The findings will go a long way to augment any effort by management of the company to optimally provide life assurance policy loans at SIC Life Company Limited to its clients. Some interesting inferences have therefore emerged through this research work.

5.2 Key Outcomes of the Research work

5.2.1 Policies with loans outstanding are mostly surrendered

Through the outcome of the analysis of the data gathered, one of the major findings is that, most of the policies which cash values have been used as collaterals for policy loans are most likely to be surrendered as compared to those policies that assureds have not used their cash values as securities for policy loans. The 55,854 policies being the sum total of all policies with loans outstanding surrendered from 1998 to 2013 as against 44, 889 policies surrendered without loans outstanding is an interesting outcome that cannot easily be ignored.

5.2.2 Family Security Policy

The outcome of the analysis of the data points to the fact that out of the four classes of policies comprising the Ultimate, Education and Flexi-Child Education

, the Family Security with 31,820 policyholders representing approximately 71% of those who surrender their policies without loans outstanding within the period under investigation indeed surrendered their policies.

5.2.3 The Poisson and Scaled Deviant values calculated

The Chi Square test is used to test the hypothesis by comparing the critical value with the test statistics (the calculated value) to give an idea as to whether to reject the null hypothesis or not. This aspect of the analysis depicted that not all the policy types are surrendered at the same rate.

5.3 Average rate of surrender

From the analysis on the rate of surrender and with respect to the years under investigations (1998 to 2013), it came out that policies in force for 7 years from the date of issue ranging from 1998 to 2007, were surrendered at a rate of 39.93%.

It must also be noted that the rate of surrender is in the increase.

5.4 RECOMMENDATIONS

5.4.1 New threshold for policy loans

The research has brought to light that policies that are predominantly surrendered are those with loans values outstanding. The practice of the company has been to grant loan up to 85% of one's policy cash value as loans. In as much as there is a positive cash value, the company continues to grant future loans without limiting the policyholder's indebtedness. When a policyholder at a point entertains fears that his indebtedness will get out of hand, the next step is to surrender the policy for the net cash value. The average surrender rate of

39.93% of policies surrendered with loans outstanding which this research revealed is quite high and should not simply be ignored. One other interesting finding will be to investigate the percentage of those who reinstate their policies after surrender. Meanwhile, out of the findings of this research work, I strongly recommend the following threshold level for the administration of new policy loans by the company:

$$\text{New policy loan} = \max\{(85\% \times CV_t - LO_t), 0\}$$

where CV is Cash Value, LO , Loan Outstanding and t, time. With this a new loan will be granted if the equation gives a positive value as new policy loan.

5.4.2 Recommendations for future research

Time constraint as a limiting factor prevented me from soliciting for more data so that I could have enhanced the accuracy and generalisation of the findings as a representation of what really pertains regarding the provision of life assurance policy loans of SIC Life Company Limited. Nonetheless, this piece of is a good step for future researchers to be built upon it especially regarding reinstatement of policies after surrender. Survival analysis of the policies will go a long way to assist the company. It must be noted that the primary aim of every company is to continue in business and to make profit thus every effort to optimize profit is always welcomed.

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