A FINANCIAL PLANNING MODEL FOR RETIREMENT, TAKING INTO ACCOUNT THE IMPACT OF PRE-RETIREMENT FUNDING INCOME, AGE AND TAXATION

A thesis submitted in partial fulfilment of the
requirements for the degree of

MASTERS IN COMMERCE

of

RHODES UNIVERSITY

by

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January 2006

Individuals are often not aware of the required level of contributions needed to fund a retirement savings plan. This problem is compounded by the fact that the assistance provided to these individuals by way of commercially-available retirement planning models does not take into account the effect of income tax on the level of required retirement savings contributions and recent changes in the tax legislation to the income tax payable by individuals has had a significant effect on these required levels.

As a preamble to the research process, an exploratory questionnaire was administrated to a sample of individuals, which was designed to measure the level of awareness of these individuals of the contributions to a retirement savings plan needed to fund their post-retirement financial needs, and of the impact of age, the level of income and income tax on their contributions. Responses to the questionnaire indicated a low level of awareness of retirement planning amongst these individuals.

A retirement planning model was then designed to test the effect of earnings, age and changes in tax legislation on the level of an individual's required monthly contributions to a retirement savings plan. Independent variables of age and income were processed using the model. These same variables were then processed using the Old Mutual and Liberty Life retirement planning models and a comparison was made between the model developed in the research and these commercially developed models, to assess their usefulness and limitations.

Based on the above comparison, it appeared that the Old Mutual and Liberty Life retirement models both included the effects of the individual marginal tax rates in their calculations. However, they appeared to be using marginal tax rates which were higher than those reflected in the 2006 individual income tax tables. In addition these models did not include the effect of income tax exemptions and deductions and they therefore provided more conservative estimates than the retirement planning model designed in the research.

Recent tax adjustments have had the effect of greatly increasing the after-tax income of individuals and therefore it is important to include the effects of changes in tax legislation in determining the monthly contributions to a retirement savings plan.

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CHAPTER 1: INTRODUCTION

1.1 Background

Rapacki, S (1998) states that young workers are increasingly taking responsibility for making sure that they have saved sufficiently for retirement. The reason for this is the wide range of retirement planning options. Littman, M (1998) however states that even though there has been a growing interest in retirement planning, a number of individuals underestimate the cost of retirement.

Based on a number of preliminary discussions held with a select group of people and through the personal experience of the writer of this thesis, the above appears to hold true. Even though people may realise that they should be saving for retirement, they are not aware of how much they need to save or of how much they have already saved for retirement. A questionnaire has therefore been developed to obtain a more structured evaluation of people's attitudes and knowledge about their retirement savings.

Packaged software retirement planning tools, such as Quicken and Microsoft Money, are available. Barker, R (2000) points out, however, that the underlying assumptions on which these models are based are not known. In "Setting Retirees on the Right Path", Barker (2000) focuses on the efforts of former Boeing executive Bud Hebeler to educate the public about saving for retirement. He developed spreadsheets to guide retirement plans, including Excel spreadsheets that help project a realistic budget for retirement year, and Excel spreadsheets showing how an individual's retirement savings would have fared in the past.

In addition to the spreadsheets developed by Bud Hebeler, Jahnke, W (2001) also mentions that a number of organisations have developed retirement planning software. The problem is, however, that all of the software and spreadsheets are incomplete in some respects and important financial planning information in missing. This aspect is discussed in detail in the thesis.

1.2 Evaluation of existing retirement planning models

A number of organisations have developed retirement planning software. However, the majority of these programmes do not explain what assumptions have been used in calculating the required contributions to a retirement savings plan, nor do they take into account the large

number of variables which could affect the level of required contributions to these savings plans. The following retirement planning models are discussed in more detail:

- "Ballpark estimate" (http://www.asec.org/ballpark/blpkcomp.htm)
- "SmartMoney" (http://www.smartmoney.com/retirement/planning)
- "Moneymax" (http://moneymax.co.za/retirement)
- Old Mutual (http://www.oldmutual.co.za)
- Liberty Life (http://www.libertylife.co.za).

1.2.1 "Ballpark estimate"

This model was developed in the United States and takes into account social security benefits that individuals receive on retirement. The model makes use of a number of different pre-determined factors to calculate the required increase in retirement savings contributions in order to save adequately for retirement.

The first step involves determining how much annual income an individual wants to have on retirement. An individual usually requires between seventy and eighty percent of his or her current annual income to maintain the same standard of living.

The second step involves calculating the required capital to be saved at retirement date by multiplying the annual required income by a factor which depends on the anticipated age of retirement. These factors assume a real rate of return on investments of three percent and that the anticipated life expectancy of an individual is eighty-seven. The factors are as follows:

Anticipate age of retirement	Multiplication factor
55	21.0
60	18.9
65	16.4
70	13.6

The third step involves multiplying an individual's current savings by a factor to determine the value of those savings on retirement. The factors are as follows:

Number of years to retirement	Multiplication factor
10	1.3
15	1.6
20	1.8
25	2.1
30	2.4
35	2.8
40	3.3

The fourth step involves determining the difference between the amount required to have been accumulated on retirement and the value of current savings on retirement. The difference is then multiplied by another factor to determine the annual amount an individual will need to save to provide adequately for retirement. The factors are as follows:

Number of years to retirement	Multiplication factor
10	0.085
15	0.052
20	0.036
25	0.027
30	0.020
35	0.016
40	0.013

This model does not incorporate the effects of changes in the real rate of return. The real rate of return is assumed to be three percent. All the multiplication factors are based on this factor and therefore any changes in the real rate of return will not be incorporated into the model.

In addition, the model does not incorporate the effects of income tax. Neither income tax on an individual's annual income, nor income tax on investment returns, are taken into consideration in the "Ballpark Estimate" model.

1.2.2 "SmartMoney"

This model was developed in the United States and incorporates a number of variables in determining the required contributions to a retirement savings plan. These variables include the estimated expenses on retirement, the inflation rate, the expected after-tax return on investments and the income tax rates applicable to individuals.

Even though the model does incorporate the effect of taxation on the level of required savings towards a retirement savings plan, the income tax rates used are those rates applicable to individuals working in the United States and would not be appropriate in South Africa.

1.2.3 "Moneymax"

This is a model developed in South Africa that takes into consideration the effects of the South African economy. There are, however, some variables that are not included in the retirement planning model.

The model initially requests the current market value of provident, pension and retirement annuity funds as well as the monthly contributions being made to these funds. The number of years to anticipated retirement for the individual is then requested and the model calculates the future value of the current retirement savings contributions based on the assumption that there will be an annual seven percent increase in contributions and the annual expected return on investments is twelve percent.

The model calculates what the gross monthly income will be for the individual on retirement based on two assumptions. The first assumption is that the capital will last for twenty-five years after the anticipated date of retirement. The second assumption is that the post-retirement income will increase by an annual amount of seven percent.

The gross monthly income is then translated into the present day's buying power, taking into account an annual inflation rate of seven percent. Based on this translation the individual must make a decision on whether or not he or she is contributing a sufficient amount to a retirement savings plan. The model does not perform a calculation to determine how much more an individual needs to contribute to a retirement savings plan.

In addition, the retirement planning model does not take into account the effects of income tax on the gross income of an individual. The model only calculates the gross monthly income of the individual on retirement.

1.2.4 Old Mutual

The Old Mutual retirement planning model is fairly comprehensive and requests information relating to gender, gross monthly income, current age, age at retirement, type of pension fund, value of current savings, percentage of gross monthly income invested towards retirement, percentage of final salary required upon retirement, percentage increase in retirement income each year, average inflation rate until death, average salary increase until retirement and average growth of retirement savings.

An initial evaluation of the Old Mutual retirement planning model indicated that it appeared to include the effects of the personal income tax rates. However the rates that were used did not appear to be the latest income tax rates. The retirement planning model also did not appear to include the effect of other aspects of income tax legislation, including income tax exemptions and deductions. This model is evaluated in detail in Chapter Six.

1.2.5 Liberty Life

The Liberty Life retirement planning model included a disclaimer that stated that the calculations performed by the retirement planning model do not provide for tax deductions. This model requested information relating to total income needed, before tax, in today's terms, the number of years until retirement, the expected inflation rate, the number of years for which income is required after retirement, the expected rate of return on investments and the monthly income expected at retirement from existing policies.

This retirement planning model specifically stated that it does not take income tax deductions into account and, like the Old Mutual retirement planning model, upon initial evaluation it appeared that the effect of personal income tax rates had been included. However the latest income tax tables had not been used. This model is also evaluated in detail in Chapter Six.

Both the Old Mutual and the Liberty Life models require the enquirer to estimate inflation and return on investment. These are critical aspects of the model and over-optimistic estimates (low inflation, coupled with high rates of return) by persons not knowledgable in the area could produce totally misleading answers.

1.2.6 Conclusion

The retirement planning models that have been discussed in this chapter either relate to another country with different circumstances to South Africa or they do not incorporate all the variables applicable to saving for retirement.

The model that is developed in this thesis takes into account the effect of income tax, and a number of other variables, on the level of required contributions to a retirement savings plan. Unlike some of the models referred to, the model will be based on South African economic conditions and the South African rates of income tax.

1.3 Problem statement

Individuals are often not aware of the required level of contributions needed to fund a retirement savings plan. This problem is compounded by the fact that the assistance provided to these individuals by way of retirement planning models, which are widely available, does not take into account the effect of income tax on the level of required retirement savings contributions. Due to the changes in tax legislation over the last eight years, the income tax payable by individuals has had a significant effect on the required level of retirement savings contributions.

The research identifies the impact that these changes in tax legislation have had on retirement savings contributions. These results are compared to two existing retirement funding models to determine the impact of failing to incorporate the effects of income tax into a retirement funding model.

The research enables individuals to plan for their retirement income more effectively, as tax legislation changes occur. The changes in tax legislation have an effect on all individuals who are earning an income and are saving towards retirement and therefore the research should benefit all these individuals.

1.3 Goals of the research

The goals of the research are firstly to assess the level of awareness of individuals regarding the required level of contributions to a retirement savings plan. This is important in order to determine the extent to which existing retirement planning models could assist individuals to calculate the required level of contributions. If the level of awareness is low and there is therefore a need for a planning model, the effectiveness of existing models should be evaluated.

Secondly a model is developed to determine how much an individual should contribute on a monthly basis to a retirement savings plan in order to provide adequately for his or her needs during retirement. The model is also designed to incorporate the effects of changes in tax legislation on the level of savings required to adequately provide for retirement. This model is then used to illustrate the shortcomings identified in other retirement planning models, namely that they do not take into account the effect of income tax.

1.4 Research methods and design

The research process commenced with the administration of a questionnaire to a small, non-representative sample of individuals, designed to measure the level of awareness of the contributions to a retirement savings plan needed to fund their post-retirement financial needs and of the impact of age, income level and income tax on their contributions. Responses to the questionnaire indicated a low level of awareness, even in the case of professional respondents.

A retirement planning model was designed to test the effect of earnings, age and changes in tax legislation on the level of an individual's required monthly contributions to a retirement savings plan. This was designed to be used to make individuals aware of the effect of the above variables on their contributions to a retirement savings plan and to enable individuals to adjust their contributions if there are changes in any of the above variables.

The retirement planning model was developed in spreadsheet format using Excel software and comprised a number of worksheets that combine to determine the extent of saving that is necessary to fund retirement.

The model was used to process the independent variables of age and income, which were adjusted to determine the required monthly contribution to a retirement savings plan. Ages of twenty-five, thirty, thirty-five and forty were processed using the model, for individuals earning an after-tax income of R2 000, R4 000, R6 000, R8 000, R10 000 and R15 000.

These variables were then processed using the Old Mutual and Liberty Life retirement planning models and a comparison made between the model developed in this research and these commercially developed models to assess their usefulness and limitations.

In order to determine the overall impact of not including the effects of income tax in a retirement planning model, the effect of changes to the individual income tax tables were compared to the Consumer Price Index to determine their effect on the monthly contributions required for retirement.

The research methods and design therefore include the administration of a questionnaire, the design of a retirement planning model and the comparison of the retirement planning model to two existing models.

The ethical considerations applying to the administration of the questionnaire are discussed in Chapter Two. All the other data relates to public documents or self-generated simulations and therefore no ethical considerations apply.

1.5 Limitation of scope

During the development of the retirement planning model certain limiting assumptions have been made. These assumptions are discussed in more detail in Chapter Three and are necessary to ensure the comparability of the results between the retirement planning model which was developed and the existing retirement planning models.

1.6 Terminology

Throughout this thesis, the following definition applies:

Retirement savings plan: The provision of funds for retirement depends, inter alia, on the age at which an individual starts making provision, the gross income of an individual and the tax rates applicable to the individual. This provision for retirement may take any number of forms, including contributions to a pension fund, provident fund, retirement annuity fund or the accumulation of money market investments or stock market investments, or any combination of these. The contribution to any one of these forms of saving would form part of an individual's overall retirement savings plan.

1.7 Conclusion

The present chapter has briefly sketched the context of the research, this being the need to plan adequately for financial independence on retirement, the formulation of the research problem and the research process to be followed to seek a solution to the research problem.

Chapter Two describes the development and administration of a questionnaire designed to obtain a more formal evaluation of people's attitudes and knowledge about their retirement savings plans. This chapter includes an analysis of the results of the questionnaire.

Chapter Three provides a detailed discussion of the assumptions used in the development of a model to be used for the analysis of the level of an individual's contributions to a retirement savings plan.

Chapter Four describes the design of a retirement planning model used to determine the effect of pre-retirement income, age and taxation on the level of an individual's contributions to a retirement savings plan.

Chapter Five deals with various scenarios that are processed using the retirement planning model that was developed and the results are discussed.

Chapter Six processes various scenarios using the Old Mutual and Liberty Life retirement calculators and the results are compared to the results generated by the retirement planning model developed in the research.

Chapter Seven provides an evaluation of the overall impact of not including the effect of income tax in a retirement planning model.

Chapter Eight provides a final conclusion in relation to the results obtained from the scenario analysis using the retirement planning model and recommendations are made for further areas of research.

CHAPTER 2: THE DEVELOPMENT, ADMINISTRATION AND EVALUATION OF THE RESULTS OF A QUESTIONNAIRE USED TO TEST AWARENESS OF RETIREMENT FUNDING

2.1 Introduction

Chapter One referred briefly to the need to make financial provision that is adequate for post-retirement needs. Following informal preliminary discussions that were held with a number of people, it initially appeared that even though people are aware that they need to save for retirement, they are not aware of the high cost of retirement. It is therefore important to assess the level of awareness of individuals regarding their contributions to a retirement savings plan. This will give an indication of the extent to which a retirement planning model would be beneficial to these individuals. This chapter describes the development, administration and analysis of the results of the questionnaire.

2.2 Development of the questionnaire

A questionnaire was designed in order to obtain a more structured evaluation of people's attitudes and knowledge about their retirement savings. This questionnaire was designed as a preliminary evaluation and there was therefore no need to comply with the requirements of statistical interpretation, and no intention to generalise the results. The questionnaire was designed to provide answers to questions from which further qualitative analysis could be performed. A copy of the questionnaire is included in Appendix A.

With this in mind the questionnaire was designed to achieve the following main objectives:

- Determine the percentage of individuals who are saving towards retirement and their knowledge of the extent of their savings;
- Assess how individuals' occupations and age impact on their attitudes towards and awareness of retirement;
- Evaluate whether individuals' contributions towards retirement savings are sufficient to accumulate the amount of capital which they perceive to be sufficient for retirement.

Each question within the questionnaire was designed to obtain further information relating to the above points and each question is discussed in further detail below.

- What is your occupation? This question was designed to assess whether the level of sophistication or professional training had any effect on the participant's awareness of financial planning for retirement and its requirements. This was made clear to participants in the preamble to the question.

- What is your current age? This question, similar to the question relating to an individual's occupation, was designed to assess whether the age of an individual had any effect on the participant's awareness of financial planning for retirement and its requirements.

- Are you currently saving towards your retirement? This question ensured that one of the main objectives of the questionnaire was satisfied, that is, to determine whether individuals are saving towards retirement.

- Which forms of savings are you using to save towards your retirement? This question was designed to assess the most popular option of saving for retirement. Each option is dealt with differently for tax purposes and individuals may choose different options depending on their tax and risk profiles.

- Do you know the current market value of your fund, are you aware of who the fund manager is, are you aware of the risk profile of your investment, what do you think the inflation rate has been over the last five years, do you know if your retirement savings have achieved a positive real rate of return, do you know what percentage of your monthly income you pay to the South African Revenue Service as Income Tax? These questions were designed to assess the knowledge and awareness of an individual about his or her retirement savings and financial planning.

- At what age do you anticipate retiring, how many times your present salary to you think you need to have invested by the time you retire, at what age did you start contributing to a retirement savings plan, what percentage of your salary do you contribute to retirement savings? These questions were developed so that an analysis could be performed to determine whether or not individuals were contributing a sufficient amount to a retirement savings plan. Based on the responses, the actual contributions made by individuals could be compared to what they anticipated requiring on retirement. The potential gap between the two could then be quantified.

2.3 Sample

The questionnaire was administered to a small, non-representative sample of thirty-five individuals. The individuals were chosen at random with the intention to involve people from as many different backgrounds as possible. The participants were approached individually and the questionnaires were filled out under supervision. There was therefore a 100 percent response rate.

The questionnaire included a space for the participants to complete their personal details. They were informed, however, that they could remain anonymous should they so wish. The aim of the questionnaire was to obtain feedback from a sample of individuals regarding their retirement savings plans, and not to analyse the data statistically.

2.4 Review of the results of the questionnaire

All the results of the questionnaires were entered into an Excel spreadsheet. Once the data had been captured, Pivot Tables were used to group and analyse the data to determine the variation of responses to the questions.

2.4.1 Age and occupation

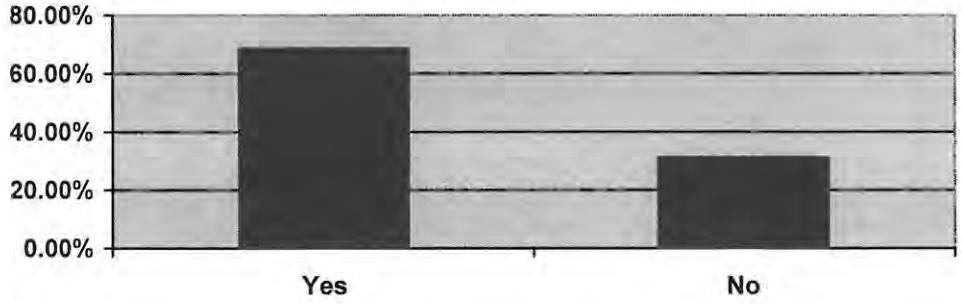
Thirteen participants were accountants, seven were educationalists, six were from middle management and two from top management positions. Of the remaining participants, two were engineers and there was one each from the information technology sector, the transport sector and the ministry, as well as a secretary and a student. Thirty-one of the participants were below the age of forty, two were between the ages of forty and fifty and two were older than fifty.

The participants were therefore mainly young professional people who would be expected to have a fairly good understanding of the need to provide adequately for retirement and would earn the level of income which would enable them to provide for their retirement.

2.4.2 Percentage of individuals saving towards retirement

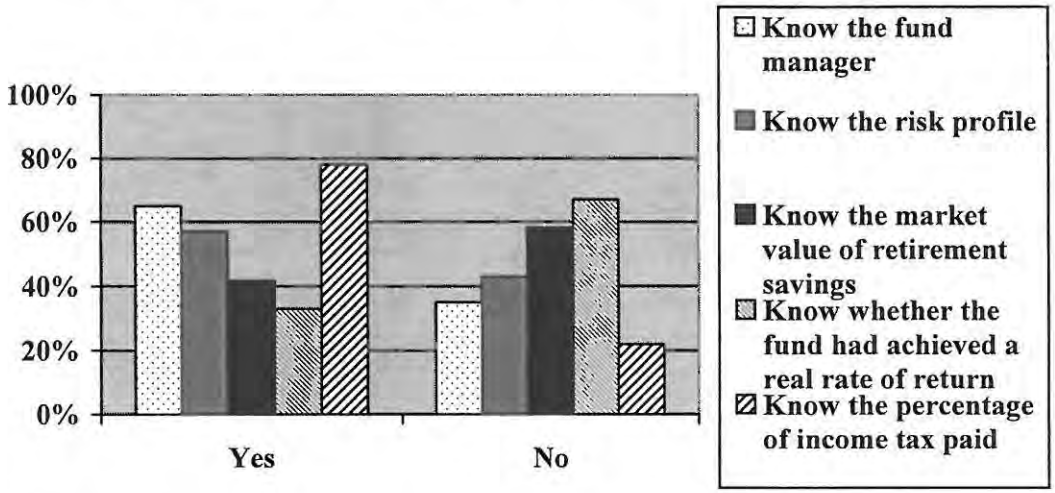
The results of the questionnaire confirmed that the majority of the individuals were saving towards retirement, however, there was generally a lack of knowledge regarding the extent of their savings.

Percentage of individuals saving towards retirement



Sixty-eight percent of the thirty-five individuals who took part in the questionnaire were saving towards retirement. Of those individuals, however, only forty-two percent knew the current market value of their savings. They therefore did not know whether their savings were achieving a positive real rate of return or whether their savings had a negative real rate of return.

Financial planning knowledge of individuals



Based on the results of the questionnaire there is generally a fair level of knowledge of who the fund manager is, what the risk profile is for the fund and how much income tax is paid. There is, however, generally a lack of knowledge regarding the market value of the fund and the real rate of return for the fund.

This highlights the fact that individuals are aware of financial planning and how they are investing their retirement savings. They are not, however, actively involved in assessing and managing their required level of contributions to a retirement savings plan. The first step to

determining the required level of contributions is to know how much has currently been saved for retirement. This information is essential when determining whether or not the current level of contributions to a retirement savings plan is sufficient.

The fact that many participants appeared to have a low level of knowledge about the risk profile of their funds as well as the real rate of return achieved, is a problem. The combination of risk, return and the rate of inflation determine the success or failure of adequate financial provision for retirement. These are also factors used in the commercially available retirement planning models to determine the level of ongoing savings required. If the person using the model uses inappropriate values, the result would be meaningless.

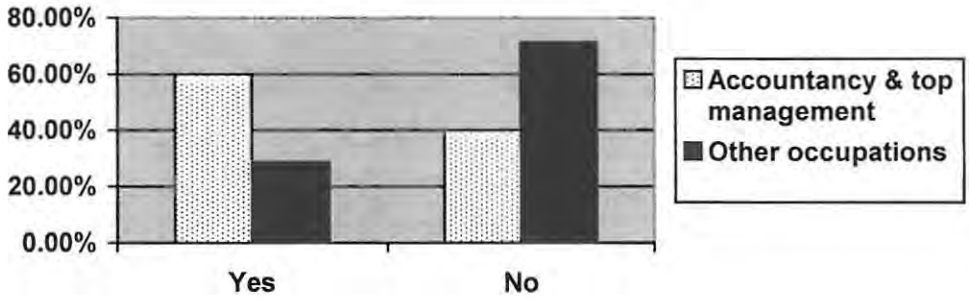
2.4.3 Impact of occupation and age on a individual's attitude towards retirement

The survey highlighted the fact that an individual's occupation and age has a definite impact on his or her knowledge about the financial aspects of retirement planning. In general the individuals involved in the accountancy, finance or top management positions had a greater awareness of retirement planning compared to the other professions. In addition, individuals who were older had a greater awareness of retirement planning compared to younger individuals.

Even though people in the other professions might have been saving towards their retirement, the knowledge regarding the value of those savings and the risk profiles of their funds was generally not the same as the accountancy and top management professions.

The following graph illustrates the awareness of the market value of retirement savings between accountancy and top management positions compared to other occupations:

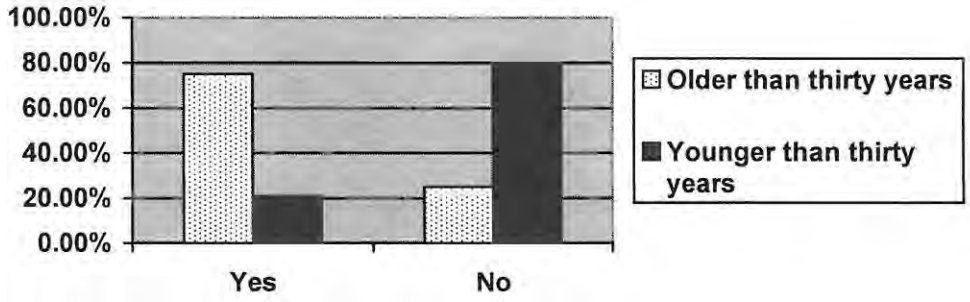
Percentage of individuals who know the market value of their retirement savings



In the accountancy and top management category, sixty percent of the individuals were aware of the market value of their retirement savings compared to only twenty-nine percent of the individuals in other professions.

The following graph illustrates the awareness of the market value of retirement savings between individuals younger than thirty and individuals older than thirty:

Age profile of individuals who know the market value of their retirement savings



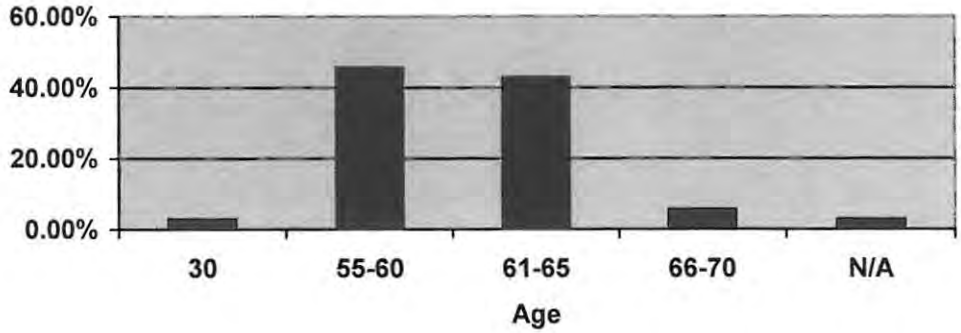
In the category of individuals older than thirty years, seventy-five percent of the individuals were aware of the market value of their retirement savings, compared to only twenty-one percent of the individuals younger than thirty years.

2.4.4 Sufficiency of retirement contributions

The survey was also used to gather information from individuals regarding their anticipated age of retirement, the date on which they had commenced saving towards retirement, their percentage contributions towards a retirement savings plan and the invested capital amount that would be required in order to fund their retirement (as a multiple of their annual salary). This information was then used to determine whether their current contributions to a retirement savings plan are sufficient to accumulate what they perceive as the required level of invested capital on retirement.

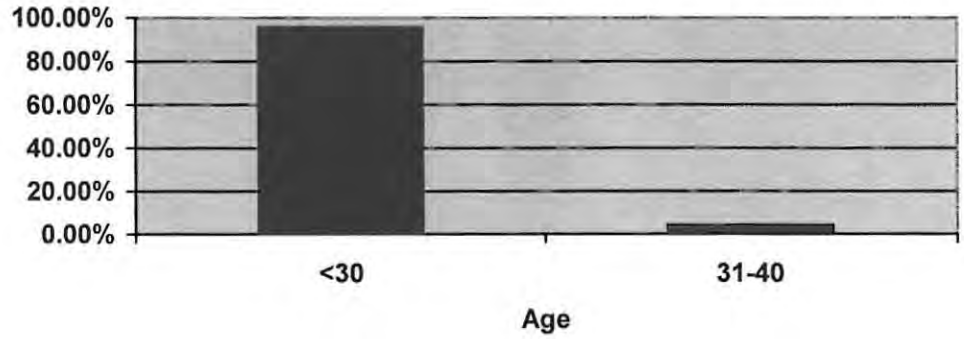
The majority of individuals anticipated retiring between the age of fifty-five and sixty-five. The average anticipated age of retirement is therefore sixty years.

Average anticipated retirement age



The majority of individuals, who are currently saving towards retirement, commenced saving before they reached the age of thirty years.

Age of commencement of retirement savings



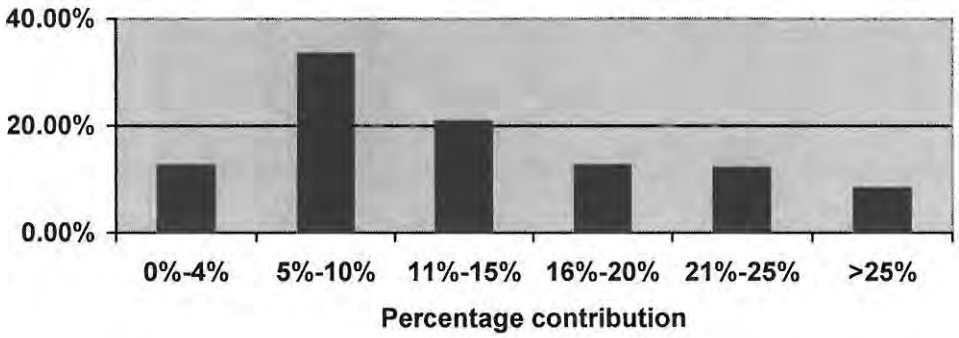
The individuals who are saving towards retirement contribute various percentages of their income towards retirement. Thirty-three percent of the individuals contribute between five percent and ten percent, twenty percent of the individuals contribute between eleven percent and fifteen percent, thirty-three percent of the individuals contribute more than fifteen percent and the remainder of the individuals contributed less than five percent.

It was interesting to note that, of the twenty-four participants who indicated that they were saving for retirement, sixteen were contributing to their employers' pension or provident funds. The other eight were making provision through various other savings instruments, mainly retirement annuity funds. These are all people who would, at one time or another, be more than likely to make use of one of the retirement planning models that are available.

Of the participants who were saving for retirement, fifteen were making use of more than one savings vehicle, thus demonstrating that even at such a relatively early stage of their careers, they have a serious intention to plan financially for retirement. Only two participants who

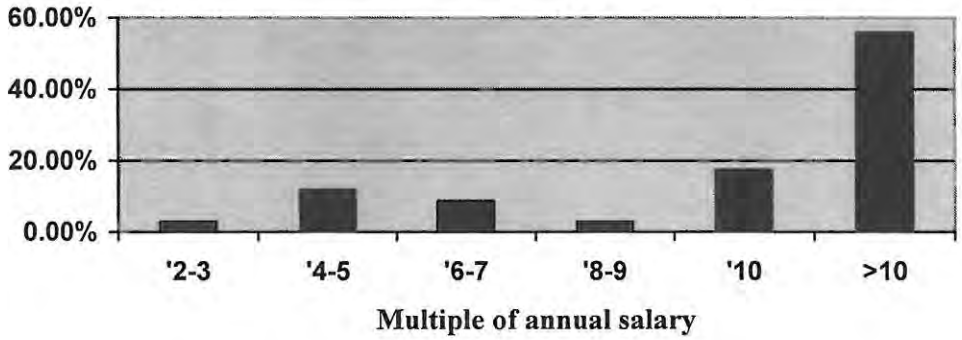
were members of their employers' pension and provident funds were not contributing anything over and above the amounts they were obliged to contribute to these funds.

Percentage contribution to a retirement savings plan



The majority of the individuals included in the survey believed that an investment of greater than ten times their present annual salary was required to fund their retirement.

Invested capital required on retirement



2.5 Quantifying certain responses

The average of the responses to questions discussed above, relating to the sufficiency of contributions, were then used in order to attempt to quantify on average, the gap between the belief (on average) that in excess of ten times their current earnings would be required by respondents at retirement and the amount that they would acutally be able to accumulate by that time.

The following is a summary of the information that was obtained from the relevant questions in the questionnaire:

- The average anticipated retirement age is sixty years of age;
- The average age at which people started contributing to their retirement was twenty-five years of age;
- The average percentage contribution made towards a retirement savings plan is twelve and a half percent of an individual's salary; and
- In general, the amount of invested capital required in order to fund retirement was perceived to be greater than ten times an individual's current annual salary.

The above information was used, together with certain assumptions, to calculate the amount of invested capital which the individuals in the survey would have accumulated upon retirement. The calculated investment income was then compared to the individuals' perceived required level of capital at retirement date.

The following assumptions were used to perform the calculations:

- The inflation rate is, and will remain, at seven percent per annum;
- The rate of return on investments will be ten percent per annum;
- The individual's present salary is R60 000 per annum;
- The contributions to a retirement savings plan will increase in line with inflation (that is seven percent), and
- The effect of taxation was ignored.

Based on the information and assumptions, the following calculations were made:

- The individual will contribute R625 per month to a retirement savings plan in the first year. This will increase to R668.75 (R625 x 1.07) in the second year and so on until the retirement age of sixty years. In the last year of working the monthly contributions to the retirement savings plan will be R6 236 (the future value of R625 for a period of thirty-four years increasing at a rate of seven percent per annum).

- The value of the retirement savings in thirty-five years time, at the age of sixty years, will be R4 356 463.84[1]. The present value of the retirement savings, taking into account an inflation rate of seven percent, will be R408 039.

- The present value of the retirement savings amounts to six point eight times the current annual salary (408 039/60 000).

The above calculations were based on assumptions and should these assumptions change, the result will be affected. If the inflation rate were to increase or the rate of return on the investments should decrease then the present value of the retirement savings will decrease. This will result in the investment for retirement being even less than six point eight times an individual's annual salary.

The above analysis indicates that, in general, people are not aware of their retirement funding requirements. In terms of the survey conducted, individuals, on average, believed that greater than ten times their annual salary would be required to fund their retirement. Based on their present contributions to a retirement savings plan, it appears that they will only be able to accumulate six point eight times their current annual salary.

2.6 Conclusion

The analysis of the questionnaire discussed in this chapter has demonstrated the lack of awareness of the future value of retirement funding contributions together with the lack of awareness of individuals in non-accountancy occupations and indicates that there is a need for a retirement planning model and a need for existing retirement planning models to be evaluated. It is therefore necessary to develop a retirement planning model and use it to evaluate existing retirement planning models. This is discussed in the chapters which follow.

[1] Refer to Appendix B for the calculation of this amount.

CHAPTER 3: ASSUMPTIONS OF THE RETIREMENT PLANNING MODEL DEVELOPED IN THE RESEARCH

3.1 Introduction

The previous chapter discussed the inadequate level of awareness of the financial aspects of retirement planning which were revealed by a questionnaire designed for this purpose. The responses and the analysis of these responses substantiated the need for a retirement planning model for use as a basis in financial planning. There are a number of commercially developed models which are freely available for this purpose. Preliminary investigation revealed that these models do not include the impact of taxation as one of the variables.

The goal of this research was to develop a retirement planning model that can be used to measure the effect of not taking the impact into account of income tax legislation on retirement funding. This was done by comparing a model that was developed and discussed in Chapter Four, with existing retirement funding models. In order to make a comparison between various retirement funding models possible, certain assumptions need to be made that will remain constant throughout the testing process. These constant assumptions will enable the testing process to isolate the effects of not including income tax in a retirement planning model.

The assumptions made relate to:

- retirement age;
- life expectancy of individuals;
- the proportion of monthly income required on retirement;
- the level of current retirement savings;
- the form of contributions to a retirement savings plan;
- the annual increase in retirement funding contributions;
- the inclusion of medical expenses;
- the inflation rate;
- investment returns; and
- the ratio of the split of retirement income between pension, interest, dividends and capital receipts.

The rationale underlying each of these assumptions is discussed below.

3.2 Retirement age

A number of different factors were taken into account when determining what age should be used as the average retirement age for individuals. These factors included the information obtained from the survey discussed in Chapter Two as well as certain age-related concessions granted in the Income Tax Act, 58 of 1962 (hereafter referred to as the "Income Tax Act").

The survey that was conducted indicated that the majority of the participants in the survey anticipated retiring at the age of sixty years. The analysis of the survey in Chapter Two revealed, however, that the contributions to a retirement plan by the average participant were not sufficient to accumulate the required capital for retirement. The majority of the participants were of the opinion that at least ten times their annual salary was required to adequately provide for retirement. With their current contributions, however, they would only be able to accumulate six and a half times their annual salary by the age of sixty years. This indicates that the participants (and, it is assumed, most individuals) will have to work for longer than they originally anticipated, or contribute considerably more to their retirement fund during their working life.

In addition, at the age of sixty-five years, individuals qualify for certain income tax concessions. They are granted a higher tax rebate when calculating their income tax payable (section 6 of the Income Tax Act), they receive a higher tax exemption on interest earned (section 10(1)(i)(xv)) and they are also able to deduct their medical expenses in full when calculating their taxable income (section 18).

Based on these considerations, it would seem reasonable to assume that the average retirement age for individuals will be sixty-five years of age even though individuals may ideally prefer to retire at the age of sixty years.

3.3 Life expectancy of individuals adjusted to reflect the South African situation

The World Bank Group (2003) defines life expectancy at birth as the average number of years a newborn infant would be expected to live if health and living conditions at the time of its birth remained the same throughout its life. The life expectancy at birth varies between countries and is dependant mainly on the average income level of the country. Generally, the higher the level of income, the higher the life expectancy due to the availability of clean water, medicines, health care and education of the population. The World Bank Group (2003) states that, between 1980 and 1998, the average life expectancy at birth of the world's

population had risen from 61 to 67 years. The increase in life expectancy is mainly due to the increase in the availability of clean water and primary health care to the low and middle income countries.

Even though there has been an increase in the average life expectancy at birth of the world's population, there are countries in which a decrease in the life expectancy at birth has been experienced. In the Sub-Saharan countries (including South Africa, Botswana and Zimbabwe), the World Bank Group (2003) states that the Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS) has resulted in a decrease in the life expectancy in these countries. Schroeder, F (2003) writes that, in six years, black people in Cape Town will not be expected to live longer than forty years (a decrease of fifteen years in life expectancy) and coloured people will not be expected to live longer than fifty-five years (a decrease of ten years). Due to the prevalence of AIDS in South Africa, The World Bank Group (2003) has estimated the life expectancy at birth of South Africans at 47.1 years in 2001 and 46.5 years in 2002. There is therefore a considerable difference in the life expectancy at birth of South Africans compared to a high income country such as the United Kingdom, which has an estimated life expectancy at birth of 77.4 years in 2001 and 77.5 years in 2002.

In assessing the impact of pre-retirement income, age and taxation on retirement funding, a range of monthly income levels of between R2 000 and R15 000 is to be used. These income levels relate to a relatively high level of earnings and therefore the life expectancy at birth to be used should reflect that of a high income earning population and not that of a low income earning population. People surviving on very low levels of income would, in any event, not be able to save for retirement and would depend on state pensions. The life expectancy of people living in the United Kingdom and the United States will therefore be used to determine the life expectancy of high income earners in South Africa.

The following is a table of life expectancies for people living in the United Kingdom:

	Male		**Female**		**Average**	
Age	**Life expectancy**	**Total Life**	**Life expectancy**	**Total Life**	**Life expectancy**	**Total Life**
0	73.42	73.42	78.96	78.96	76.19	76.19
20	54.45	74.45	59.75	79.75	57.10	77.10
40	35.35	75.35	40.24	80.24	37.80	77.80
60	17.85	77.85	22.08	82.08	19.97	79.97
80	6.45	86.45	8.42	88.42	7.44	87.44

English Life Table 15

The following is a table of life expectancies for people living in the United States:

	Total population	
Age	Life expectancy	Total Life
0	76.90	76.90
20	56.90	76.90
40	38.90	78.90
60	21.60	81.60
80	8.60	88.60

National Vital Statistics Reports, Vol. 51, No. 3, December 19, 2002

In assessing the impact of pre-retirement income, age and taxation on retirement funding, a sample of present ages between twenty-five and forty will be used. Therefore the life expectancies for an individual between these two ages must be determined. From the above tables, the life expectancy ranges from 76.90 (for a twenty year old in the United States) to 78.90 (for a forty year-old in the United States).

The life expectancy determined from the above tables must then be adjusted downwards for the effect of living in South Africa, where the life expectancy at birth is only 46.5 years (The World Bank Group: 2003). The reasons for the low life expectancy experienced in South Africa may also have an impact on the high income earners. These reasons include the impact of AIDS and the state of the public health system, should the income earners at the lower end of the income range not be able to afford all the costs relating to private health care. These factors are however not expected to have as large an impact on a high income earner and therefore a downward adjustment will be made of between three percent and five percent.

The life expectancy must also be adjusted for possible future changes in life expectancies. Nyce and Schieber (2001) compiled a table, which included the future life expectancy at birth for the United Kingdom and the United States. This information was based on an unpublished series provided by the Organisation for Economic Cooperation and Development:

Country	2015 to 2020	2035 to 2040
United Kingdom	80.30	82.10
United States	78.50	80.30

Based on the above table, the life expectancy's of individuals is expected to increase in the future, which Nyce and Schieber (2001) suggest is due to the breakthroughs made in biomedicine and genetic research.

Taking into account all the above information, including life expectancies of high income earning countries (ranging from 76.9 to 78.9), expected future increases in life expectancies (about two extra years every fifteen years) and living in a country with a low life expectancy at birth (a downward adjustment of between three percent and five percent), an average life expectancy of seventy-eight years will be used.

3.4 Proportion of monthly after-tax income earned immediately prior to retirement required to fund monthly expenses after retirement

As a general rule a retired individual will only require between seventy percent and eighty percent of his or her salary during retirement (http://www. investorguide. com/ iguretireintro. html). The reason why individuals require less income during retirement is that they have usually paid off their houses and motor vehicles before retirement and work-related expenses, such as clothes and travelling costs, are no longer incurred. In addition, they are no longer required to save for retirement as sufficient capital should already have been saved to provide the necessary funding for retirement.

Therefore a conservative assumption was made that all individuals will require at least eighty percent of their final salary during retirement.

3.5 No savings have yet been made for retirement

The goal of the research is to illustrate the shortcomings in various retirement planning models as a result of not including the impact of income tax in their calculations. A select number of ages and income levels was processed through the model developed and discussed in Chapter Four and these results were compared to other retirement planning models. It was assumed that at each selected age no savings had yet been made for retirement. This also illustrated the effect of age on the level of monthly contributions required for a retirement savings plan.

3.6 All contributions to the retirement savings plan will be in the form of retirement annuity fund contributions

A retirement savings plan may take any number of forms, including contributions to a pension fund, provident fund or retirement annuity fund. A retirement savings plan may also take the form of investments in property, money market funds or stock market funds. Each of these forms of savings is treated differently for tax purposes.

Pension fund contributions

Contributions to a pension fund are deductible in terms of section 11(k) of the Income Tax Act. An individual is allowed to deduct contributions to the extent to which they do not exceed R1 750 or seven and a half percent of retirement funding income. Any withdrawals or resignations from the fund are taxable in terms of the Second Schedule to the Act, which excludes a portion of the lump-sum receivable, up to a maximum of R120 000 in respect of all retirement lump sums from pension, provident or retirement annuity funds. In addition, the taxable portion of these retirement lump-sum amounts is subject to tax at the average rate of tax in terms of section (5)10 of the Act.

Provident fund contributions

Contributions to a provident fund are not deductible for income tax purposes. Upon withdrawal or resignation from the fund, the receipts are taxed in terms of the Second Schedule.

Retirement annuity fund contributions

Contributions to a retirement annuity fund are deductible in terms of section 11(n) of the Income Tax Act. An individual is allowed to deduct the greater of fifteen percent of non-retirement funding income, the amount by which R3 500 exceeds the pension fund deductions or R1 750. Any withdrawals or resignations from the fund are taxable in terms of the Second Schedule.

Property Investments

An individual does not receive any tax concessions for investing in property, unless the property is used for manufacturing purposes or constitutes qualifying residential accommodation, where specific tax incentive allowances apply. In addition, should rental income be received from the property investment, it is taxed at the marginal rate of income tax for the individual, after deducting any allowable expenses in terms of section 11 of the Income Tax Act.

Money Market Funds

An individual does not receive any tax concessions for investing in a money market fund. In addition, the individual is also taxed on the interest that is earned from the fund, subject to the exemption granted in terms of section 10(1)(i)(xv) of the Income Tax Act. For the tax year ending 28 February 2006, this exemption enables an individual under the age of sixty-five to earn interest of R15 000 annually and an individual over the age of sixty-five to earn interest of R22 000 annually, free of income tax.

Stock Market Funds

An individual does not receive any tax concessions for investing in stock market funds. The dividends received from these investments are, however, exempt from income tax in terms of section 10(1)(k) of the Income Tax Act. Should the shares be sold, however, any profit earned on the sale will be subject to Capital Gains Tax, in terms of the Eighth Schedule of the Income Tax Act, if the shares are held as investments and not as trading stock. Should the individual hold the shares as trading stock (for the purpose of purchase and sale to earn a profit) then the profits earned on the sale of shares will be included in the individual's gross income in terms of the "gross income" definition in section 1 the Income Tax Act.

Conclusion

Due to the different tax treatments for the various methods of saving for retirement, it was assumed that saving for retirement would be in the form of retirement annuity fund contributions only. This enabled the results of the research to be comparable.

3.7 Contributions to a retirement annuity fund escalate on an annual basis in line with inflation

Inflation has the effect of decreasing the "buying power" of money. In order to counteract the decrease in "buying power", an individual will need to contribute more to a retirement savings plan to ensure that the real value of the contributions does not decrease. It was therefore assumed that an individual's contributions to a retirement annuity fund would increase each year in line with inflation.

3.8 All growth in savings was adjusted to reflect after-tax income

The proceeds flowing from the various savings vehicles are subject to different forms of taxation in terms of the Income Tax Act and the Tax on Retirement Funds Act, 38 of 1996

(hereafter referred to as the "Tax on Retirement Funds Act"). This must be taken into account when determining the rate of return for investments. In this research an after-tax rate of return was determined after taking into consideration the different forms of income and taxation.

Pension, provident and retirement annuity funds

In terms of the Tax on Retirement Funds Act, any pension fund, provident fund or retirement annuity fund, as defined in section one of the Income Tax Act, is subject to tax at the rate of eighteen percent for the year ended 28 February 2006. The tax is calculated on an amount as determined by section five of the Tax on Retirement Funds Act.

In addition to the direct taxation of pension, provident and retirement annuity funds, individuals are also taxed on their lump sum benefits received from these funds in terms of the Second Schedule of the Income Tax Act. The Second Schedule calculates the portion of the pension, provident and retirement annuity fund lump sums that are tax-free and only the taxable portion forms part of an individual's taxable income.

Property investments, money market funds and stock market funds

The different forms of taxation for property investments, money market fund and stock market funds have already been discussed above.

Conclusion

In order to simplify the comparison of earnings, age and changes in tax legislation, an after-tax rate of return on investments was determined in order to incorporate all the above forms of taxation.

3.9 Monthly medical expenses

Individuals are allowed to deduct a certain portion of their medical expenses in terms of section 18 of the Income Tax Act, when calculating their taxable income. Individuals under the age of sixty-five are allowed to deduct medical expenses to the extent that they exceed five percent of taxable income prior to the deduction of the medical expenses. Individuals over the age of sixty-five are allowed to deduct their medical expenses in full. Therefore, once an individual is sixty-five or older, medical expenses play an important role in determining his or her taxable income.

In every retirement, there are generally two phases (APPLEGARTH, G: http://moneycentral.msn.com/articles/retire/create/1212.asp). The first phase occurs immediately after retirement when the retiree is still healthy enough to enjoy an active lifestyle. During this phase the retiree will still be in a good physical condition and he or she will not be spending much on medical expenses. The second phase occurs during the latter part of retirement. During this phase the retiree's health will start to deteriorate and the medical costs of the retiree will increase.

Based on the above information, it was assumed that a monthly amount of R500 would be spent on medical expenses prior to retirement and a monthly amount of R1 000 would be spent on medical expenses after retirement. The monthly amount of R1 000 after retirement is an average which incorporates the relatively lower medical costs in the first phase of retirement and the higher medical costs in the second phase of retirement.

3.10 The Consumer Price Index (CPIX) rate used to determine the inflation rate

The Consumer Price Index (hereafter referred to as the "CPIX") measures the increase, year on year, of a basket of goods including food, housing costs and petrol.

The CPIX over the last five years was used as a basis to predict what the inflation rate would be in the future. Below is a summary of the CPIX over the last six years:

	1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004
March	5.4%	7.9%	3.4%	7.4%	6.2%	10.2%
April	5.0%	7.6%	4.5%	6.5%	7.4%	8.8%
May	5.1%	7.0%	5.1%	6.4%	7.8%	7.8%
June	5.2%	7.2%	5.2%	6.3%	8.0%	5.0%
July	6.6%	4.9%	6.0%	5.3%	9.6%	4.2%
August	7.6%	3.3%	6.9%	4.6%	10.4%	3.7%
September	9.0%	1.9%	6.9%	4.4%	11.2%	3.7%
October	9.0%	1.7%	7.0%	4.0%	13.0%	4.2%
November	9.3%	1.9%	7.0%	4.3%	12.9%	4.6%
December	9.0%	2.2%	7.0%	4.6%	12.4%	4.3%
January	8.9%	2.6%	7.1%	5.0%	11.6%	3.6%
February	8.6%	2.3%	7.8%	5.9%	10.3%	3.1%
Average	7.4%	4.2%	6.2%	5.4%	10.1%	5.3%

Consumer Price Index (www.statssa.gov.za)

In addition to the history of the CPIX over the last six years, the inflation targeting by the Minister of Finance, Trevor Manual, must also be considered. In his budget speech for 2003,

the Minister of Finance stated that the inflation target for 2004 was between three percent and six percent and this has remained the target through 2004 and 2005.

Even though the inflation target set by the Minister of Finance is between three percent and six percent, the average inflation rate over the last five and a half years has been six point four percent with double figure inflation recorded from August 2002 to March 2003. The high medical inflation rate must also be considered when determining the overall inflation rate to be used for the future.

Based on the above considerations, an inflation rate of seven percent was used in the research.

3.11 Investment returns

The two main forms of investing for retirement are the purchase of shares and the purchase of bonds. Even if contributions are made to a pension fund, provident fund or retirement annuity fund, the underlying investments of the fund will comprise mainly shares and bonds. These two forms of investment were therefore used to determine the expected rate of return on investments.

Shares

Investment in shares yields two forms of revenue. The first form of revenue is the dividends that companies declare out of the profits that they make each year and the second form of revenue is the capital appreciation of the shares.

The dividends that a company declares can be measured by the dividend yield of that company. The dividend yield for the JSE Securities Exchange All Share Index in April 2005 was two point nine percent (Sunday Times: 2005). This is lower than the dividend yield two years earlier (in April 2003) of eleven point six percent (Sunday Times: 2003). Based on the fluctuations experienced in the dividend yield an expected yield of five percent was used. Dividends are exempt from income tax in terms of section 10(1)(k) of the Income Tax Act, therefore no adjustment needs to be made for taxation.

The capital appreciation of shares can be measured by taking the fluctuations for the JSE Securities Exchange as a whole. During the past three years the JSE Securities Exchange All Share Index moved from 10333 points in January 2002 (http://www.jse.co.za) to 12656 points in December 2004 (http://www.jse.co.za). This amounts to an increase of twenty two and a half percent over three years (an increase of seven and a half percent per annum). It

did, however, decrease to a low of 7510 points in April 2003 before increasing to a high of 12656 in December 2004. This is an increase of 5146 points in twenty months or an average increase of forty one percent per annum.

Due to the large fluctuations of the JSE Securities Exchange All Share Index, an average return was used to determine what the expected rate of growth would be. Based on the past three years, the All Share Index average return was seven and a half percent. During the last twenty months, however, an average return of forty one percent per annum would have been achieved. For the purposes of determining capital return on equity, a rate of ten percent per annum was therefore used.

This return, however, is subject to Capital Gains Tax at the rate of ten percent for an individual (this incorporates a twenty-five percent inclusion rate and a forty percent marginal tax rate). Therefore the effective return on equity to be used was assumed to be nine percent.

Bonds

The expected interest rate was based on the R153 Government Bond. The interest rate on a R153 Government Bond moved from 10.69 percent in September 2001 (Sunday Times: September 2001) to 7.9 in May 2005 (Sunday Times: May 2005). The main reason for the decrease in the interest rate is the drop in the Repo Rate (the rate at which the Reserve Bank lends money to financial institutions). The Repo Rate at the end of May 2005 was seven percent. Interest rates move in cycles, however, and the interest rate of the R153 Government Bond would be expected to increase in the next interest rate cycle. An average interest rate of nine percent was therefore used.

All interest exceeding the amount subject to exemption in terms of section 10(1)(i)(xv) of the Income Tax Act is subject to income tax. Therefore the estimated interest rate was decreased by a rate of income tax applicable to an individual. The rate of tax used was thirty percent, which is lower than the marginal tax rate due to the exemption granted in terms of section 10(1)(i)(xv) of the Income Tax Act.

Conclusion

Due to the risk involved in investing in shares, younger individuals will usually invest a larger percentage in shares when they can afford to take the risk. When they are older they will invest a larger percentage in bonds to avoid the risk associated with shares. The research uses a range of ages from twenty five to forty and therefore a conservative ratio of an investment of fifty percent in shares and fifty percent in bonds was used.

Based on the above assumptions the expected rate of return was calculated as follows:

	Shares			Bonds	
	Capital Appreciation	Dividend Yield	Total expected return on shares	Interest	Total Expected Return using a 50%/50% split
Estimated return	10%	5%	15%	9%	
Taxation %	10%	0%		30%	
Net after tax return	9%	5%	14%	6.3%	10.15%

Based on the above calculation, an estimate of ten percent was used as the average after-tax rate of return on investments. This is the rate of return that was used to test the effect of pre-retirement income, age and changes in tax legislation on the level of an individual's monthly contributions to a retirement savings plan.

3.12 The post-retirement income ratio of pension, interest, dividends and capital gains is fixed

The funds to which retirement savings contributions are made will dictate the form of income earned by an individual after retirement. If contributions are made to a pension, provident or retirement annuity fund, the individual will be allowed to withdraw one third of his or her capital on retirement and the remaining two thirds will be converted into a monthly pension. The monthly pension received by an individual will be taxable as income in terms of paragraph (a) of the definition of "gross income" in section 1 of the Income Tax Act.

The one-third of the capital that can be withdrawn as a lump sum can be invested (in either the money market, stock market or property) or it can be used to purchase an annuity, which will also be taxable as income in terms of the provision relating to all annuities discussed above, when it is received.

If retirement savings contributions were made to a money market fund or accumulated on the stock market, then the individual would probably not receive a monthly pension on retirement. Instead the majority of his or her income would consist of interest, dividends and profits from the sale of shares.

Due to the different manner in which all these forms of income are taxed, an assumption must be made regarding the ratio of income from pension, interest, dividends, annuities and capital gains. Due to the fact that an assumption was made that all contributions to a retirement savings plan would be in the form of retirement annuity contributions, it was assumed that the majority of income on retirement would be in the form of pension income. It was also assumed that the one-third withdrawal from the retirement annuity fund would be conservatively invested.

Based on the above assumptions the income ratio was assumed to be seventy percent pension income, twenty percent interest income, five percent dividend income and five percent capital gains.

3.13 Conclusion

The use of the limiting assumptions discussed and motivated in this chapter is necessary in order to ensure comparability when the variables are processed using the different retirement planning models. Should any of these assumptions change then the output from the retirement planning models changes accordingly.

These variables were processed using the retirement planning model developed in this research and described in Chapter Four and were also processed using the Old Mutual and Liberty Life retirement planning models described in Chapter Six, in order to assess the impact of taxation which was built into the research module but omitted from the other two models.

These assumptions were also required to remain constant so that a sensitivity analysis could be performed relating to the changes over time in the personal income tax rates. This sensitivity analysis was performed and discussed in Chapter Seven, where a comparison was made of changes in the personal income tax rates with changes in the CPIX index to determine the effect of not including income tax in a retirement planning model.

CHAPTER 4: THE FINANCIAL MODEL FOR RETIREMENT PLANNING

4.1 Introduction

The main objective of the research was to develop a retirement planning model which incorporates the effect of taxation. In addition to its potential use for retirement planning, it was also designed to test commercially available retirement planning models. The assumptions on which these models are based should be both relevant and reasonable and should be stated explicitly. The development and justification of the assumptions underlying the research model was set out in Chapter Three.

This chapter sets out the process of developing the research model, which consists of three basic components. The first component involves the estimation of the monthly income required after retirement. The second component involves the determination of the present value of the monthly income after retirement, at the date of retirement, taking into account the life expectancy of the individual. This determines the lump sum required at retirement date. The third component involves calculating the monthly contributions needed to fund the lump sum required at retirement date. The required monthly contributions, less the monthly contributions currently being made by the individual, determines the shortfall in an individual's contributions to a retirement savings plan.

The retirement planning model was developed in an Excel spreadsheet and it comprises a number of worksheets that combine to determine the extent of saving that is necessary in order to fund retirement. The following worksheets form part of the retirement planning model:

- summary of retirement planning information;
- information input form;
- life expectancy calculation;
- tax rates;
- tax computation;
- income and expenditure budget;
- investment required on retirement;
- present value of current retirement fund savings; and
- calculation of the required annual contribution to a retirement savings plan.

The worksheets that comprise the retirement planning model are discussed in detail below and an example of the retirement planning model has been included in Appendix C. The example used is that of a twenty-five year old individual who earns an after-tax income of R10 000 per month. Based on the assumptions explained in Chapter Three this individual would require eighty percent of his after-tax income when he retires. This would amount to R8 000 after-tax income per month.

The current total gross earnings of the individual before tax amount to R12 452.99 per month and the required total gross earnings before tax on retirement would amount to R8 208.89 per month. Based on the assumptions discussed in Chapter Three this individual would require R17 361 271.58 on the date of his retirement at the age of sixty-five. In order to save this amount he would need to commence immediately with contributions of R1 433.17 per month to a retirement savings fund. These contributions would need to increase each year in line with inflation, which has been assumed to be seven percent.

4.2.1 Summary of retirement planning information

The summary worksheet makes provision for all the important information relating to the retiree and includes the following:

- current age;
- anticipated age of retirement;
- life expectancy;
- current gross earnings;
- projected gross earnings required on retirement;
- amount to be saved before retirement;
- future value of current savings;
- monthly increase in contributions required; and
- total retirement savings contributions.

4.2.2 Information input form

An "information input form" was developed to capture all the relevant information relating to the retiree. The required information includes the following:

- name;
- age;

- anticipated age of retirement;
- annual increase in retirement funding contributions;
- current value of any retirement annuity funds, pension funds or provident funds; and
- the annual increase in contributions required to fund retirement.

This worksheet also provides links to other worksheets to complete the following information:

- current expenses;
- expenses on retirement;
- current income;
- income on retirement; and
- income split on retirement (between interest, dividends, retirement fund payments and capital receipts).

The economic factors of expected inflation and the expected rate of return on investments are also entered into this worksheet. These economic factors are of vital importance in determining retirement savings contributions, as any change in these factors can have a significant impact on the level of contributions.

4.2.3 Life expectancy calculation

In order to calculate a person's life expectancy, a life expectancy table must be used. A number of life expectancy tables have been compiled and the one most relevant to a particular individual can be used to calculate his or her life expectancy. Different life expectancy tables include the English Life Tables (including ELT12) and Life Tables for the United States population (year 2000 tables were published in National Vital Statistics Reports, Vol. 51, No. 3, December 19, 2002).

Wolfram Research (2003) describes a life expectancy table as a tabulation of numbers which is used to calculate life expectancies. The table consists of various columns including: the census size (N_x); the death rate of individuals in a specific age category (d_x); the proportion of individuals surviving in a specific age category (L_x) and the life expectancy for individuals for each age category (e_x).

When determining the life expectancy of an individual the corresponding life expectancy (e_x) for the individual's age is used. This is the remaining number of years that an individual is expected to live.

The English Life Table 12 and the United States Life Table 2000 were used in the "life expectancy calculation" worksheet as these tables best represent the life expectancy of a South African in the higher income category.

4.2.4 Tax rates

A worksheet was developed, which includes all the income tax rates for individuals from the year ended 1999 through to the year ended 2006. From the tax rates for each of these years, a schedule was calculated which determines the percentage taxation payable by an individual, depending on his or her level of income. For example, an individual earning R60 000 for the year ended 28 February 2006 would have to pay seven and a half percent of his or her income towards income tax.

This schedule is used in the "tax computation" worksheet for the individual to determine the extent of tax payable on his or her income.

4.2.5 Tax computation

The figures entered into the "income and expenditure budget" worksheet flow through to the "tax computation" worksheet. This worksheet computes both the income tax payable before sixty-five years of age and after sixty-five years of age. Individuals are granted higher taxation exemptions and rebates after they reach the age of sixty-five years, and therefore two separate tax computations were performed.

The tax computations take into account all the income earned by the individual according to his or her budget and then deduct all the exempt income as well as any deductions granted for tax purposes (including pension contributions, retirement annuity contributions and medical expenses).

The schedules in the "tax rates" worksheet are then used to calculate the tax payable by the individual.

4.2.6 Income and expenditure budget

The "income and expenditure budget" worksheet allows an individual to input his or her budget for both present income and expenses as well as predicted income and expenses on retirement. The income of an individual before retirement generally consists of a salary plus any additional interest and dividends that may be earned. After retirement the composition of the income of an individual changes to the receipt of a pension and an increase in interest and dividends due to an increase in the capital accumulated by the individual. The income also includes any annuities that are purchased on retirement as well as any capital income resulting from the sale of assets (for example shares).

The "income and expenditure budget" worksheet then includes the taxation payable that was computed on the "taxation computation" worksheet. Once the taxation has been deducted from the income the remaining surplus can be allocated to the expected expenditure items of the individual. If there is any surplus remaining after the deduction of all the expenses, then this surplus may be used as additional savings for retirement or it may be used to buy additional non-essential items.

Included in this worksheet is also the predicted split of income after retirement between the different categories of pension, interest, dividends, annuities, capital and other. As each of these categories are taxed differently, it is important to estimate in what form income is to be earned upon retirement.

In addition, after retirement, individuals generally require less income than before retirement. The worksheet allows the individual to input the percentage of present income he or she anticipates requiring on retirement and it then automatically calculates the income per category (from the income split requirements) and the taxation (from the "tax computation" worksheet).

4.2.7 Investment required on retirement

This worksheet calculates the amount of capital that individuals need to have accumulated by the time they retire in order to support themselves for the remainder of their expected life. All the necessary information required to calculate this capital amount has already been entered onto the previous worksheets.

The first step is to calculate the annual amount of income required from the date of retirement to the expected date of death. This is done by calculating the future value of the income required on retirement, as entered in the "income and expenditure budget" worksheet, taking into account the annual rate of inflation. The future value of the income on retirement takes into account the number of years from the individual's current age to the anticipated date of retirement.

For example, if the individual is thirty years old and he or she anticipates retiring at the age of sixty-five years, then the future value of the income required in the first year of retirement must take into account thirty-five years of inflation. The future value of income required in the second year of retirement must be calculated taking into account thirty-six years of inflation. This must be done for each year after retirement, until the year of expected death.

The second step is to calculate the capital required at the retirement date. This is done by determining, at the date of retirement, the present value of income required for each year of retirement. The present value of the income is determined using the expected rate of return on investments, as the capital invested at the retirement date will be used to fund the income during retirement and this capital will earn income at the expected rate of return on investments.

For example, if the anticipated age of retirement is sixty-five years of age, then the income required in the first year of retirement will be the present value of that income. In the second year of retirement, the present value of the income required will be need to be calculated by determining the present value of the income for one year at the anticipated rate of return on investments. This must be done for the income required in each year after retirement.

Once the present value of the annual retirement income required for each year has been obtained, these values are added together to calculate the total capital required at the date of retirement.

4.2.8 Present value of current retirement fund savings

If an individual has already started saving for retirement then this needs to be taken into consideration in determining whether he or she is making sufficient provision for retirement. This worksheet calculates the future value at the date of retirement of current savings.

In the "information input form" the individual inputs his or her current contributions towards retirement as well as the market value of any savings towards retirement. This information is used to calculate the value of his or her current savings at the date of retirement.

The first step is to calculate the value, at the date of retirement, of the current market value of any savings. The future value is calculated using the expected rate of return on investments.

The second step is to calculate the value, at the date of retirement, of current contributions to a retirement savings plan. Some individuals may also have provided for an automatic increase in their annual contributions. This also needs to be taken into account. For example, an individual may have provided for a ten percent escalation in his or her contributions. In the first year the monthly contributions may be R500 and will increase to monthly contributions of R550 in the second year.

Once the values in steps one and two have been calculated they are added together to determine the value, at the date of retirement, of an individual's current savings plan. This value is used in the final worksheet, "calculation of annual required contributions to a retirement savings plan", to determine, if necessary, the required increase in contributions to a retirement savings plan.

4.2.9 Calculation of annual required contribution to a retirement savings plan

In the final worksheet the investment required on retirement is compared to the expected value of the individual's current retirement savings plan. If the investment required on retirement is greater than the value of an individual's current retirement savings plan, that indicates that the individual is not making adequate contributions to fund his or her retirement. In this case the worksheet calculates the necessary increase required in order to have sufficient capital on retirement.

The first step is to determine the difference between the capital required and the value of the individual's current retirement savings plan. This is the total amount required on retirement for which no provision has yet been made. The second step is to use the shortfall to calculate the monthly contributions required by the individual to accumulate that amount of capital on retirement. It must also take into account whether the individual wishes to escalate his or her additional contributions on an annual basis and also the extent of his or her escalation.

Once the additional contributions required have been determined, they are included on the "summary of retirement planning information" worksheet. The contributions required in order to sufficiently fund retirement now include both the current contributions plus the additional contributions as calculated.

4.3 Conclusion

This chapter described in detail the components of the research model that was developed, as well as the different worksheets used to process these components.

The retirement planning model developed and described in this chapter was then used, together with the assumptions made in Chapter Three, to process independent variables of age and income levels. The outcome of this exercise is discussed in Chapter Five and compared to the outcomes of existing commercially developed retirement planning models in Chapter Six.

CHAPTER 5: INTRODUCING THE VARIABLES OF EARNINGS, AGE AND TAXATION TO THE RETIREMENT PLANNING MODEL

5.1 Introduction

The retirement model developed for this research was discussed in Chapter Four and was based on assumptions set out in Chapter Three. The retirement model includes the effects of taxation and tax deductible expenses on the required level of contributions to a retirement savings plan. The model was used to process a retirement plan for a hypothetical individual and the results (included in Appendix C) were discussed in detail in Chapter Four.

In the present chapter, the independent variables of income and age are processed using the retirement model developed in this research and the results analysed. The ages of twenty-five, thirty, thirty-five and forty were processed for individuals earning an after-tax monthly income of R2 000, R4 000, R6 000, R8 000, R10 000 and R15 000, for the tax years ending 28 February 1999 to 2006.

5.2 Results

The results of the scenario processing are included in Appendix E. These results represent the retirement annuity contributions that are required in order to save sufficient capital for retirement, based on the assumptions discussed in Chapter Three.

Appendix F contains the results of the information processed in the format of a required percentage of after-tax income to be contributed to a retirement annuity fund, in order to save sufficient capital for retirement.

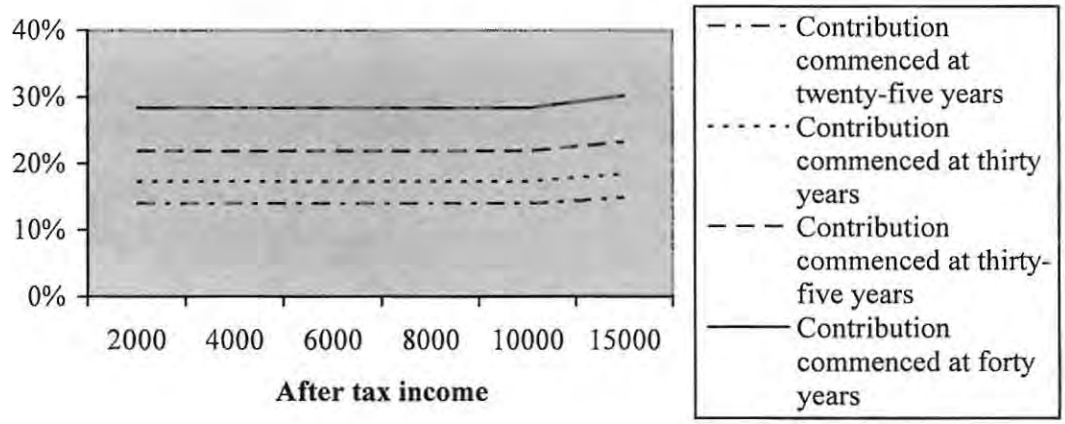
The effect of pre-retirement income and age on the level of required monthly contributions to a retirement savings plan, is discussed separately below, in respect of each variable. An evaluation of the effect of not including income tax in a retirement planning model is discussed separately in Chapter Seven.

5.2.1 Effect of income on the level of monthly contributions

The results in Appendix E and F clearly indicate that, as the level of after-tax income increases, the level of retirement annuity contributions required also increases. However, in

addition to the contributions increasing, the percentage of after-tax income required to be contributed also increases. This is illustrated in the following graph:

Required contributions to a retirement annuity fund as a percentage of after-tax income: 2005/2006 tax year



The following three factors are responsible for the increase in the percentage of required contributions:

- Marginal tax rates for individuals;
- Additional tax rebates granted to individuals older than sixty-five years;
- Additional tax exemptions granted to individuals older than sixty-five years.

Marginal tax rates for individuals

In South Africa, individuals are taxed at different rates of income tax, which is dependent upon their level of earnings. This is illustrated in the individual tax tables in Appendix D.

For example, if an individual earns an annual taxable income of more than R300 000 for the year ended 28 February 2006, each Rand of income in excess of R300 000 will be taxed at a rate of forty percent. However, an individual who earns R90 000, will only be taxed at a rate of twenty-five percent on each Rand in excess of R80 000. All taxpayers are taxed at a rate of eighteen percent on the first R80 000 of taxable income, irrespective of the level of their total earnings. Therefore, individuals are taxed at higher rates of income tax when their level of earnings increases.

The higher rates of income tax for high-income earners has the effect of increasing the amount of tax payable on retirement, should they maintain their level of earnings. Therefore,

in order to receive eighty percent of their after-tax income during retirement, they need to contribute more to a retirement savings plan.

Additional tax rebates granted to individuals older than sixty-five years

Once individuals reach the age of sixty-five years they are granted an additional tax rebate. For the year ended 28 February 2006, individuals over the age of sixty-five years were granted an additional rebate of R4 500, which is deducted from the amount of income tax owing.

The additional tax rebate allows individuals over the age of sixty-five years to receive tax-free income of up to R60 000 for the year ended 28 February 2006. This is R15 000 more than an individual under the age of sixty-five years who can only receive tax-free income of R35 000.

Additional tax exemptions granted to individuals older than sixty-five years

Individuals over the age of sixty-five years are granted an additional income tax exemption for interest earned and an additional deduction for medical expenses. These additional tax concessions are explained as follows:

- Individuals over the age of sixty-five can earn interest of up to R22 000 tax-free, compared to R15 000 tax-free interest for individuals under the age of sixty-five years; and
- They are allowed to deduct all medical expenses, whereas individuals under the age of sixty-five years are only allowed to deduct medical expenses to the extent that they exceed five percent of their taxable income, before the medical expense deduction.

Comparison of required contributions for an individual earning R10 000 per month after-tax income before retirement and an individual earning R15 000 per month after-tax income before retirement

The required contributions to a retirement savings plan, as a percentage of after-tax income, remains constant up to an after-tax income of R10 000 per month. This can be attributed to the fact that, based on the assumptions in Chapter Three, individuals earning an after-tax monthly income of R10 000 before retirement will not have to pay income tax on their monthly income after retirement. This is due to the interest exemptions granted to individuals over sixty-five, the allowance of all medical expenses as a deduction and the additional rebate granted to individuals over sixty-five. However, an individual earning R15 000 per month after-tax income before retirement will pay income tax on their monthly income after retirement, according to the individual tax tables.

The following table illustrates the difference between the two monthly levels of income after retirement at the age of sixty-five years:

	R10 000 **R**	**R15 000** **R**
Pre-retirement after-tax income	10 000	15 000
Annual after-tax income	120 000	180 000
After-tax income on retirement (eighty percent of after-tax income before retirement)	96 000	144 000
Tax computation on retirement		
Income Split :		
Pension (seventy percent)	67 200	107 537
Interest (twenty percent)	19 200	30 725
Dividends (five percent)	4 800	7 681
Capital (five percent)	4 800	7 681
Annual pre-tax income required on retirement	96 000	153 624
Less : Exemptions		
Interest	(19 200)	(22 000)
Dividends	(4 800)	(7 681)
Capital (Not subject to Capital Gains Tax)	(4 800)	(7 681)
Less : Deductions		
Medical expenses	(12 000)	(12 000)
Taxable income	55 200	104 262
Tax payable per 2006 tax tables	0	(9 624)
Total pre-tax income	96 000	153 624
Tax payable	0	(9 624)
After-tax income on retirement (eighty percent of after-tax income before retirement)	96 000	144 000

An individual who earns R180 000 after-tax income a year prior to retirement must therefore accumulate sufficient capital prior to retirement to earn pre-tax income of R153 624. This amounts to eighty-five percent (153 624 / 180 000) of the after-tax income prior to retirement.

However, an individual who earns only R120 000 after-tax income prior to retirement, only needs to accumulate sufficient capital prior to retirement to earn pre-tax income of R96 000. This amounts to eighty percent (96 000 / 120 000) of the after-tax income prior to retirement.

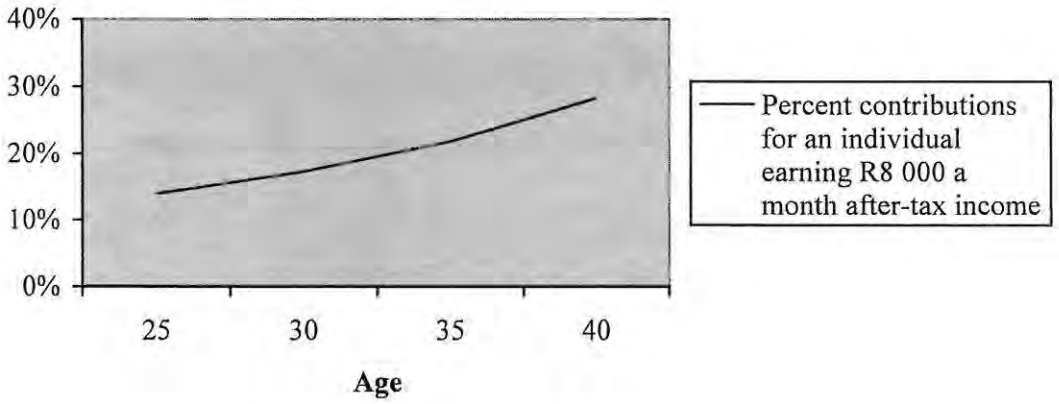
The individual earning R180 000 after-tax income prior to retirement will have to pay taxation of R9 624 per annum on retirement. However, the individual earning R96 000 after-tax income prior to retirement will not need to pay any taxation on retirement.

Therefore, on retirement both individuals will receive eighty percent of their pre-retirement after-tax income, but individuals earning R180 000 per annum will need to contribute a greater percentage of their after-tax income to a retirement savings plan in order to achieve that level of earnings.

5.2.2 Effect of age on the level of monthly contributions

The results in Appendices E and F indicate that as the age at which individuals commence saving for retirement increases, the level of required retirement annuity contributions also increases. However, in addition to the contributions increasing, the percentage of after tax income required to be contributed also increases. This is illustrated in the following graph:

Required contributions to a retirement annuity fund as a percentage of after-tax income: 2005/2006 tax year



The increase in the required percentage of contributions is due to the effect of compound interest on the savings of an individual. The following example is an illustration of the effects of compound interest:

> Investment A of R1 000 earns annual interest of ten percent which is credited to the investment at the end of the year. Investment B of R1 000 earns annual interest of ten percent, but it is credited to the investment on a monthly basis.
>
> Investment A will earn interest of R100 (1 000 x 10%).

The future value of Investment B will be as follows:

Future value of investment = $P(1+i)^{n}$

= $1\,000(1+0.10/12)^{12}$

= R1 104.71

Therefore the interest earned on Investment B will be R104.71 (R1 104.71 – R 1 000)

In the above example, if the interest is compounded on a monthly basis then the return on the investment is greater than if the interest is only earned at the end of the year.

Therefore, the effect of saving from an earlier age is that the return on those savings is compounded and the return in future periods is based on the original investment plus the returns achieved to date. This enables an individual to earn a higher return on his investments if he commences his savings at an earlier date.

Comparison of saving for retirement commencing at twenty-five years of age compared to commencing at forty years of age

To illustrate the effect of an early start to saving for retirement, a comparison is made between two individuals who commenced saving for retirement at the age of twenty-five years and forty years. Both the individuals earn R8 000 after-tax income a month and all the assumptions made in Chapter Three apply to both individuals.

The twenty-five year old will only retire in forty years time at the age of sixty-five years and therefore he will have forty years in which to use the effects of compound interest to his benefit whereas the forty year old will only have twenty-five years.

Based on the assumptions in Chapter Three, during each year after retirement the individuals will require eighty percent of their pre-retirement income to cover their daily expenditure. The following tables illustrate the above required annual income inflated to the individual's retirement age using the assumed inflation rate of seven percent. For example, a twenty-five year old who currently earns R8 000 after-tax income a month (an annual equivalent of R96 000 after-tax income) will require R76 800 after-tax income per annum. Based on the assumptions in Chapter Three, the twenty-five year old will retire in forty years time. His or her annual after-tax income required in the first year of retirement will be calculated as follows:

Required annual after-tax income at the age of sixty-five = $P(1+i)^{n}$

= $76\,800(1+0.07/12)^{40}$

= 1 150 038.36

Twenty-five year old

A	B	C	D	E	F
Age	Inflation	Expected return on investments	Annual Amount Required	Value of annual amount at retirement date	Cumulative Total
	7%	10%			
65			1,150,038.36	1,150,038.36	1,150,038.36
66			1,230,541.05	1,118,673.68	2,268,712.04
67			1,316,678.92	1,088,164.40	3,356,876.44
68			1,408,846.45	1,058,487.19	4,415,363.63
69			1,507,465.70	1,029,619.35	5,444,982.98
70			1,612,988.30	1,001,538.83	6,446,521.81
71			1,725,897.48	974,224.13	7,420,745.94
72			1,846,710.30	947,654.38	8,368,400.32
73			1,975,980.02	921,809.26	9,290,209.58
74			2,114,298.62	896,669.01	10,186,878.59
75			2,262,299.52	872,214.40	11,059,092.99
76			2,420,660.49	848,426.74	11,907,519.73
77			2,590,106.73	825,287.82	12,732,807.55
78			2,771,414.20	802,779.97	13,535,587.52

Forty year old

A	B	C	D	E	F
Age	Inflation	Expected return on investments	Annual Amount Required	Value of annual amount at retirement date	Cumulative Total
	7%	10%			
65			416,826.83	416,826.83	416,826.83
66			446,004.70	405,458.82	822,285.65
67			477,225.03	394,400.85	1,216,686.50
68			510,630.79	383,644.47	1,600,330.97
69			546,374.94	373,181.44	1,973,512.41
70			584,621.19	363,003.76	2,336,516.17
71			625,544.67	353,103.66	2,689,619.83
72			669,332.80	343,473.56	3,033,093.39
73			716,186.09	334,106.10	3,367,199.48
74			766,319.12	324,994.11	3,692,193.60
75			819,961.46	316,130.64	4,008,324.24
76			877,358.76	307,508.89	4,315,833.13
77			938,773.87	299,122.29	4,614,955.42
78			1,004,488.04	290,964.41	4,905,919.82

A – The age of the individual.

B – The expected inflation rate.

C – The expected return on investments.

D – The annual amount required by the individuals for each year of their retirement taking into account the effects of inflation.

E – The present value of each annual amount required by the individual, at the date of retirement (sixty-five years of age), taking into account the expected return on investments.
F – The cumulative total of capital required on retirement by the individual, that is, a capital amount of R13 535 587.52 is required by the twenty-five year old on retirement and R4 905 919.82 is required by the forty year old on retirement.

Significantly more capital is required by the twenty-five year old on retirement due to the effect of inflation on the purchasing power of money. Even though more capital is required the effect of compound interest will enable the twenty-five year old to accumulate the necessary capital by contributing a smaller percentage of his income compared to the forty year old.

The following tables illustrate the required annual contribution by the individuals in order to save sufficient capital to meet their requirements on retirement (based on the previous tables). The tables assume that there is an annual increase in the contributions of seven percent to off-set the effects of inflation.

Twenty-five years old

A	B	C	D	E
Age	**Annual Contribution**	**Years to retirement**	**Annual Return 10%**	**Cumulative Total**
25	13408.30	39.00	551,681.49	551,681.49
26	14346.88	38.00	536,635.63	1,088,317.11
27	15351.16	37.00	522,000.11	1,610,317.22
28	16425.74	36.00	507,763.74	2,118,080.97
29	17575.54	35.00	493,915.64	2,611,996.61
30	18805.83	34.00	480,445.22	3,092,441.82
31	20122.24	33.00	467,342.16	3,559,783.99
32	21530.80	32.00	454,596.47	4,014,380.46
33	23037.95	31.00	442,198.38	4,456,578.84
34	24650.61	30.00	430,138.43	4,886,717.27
35	26376.15	29.00	418,407.38	5,305,124.65
36	28222.48	28.00	406,996.27	5,712,120.91
37	30198.06	27.00	395,896.37	6,108,017.29
38	32311.92	26.00	385,099.20	6,493,116.48
39	34573.76	25.00	374,596.49	6,867,712.97
40	36993.92	24.00	364,380.22	7,232,093.20
41	39583.49	23.00	354,442.58	7,586,535.78
42	42354.34	22.00	344,775.97	7,931,311.74
43	45319.14	21.00	335,372.98	8,266,684.73
44	48491.48	20.00	326,226.45	8,592,911.17
45	51885.89	19.00	317,329.36	8,910,240.54

Twenty-five years old (continued)

A	B	C	D	E
Age	Annual Contribution	Years to retirement	Annual Return 10%	Cumulative Total
46	55517.90	18.00	308,674.93	9,218,915.46
47	59404.15	17.00	300,256.52	9,519,171.98
48	63562.44	16.00	292,067.70	9,811,239.69
49	68011.81	15.00	284,102.22	10,095,341.91
50	72772.64	14.00	276,353.98	10,371,695.89
51	77866.72	13.00	268,817.05	10,640,512.94
52	83317.40	12.00	261,485.68	10,901,998.62
53	89149.61	11.00	254,354.25	11,156,352.87
54	95390.09	10.00	247,417.32	11,403,770.19
55	102067.39	9.00	240,669.57	11,644,439.76
56	109212.11	8.00	234,105.86	11,878,545.62
57	116856.96	7.00	227,721.15	12,106,266.77
58	125036.94	6.00	221,510.57	12,327,777.34
59	133789.53	5.00	215,469.38	12,543,246.72
60	143154.80	4.00	209,592.94	12,752,839.66
61	153175.63	3.00	203,876.77	12,956,716.43
62	163897.93	2.00	198,316.49	13,155,032.92
63	175370.78	1.00	192,907.86	13,347,940.78
64	187646.74	0.00	187,646.74	13,535,587.52

Forty years old

A	B	C	D	E
Age	Annual Contribution	Years to retirement	Annual Return 10%	Cumulative Total
40	27218.45	24.00	268,094.45	268,094.45
41	29123.74	23.00	260,782.78	528,877.23
42	31162.40	22.00	253,670.53	782,547.76
43	33343.77	21.00	246,752.24	1,029,300.00
44	35677.83	20.00	240,022.63	1,269,322.63
45	38175.28	19.00	233,476.56	1,502,799.19
46	40847.55	18.00	227,109.02	1,729,908.21
47	43706.88	17.00	220,915.14	1,950,823.34
48	46766.36	16.00	214,890.18	2,165,713.52
49	50040.01	15.00	209,029.54	2,374,743.06
50	53542.81	14.00	203,328.73	2,578,071.79
51	57290.81	13.00	197,783.40	2,775,855.19
52	61301.16	12.00	192,389.31	2,968,244.50
53	65592.24	11.00	187,142.33	3,155,386.82
54	70183.70	10.00	182,038.45	3,337,425.27
55	75096.56	9.00	177,073.76	3,514,499.03
56	80353.32	8.00	172,244.48	3,686,743.51
57	85978.05	7.00	167,546.90	3,854,290.41
58	91996.52	6.00	162,977.44	4,017,267.85

Forty years old (continued)

A	B	C	D	E
Age	Annual Contribution	Years to retirement	Annual Return 10%	Cumulative Total
59	98436.27	5.00	158,532.60	4,175,800.45
60	105326.81	4.00	154,208.98	4,330,009.43
61	112699.69	3.00	150,003.28	4,480,012.71
62	120588.67	2.00	145,912.29	4,625,925.00
63	129029.87	1.00	141,932.86	4,767,857.86
64	138061.96	0.00	138,061.96	4,905,919.82

A – The age of the individual.

B – The required annual contribution to a retirement savings plan to accumulate sufficient capital for retirement.

C – The number of years remaining until the individual will retire.

D – The future value of the annual retirement contributions, made during a specific year, at the date of retirement (sixty-five years of age). This value takes into account an expected rate of return on investments of ten percent.

E – The cumulative total of the value at retirement of all the contributions made. The value at the age of retirement equals the capital required on retirement according to the previous set of tables.

According to the above tables, the twenty-five year old will have to contribute R13 408.30 to a retirement savings plan in the current year and the forty year old will have to contribute R27 218.45. The contribution required by the forty year old is more than double that of the twenty-five year old.

Even when the present value of the total required contributions is calculated, individuals who commence saving at twenty-five years of age will pay less during the course of their working lives towards their retirement savings plan:

> *Twenty-five year old:*
>
> The present value of the annual retirement savings contributions for each year amounts to R13 408.30 per annum, over a period of forty years. This amounts to a present value of R536 332 which will be contributed to a retirement savings plan during the remainder of a twenty-five year old's working life.

Forty year old:

The present value of the annual retirement savings contributions for each year amounts to R27 218.45 per annum, over a period of twenty-five years. This amounts to a present value of R680 461.25 which will be contributed to a retirement savings plan during the remainder of the forty year old's working life.

5.3 Conclusion

The results obtained from processing the variables of age and earnings through the retirement planning model clearly indicate that the age at which an individual starts saving for retirement and the level of earnings of an individual play a major role in the required percentage contributions to a retirement savings plan.

Individuals requiring a level of income after retirement where they are required to pay tax will have to contribute more to a retirement savings plan. The additional contributions are required to save sufficient funds to pay the income tax on retirement.

The results from the testing also clearly showed that if individuals commence their contributions to a retirement savings plan at an earlier age, their required contributions will be a smaller percentage of their after-tax income.

The same variables used in this chapter will be processed using the Old Mutual and Liberty Life retirement models and the results discussed in Chapter Six. The results of the Old Mutual and Liberty Life retirement models will be compared to the results obtained from the research model and discussed in this chapter to evaluate the impact of including tax in a retirement planning model.

CHAPTER 6: TESTING THE OLD MUTUAL AND LIBERTY LIFE RETIREMENT PLANNING MODELS

6.1 Introduction

In Chapter Five the variables of age and income were processed through the retirement planning model developed as part of the present research process and discussed in Chapter Four. The results of the information processed indicated that there was a strong correlation between individuals' ages at which they commenced saving towards retirement, their income level and their required monthly contribution to a retirement savings plan.

There was also an indication that an individual with a higher income level would be required to contribute a greater percentage of his or her income to a retirement savings plan in order to maintain a post-retirement disposable income equal to eighty percent of pre-retirement disposable income. The reason why they would have to contribute a greater percentage was due to the fact that they would have to pay a greater proportion of their retirement savings towards the payment of income tax on post-retirement income after retirement.

The retirement planning models developed by Old Mutual and Liberty Life do not incorporate the full effect of tax on the output of the model. The impact of this omission was tested using the same variables processed using the research model, to quantify the impact. The same variables of age and income were therefore processed through the Old Mutual and Liberty Life retirement planning models to determine whether these models demonstrated a similar degree of correlation.

6.2 The Old Mutual retirement planning model

6.2.1 Variables required for the Old Mutual planning model

The Old Mutual retirement planning model was found at http://www.oldmutual.co.za. Users of the retirement planning model are alerted to the fact that it should be used for illustrative purposes only and that a financial advisor should be contacted to analyse an individual person's position more fully. It should also be noted that each individual person's circumstances are different and therefore, due to the limited number of variables used in the retirement planning tool, the result produced may not suit every individual.

The Old Mutual retirement planning model requests information relating to the following variables:

- Gender: This variable would be required to calculate the life expectancy of the individual. Generally males have a shorter life expectancy than females and therefore all the other variables are processed for both females and males and an average outcome is obtained. An average life expectancy of seventy-eight was used in Chapter Five when the variables of age and income were processed in the retirement planning model that was developed in Chapter Four.

- Gross monthly income (before deducting tax): The income amounts used in Chapter Five were all after-tax income amounts therefore they have been converted into pre-tax amounts using the retirement planning model developed in Chapter Four and the 2006 individual tax tables. These pre-tax income amounts were used when testing the Old Mutual retirement planning model.

- Current age: The current age variables of twenty-five, thirty, thirty-five and forty are processed through the retirement planning tool.

- Age at retirement: It was assumed in Chapter Three that the average retirement age is sixty-five.

- Whether the individual is a member of a defined benefit pension fund, defined contribution pension fund or not a member of any fund: To enable results from each of the variables to be compared it was assumed in Chapter Three that no amounts had yet been contributed to a retirement savings plan.

- Value of savings specifically put aside for retirement: This was assumed to be nil.

- Percentage of gross monthly income invested towards retirement: This was assumed to be nil.

- Percentage of final salary that would be required upon retirement: It was assumed in Chapter Three that at least eighty percent of an individual's final salary would be required.

- Percentage increase in retirement income each year: The increase in retirement income each year was assumed to be in line with inflation. In Chapter Three it was assumed that the inflation rate would be seven percent.

- Average inflation rate until death: It was assumed in Chapter Three that the inflation rate would be seven percent.

- Average salary increase until retirement: The increase in salary each year was assumed to be in line with inflation. In Chapter Three it was assumed that the inflation rate would be seven percent.

- Average growth of retirement savings: It was assumed in Chapter Three that investments would earn an average annual rate of ten percent.

Certain assumptions were made in Chapter Three which were not included as input variables in the Old Mutual retirement planning tool. The assumed life expectancy for an individual was seventy-eight. The Old Mutual retirement planning tool did not allow for a specific life expectancy to be entered. The life expectancy was based on Old Mutual's own calculation of the life tables for individuals and depended on whether the individual was a male or a female. Based on the review performed on existing life tables in Chapter Three it is assumed that the average of the male and female life tables used by Old Mutual are not materially different to the assumption of a life expectancy of seventy-eight years.

In Chapter Three it was assumed that all contributions to a retirement savings plan would be in the form of retirement annuity contributions. This would enable all the contributions to be tax deductible subject to the provisions of section 11(n) of the Income Tax Act. The Old Mutual retirement planning tool did not allow for a choice regarding the nature of additional retirement savings contributions.

The Old Mutual retirement planning tool did not make provision for the input of expected future medical costs. A certain portion of medical expenses is deductible in terms of section 18 of the Income Tax Act.

No provision was made for the input of the ratio of various types of income after retirement. In reality, each form of income including pension, interest, dividends and capital gains is treated differently for the calculation of income tax, and would therefore have an impact on the after-tax disposable income of retirees.

6.2.2 Old Mutual results

The results of the information processed through the Old Mutual retirement planning model are included in Appendix G. In order to analyse these results they are compared below to the results from the retirement planning model processed in Chapter Five and the results from the Liberty Life retirement planning model.

6.3 The Liberty Life retirement planning model

6.3.1 Variables required for the Liberty Life retirement planning model

The Liberty Life retirement planning model was found at http://www.liberty.co.za. The website contains a disclaimer which states that it cannot be held responsible for any losses incurred as a result of relying on the calculations and a suggestion is made that a qualified financial adviser be consulted before making any decisions. The disclaimer also states that the calculations do not provide for tax deductions.

The Liberty Life retirement calculator requested information relating to the following variables:

- Total income needed before tax in today's terms: The income amounts used in Chapter Five were all after-tax income levels therefore they have been converted into pre-tax income using the retirement planning model developed in Chapter Four and the 2006 individual tax tables. These pre-tax income amounts were used when testing the Liberty Life retirement planning model.

- The number of years until you retire: The input for this variable was calculated by deducting the age variables of twenty-five, thirty, thirty-five and forty, from the assumed retirement age of sixty-five.

- Expected inflation rate: It was assumed in Chapter Three that the inflation rate would be seven percent.

- Number of years income needed for: It was assumed in Chapter Three that the life expectancy for an individual was seventy-eight. An individual would therefore require income for thirteen years from their retirement age of sixty-five.

- Expected rate of return on investment: It was assumed in Chapter Three that investments will earn an average annual rate of ten percent.

- Monthly income expected at retirement, for example, existing policies: To enable results from each of the variables to be compared it was assumed in Chapter Three that no savings had yet been made to a retirement savings plan.

Certain assumptions were made in Chapter Three which were not included as input variables in the Liberty Life retirement planning model. The calculator did not make provision for the input of the proportion of monthly after-tax income earned immediately prior to retirement required to cover monthly expenses after retirement. The assumption made in Chapter Three was a conservative assumption that, on retirement, individuals required eighty percent of after-tax income earned immediately prior to retirement. The effect may be to understate the required contributions to a retirement savings plan based on the Liberty Life retirement planning model.

Like the Old Mutual retirement planning model, the Liberty Life retirement planning model did not make provision for the input of the nature of additional retirement savings contributions, the expected future medical expenses, and the ratio of the various types of income after retirement.

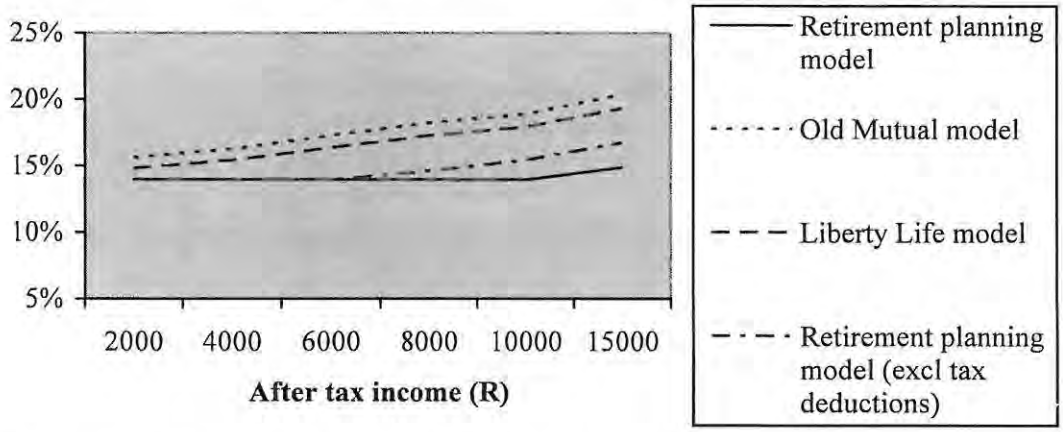
6.3.2 Liberty Life results

The results of the information processed through the Liberty Life retirement calculator are included in Appendix H. In order to analyse these results they are compared below to the results from the retirement planning model processed in Chapter Five and the results from the Old Mutual retirement planning model.

6.4 Comparison of the retirement planning model, Old Mutual retirement planning model and Liberty Life retirement planning model

The required percentage contributions of after-tax income to a retirement savings plan are compared below for an individual who commenced saving for retirement at the age of twenty-five. The after-tax income levels for the individual of R2,000, R4,000, R6,000, R8,000, R10,000 and R15,000 are used.

Required percentage contributions to a retirement annuity fund when savings commenced at twenty-five years of age



In the model developed in this study the variables were first processed without allowing for any income tax exemptions or deductions for interest, dividends, capital gains tax and medical costs. The variables were then processed by disregarding income tax exemptions or deductions. The result of failing to account for income tax exemptions or deductions resulted in a greater required retirement savings contribution.

All the retirement planning models had a similar required percentage contribution of approximately fifteen percent for an after-tax income of R2,000. As the after-tax income increased however, the required percentage contributions for the Old Mutual and Liberty Life retirement models provided for a greater percentage increase than the retirement planning model developed in Chapter Four.

The retirement planning model with the highest required percentage contributions was the Old Mutual retirement planning model. The contributions for this model increased to 20.4 percent of after-tax income for an after-tax income of R15,000. The model with the second highest required contributions was the Liberty Life retirement planning model which had a required contribution of 19.3 percent of after-tax income for an after-tax income of R15,000.

As discussed above the Liberty Life retirement planning model did not make provision for the input of the proportion of monthly after-tax income earned immediately prior to retirement required to cover monthly expenses after retirement. A conservative assumption of eighty percent was used for the Old Mutual retirement planning model which would have increased the required contributions compared to the Liberty Life retirement planning model.

The result of the comparison is that all the retirement models had a similar percentage contribution level for an after-tax income of R2,000. For an after-tax income of R15,000 the percentage contributions ranged from 14.9 percent for the retirement planning model including income tax exemptions and deductions to 20.4 percent for the Old Mutual retirement planning model. The possible reasons for the differences between the retirement savings model and the Old Mutual and Liberty Life retirement models include:

- The retirement savings model included the income tax exemptions and deductions in calculating the after-tax income whereas, as stated in its disclaimer, the Liberty Life retirement calculator expressly excluded all tax deductions in its calculations. An assumption was also made in the retirement planning model developed in Chapter Four, regarding the ratio of income earned after retirement between pension, interest, dividends and capital gains. This ratio resulted in the receipt of income that was tax-free due to the R22,000 interest exemption granted to individuals over the age of sixty-five, the exemption of dividends from income tax and the annual exclusion of R10,000 from capitals gains for individuals.

  Income tax exemptions and deductions resulted in less income tax payable after retirement. Due to a lower tax liability, less capital was required on retirement to provide for the same level of after-tax income after retirement. Therefore the required percentage contributions to a retirement savings plan were lower than for the Old Mutual and Liberty Life retirement models.

  The retirement planning model's required contributions at an after-tax income of R15,000 were 14.9 percent of such income. When the variables were processed through the retirement planning model, without making provision for income tax exemptions and deductions, the required contributions at an after-tax income of R15,000 increased to 16.76 percent. There was therefore nearly a two percent reduction in the required contributions to a retirement savings plan when the income tax exemptions and deductions were taken into account.

- As discussed in the previous chapter, the amount of an individual's after-tax income has an effect on the required percentage contributions to a retirement savings plan. As the level of after-tax income increases the required percentage contributions also increase. The reason for this relates to the increase in the marginal tax rates for individuals.

It was illustrated, however, that this increase in percentage contributions only starts when individuals reach a position where they pay tax on their income after retirement. The example used indicated that, using the assumptions in Chapter Three, individuals will not pay any income tax on retirement if they earn an after-tax income of R10,000 before retirement. Therefore based on these assumptions the required percentage contributions to a retirement savings plan should remain constant up to this income level.

The percentage contributions for both the Old Mutual and the Liberty Life retirement models start increasing from an after-tax income of R4,000 before retirement. Based on the fact that the required percentage contributions increase, both of these retirement models appear to have included the effects of the individual marginal tax rates, but the marginal tax rates used appear to be higher than the rates used in the retirement planning model. A possible reason for this could be that the Old Mutual and Liberty Life retirement planning models have used the income tax rates from previous years, but the retirement planning model developed in Chapter Four is using the latest income tax rates for the year ending 28 February 2006.

6.5 Conclusion

The variables of age and after-tax income were processed through the Old Mutual retirement planning model and the Liberty Life retirement planning model. The results were then compared to the retirement planning model developed in Chapter Four.

Based on the comparison, it appears that the Old Mutual and Liberty Life retirement models both include the effects of the individual marginal tax rates into their calculations. The effects of the marginal tax rates used appear to increase the required percentage contributions at a greater rate than the retirement planning model.

In addition it appears that the Old Mutual and Liberty Life retirement models do not include the effects of income tax exemptions and deductions in their calculations. As the calculations above reveal, this could result in up to an additional two percent required contribution for an after-tax income of R15,000.

Overall the Old Mutual and Liberty Life retirement models are more conservative as they make provision for a greater contribution to a retirement savings plan. This conservatism is partly due to the apparent use of marginal tax rates which are higher than the 2006 individual

income tax tables provide and the fact that income tax exemptions and deductions are not included in the models.

Whilst a conservative approach to saving for retirement is laudable, the reduction of the available funds for cost-of-living commitments, when higher retirement funding contributions are made, may impact on other aspects of retirement planning. These aspects include the following:

- Individuals will have fewer funds available with which to pay off home loans and other bank loans. When the period over which the loans are paid off is increased, a higher amount of interest will be paid. This will negatively affect the ability of individuals to save for retirement.

- Fewer funds will be available for health care preventative measures such as healthy eating and fitness activities. These measures will decrease the likelihood of incurring significant medical costs during retirement.

Due to the fact that the retirement planning model, developed in this study takes into account the latest income tax legislation, constant re-appraisal of the required retirement fund contributions is made possible. This re-appraisal will take into account future changes in income tax legislation.

CHAPTER 7: EVALUATION OF EFFECT OF NOT INCLUDING INCOME TAX IN A RETIREMENT PLANNING MODEL

7.1 Introduction

In addition to the critical evaluation of commercially available retirement funding models in Chapter Six it is important to understand the effect of tax changes on the ability to provide for retirement and the income needs after retirement. Changes in tax legislation over the last eight years have considerably affected the required contributions to a retirement savings plan for an individual. Should these affects not be included within a retirement planning model, it could have a significant impact on the final result.

The impact of not including changes in tax legislation in a retirement planning model is first illustrated by comparing the individual income tax tables to the Consumer Price Index. The exact affect of not including changes in tax legislation is then calculated by way of an example. This is used to illustrate the extent of the effect of changes in tax legislation on contributions to a retirement savings plan.

7.2 Comparison of changes in tax rates to the Consumer Price Index

A table has been compiled, for the 1999 to 2006 tax years, which includes the pre-tax income that an individual could earn in order to be taxed at a rate of zero percent, five percent, ten percent, fifteen percent, twenty percent, twenty-five percent and thirty percent.

Another table has also been developed that calculates the pre-tax income that an individual could earn had the adjustments to the personal income tax brackets and rates over the last eight years been granted in line with inflation. This table includes, as the base year, the 1999 pre-tax income that an individual would have to earn to be taxed at different rates. The 1999 base year has then been multiplied by the average Consumer Price Index for each year ending February (the Consumer Price Index is included in paragraph 3.9).

An average of the pre-tax income in the above two tables has then been calculated for each year. The average in terms of the actual individual tax tables is then compared to the average in terms of the Consumer Price Index adjusted tables in order to determine the real effect of the changes in tax legislation over the last eight years.

The following tables illustrate the pre-tax income that an individual would need to earn in order to be taxed at the various rates of income tax (income tax tables are included in Appendix D):

Taxpayer younger than sixty-five years

		1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006
Tax rates	0%	18 000	19 000	21 000	23 000	27 000	30 000	32 000	35 000
	5%	25 000	26 000	29 000	31 000	37 000	41 000	44 000	48 000
	10%	34 000	36 000	41 000	44 000	51 000	67 000	72 000	78 000
	15%	46 000	48 000	54 000	61 000	76 000	103 000	109 000	119 000
	20%	58 000	64 000	72 000	85 000	114 000	152 000	163 000	182 000
	25%	74 000	82 000	96 000	116 000	171 000	216 000	233 000	263 000
	30%	101 000	111 000	144 000	174 000	270 000	333 000	357 000	403 000
	Avg	50 857	55 143	65 286	76 286	106 571	134 571	144 286	161 143

Taxpayer older than sixty-five years

		1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006
Tax rates	0%	31 000	33 000	36 000	39 000	42 000	47 000	50 000	60 000
	5%	38 000	40 000	45 000	48 000	53 000	65 000	69 000	82 000
	10%	47 000	50 000	55 000	61 000	71 000	89 000	94 000	109 000
	15%	57 000	62 000	69 000	79 000	97 000	126 000	132 000	152 000
	20%	70 000	76 000	86 000	102 000	134 000	172 000	184 000	212 000
	25%	88 000	96 000	115 000	136 000	194 000	240 000	257 000	298 000
	30%	120 000	130 000	173 000	204 000	300 000	364 000	389 000	448 000
	Avg	64 429	69 571	82 714	95 571	127 286	157 571	167 857	194 429

The following tables illustrate an individual's pre-tax income at various rates of income tax adjusted for inflation, using 1999 as a base year. The 1999 based year has been multiplied by the consumer price index for 1999. The 1999/2000 year has then been multiplied by the consumer price index for 2000. This has been repeated for each year until 2005/2006. The table therefore illustrates what an individual's pre-tax income would have been had the adjustments to the personal income tax brackets and rates, granted over the last eight years, been granted in line with inflation:

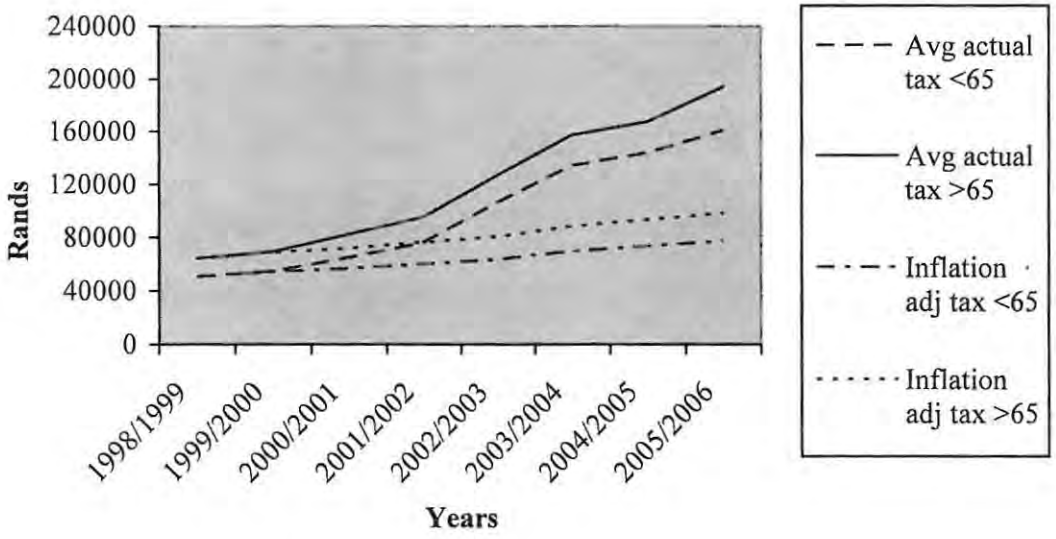
Taxpayer younger than sixty-five years

		1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006
Tax rates	0%	18 000	19 331	20 144	21 385	22 538	24 806	26 113	27 488
	5%	25 000	26 848	27 978	29 701	31 302	34 453	36 268	38 178
	10%	34 000	36 513	38 050	40 393	42 571	46 856	49 324	51 922
	15%	46 000	49 400	51 479	54 649	57 596	63 394	66 733	70 247
	20%	58 000	62 287	64 908	68 906	72 621	79 931	84 141	88 573
	25%	74 000	79 470	82 814	87 914	92 654	101 981	107 352	113 006
	30%	101 000	108 466	113 030	119 991	126 460	139 191	146 522	154 328
	Avg	50 857	54 616	56 915	60 420	63 677	70 088	73 779	77 665

Taxpayer older than sixty-five years

		1998/1999	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006
Tax rates	0%	31 000	33 291	34 692	36 829	38 815	42 722	44 972	47 340
	5%	38 000	40 809	42 526	45 145	47 579	52 369	55 127	58 030
	10%	47 000	50 474	52 598	55 837	58 848	64 772	68 183	71 774
	15%	57 000	61 213	63 789	67 718	71 369	78 553	82 690	87 045
	20%	70 000	75 174	78 338	83 162	87 646	96 469	101 550	106 898
	25%	88 000	94 505	98 482	104 547	110 183	121 275	127 662	134 386
	30%	120 000	128 870	134 293	142 564	150 250	165 375	174 085	183 253
	Avg	64 429	69 191	72 103	76 543	80 670	88 791	93 467	98 390

The average pre-tax income for each of the above tables has been calculated for illustrative purposes only and can be illustrated as follows:



The above graph illustrates that if the Minister of Finance had adjusted the personal income tax brackets and rates for individuals in line with the Consumer Price Index, then the average

pre-tax income would have been R77 665 (for individuals younger than sixty-five years) compared to the actual average pre-tax income for 2006 of R161 143.

The adjustments to the personal tax brackets and rates, actually made by the Minister of Finance, amounts to an annual average threshold adjustment of thirty-one percent, which is calculated as follows:

$$\text{Annual percent} = [\,(\,161\,143 - 50\,857\,) / 50857\,] / 7$$
$$= 31\%\ \text{p.a.}$$

This is compared to the average annual CPIX of seven and a half percent, which is calculated as follows:

$$\text{Annual percent} = [\,(\,77\,665 - 50\,857\,) / 50\,857\,] / 7$$
$$= 7.5\%\ \text{p.a.}$$

An initial assessment of the changes in tax legislation over the last eight years indicates that these changes should have a favourable impact on an individual's ability to adequately provide for retirement, by increasing the after-tax disposable income. The favourable impact is due to the annual personal income tax adjustments far exceeding the annual average Consumer Price Index over the last eight years.

7.3 Effect of changes in tax legislation on the level of monthly contributions

The changes in tax legislation over the last eight years have come in two different areas. The first area of change that has been made relates to the personal income tax tables and primary and secondary rebates deductible in terms of section 6(2) of the Income Tax Act. The personal income tax tables are used to calculate the income tax payable by an individual. Once the income tax has been calculated an individual is allowed to deduct the rebate, applicable to individuals, from the income tax calculated.

The second area of change that has been made relates to specific concessions applicable to individuals, for example, the exemption from tax of a portion of interest income. Both these areas of change have affected an individual's after-tax income and therefore the level of monthly contributions required to be made to a retirement savings plan.

The changes in each of these areas will be analysed individually and then the combined effect of the changes will be used to determine the total affect on an individual's required level of contributions to a retirement savings plan.

7.3.1 Individual tax tables

Individuals are taxed on their annual taxable income according to the tax tables for individuals. The rates included in these tables are announced each year in February by the Minister of Finance during the annual budget speech. The individual tax tables for the years ending 28 February 1999 to 2006 have been included in Appendix D.

The individual tax tables tax individuals according to the level of their taxable income. The table consists of a number of "brackets" which are each taxed at a different rate of tax. As the taxable income of an individual increases, a higher "tax bracket" will become relevant and thus the additional taxable income will be subject to a higher rate of taxation.

In addition, to prevent the taxation of individuals with low levels of taxable income, a rebate is given to all individuals to prevent the payment of tax until the tax payable according to the individual tax tables is greater than the rebate. An additional rebate (known as the secondary rebate) is given to individuals over the age of sixty-five years.

The following is an example of a tax computation for an individual who is not yet sixty-five years of age, for the year ended 28 February 2006:

	R
Taxable Income	120 000
Tax computation according to the 2005/2006 tax tables:	
- R14 400 plus	14 400
- twenty five percent of the amount that exceeds R80 000	10 000
	24 400
Less : Primary rebate	(6 300)
	18 100

The Minister of Finance can adjust the tax payable by an individual in one of three ways:

- The primary and secondary rebates can be adjusted;
- The rates of taxation in each "tax bracket" can be adjusted; or
- The "tax brackets" can be adjusted.

A number of changes have been made to the individual tax tables for the period 1999 to 2006 through the adjustment of the rebates, the rates of tax for each "tax bracket" and adjustments

to the levels of the "tax brackets". The effect of these changes is analysed by determining the individual effects of each of the above methods of adjusting the individual tax tables.

Tax rebates

The following is a list of the primary and secondary rebates for the tax years ended 28 February 1999 to 2006:

	Primary Rebate	Tax saving compared to the prior year	Secondary rebate	Tax saving compared to the prior year
1998/1999	3 515		2 660	
1999/2000	3 710	195	2 775	115
2000/2001	3 800	90	2 900	125
2001/2002	4 140	340	3 000	100
2002/2003	4 860	720	3 000	-
2003/2004	5 400	540	3 100	100
2004/2005	5 800	400	3 200	100
2005/2006	6 300	500	4 500	1 300

The majority of the tax savings granted through the increase in the rebates has occurred within the last five years. During this period the total tax savings for an individual under the age of sixty-five years has been R2 500 (340+720+540+400+500). Using the lowest rate of tax included in the 2005/2006 tax tables of eighteen percent, this amounts to an increase in tax-free income of R13 888.

Tax rates

The following is a list of the tax rates for the years ended 28 February 1999 to 2006:

Bracket No.	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006
1	19%	19%	18%	18%	18%	18%	18%	18%
2	30%	30%	26%	26%	25%	25%	25%	25%
3	39%	35%	32%	32%	30%	30%	30%	30%
4	43%	40%	37%	37%	35%	35%	35%	35%
5	44%	44%	40%	40%	38%	38%	38%	38%
6	45%	45%	42%	42%	40%	40%	40%	40%

During the last eight years the tax rate in each of the "tax brackets" has decreased considerably. The top marginal tax rate for individuals has decreased from forty-five percent to forty percent and the lowest tax rate has decreased from nineteen percent to eighteen percent. In the third and fourth tax brackets the tax rates have decreased by nine percent and

eight percent respectively. This decrease combined with the adjustment to the "tax brackets" has resulted in a large tax reduction for the individual taxpayer.

Tax brackets

The following is a list of the "tax brackets" for the years ended 28 February 1999 to 2006:

Bracket No.	**1998/ 1999**	**1999/ 2000**	**2000/ 2001**	**2001/ 2002**	**2002/ 2003**	**2003/ 2004**	**2004/ 2005**	**2005/ 2006**
1	<31 000	<33 000	<35 000	<38 000	<40 000	<70 000	<74 000	<80 000
2	31 000 – 46 000	33 000 – 50 000	35 000 – 45 000	38 000 – 55 000	40 000 – 80 000	70 000 – 110 000	74 000 – 115 000	80 000 – 130 000
3	46 000 – 60 000	50 000 – 60 000	45 000 – 60 000	55 000 – 80 000	80 000 – 110 000	110 000– 140 000	115 000– 155 000	130 000- 180 000
4	60 000 – 70 000	60 000 – 70 000	60 000 – 70 000	80 000 – 100 000	110 000– 170 000	140 000– 180 000	155 000- 195 000	180 000- 230 000
5	70 000 – 120 000	70 000 – 120 000	70 000 – 200 000	100 000– 215 000	170 000– 240 000	180 00 – 255 000	195 000- 270 000	230 000- 300 000
6	>120 000	>120 000	>200 000	>215 000	>240 000	>255 000	>270 000	>300 000

The level of the first "tax bracket" has increased from R31 000 in 1999 to R80 000 in 2006. This means that in 2006 individuals only pay 18% on their first R80 000 of income compared to 1999 where individuals were paying 19% on only the first R31 000 of income. The greatest portion of this change has occurred in the 2004 tax year.

The top "tax bracket" has also increased from R120 000 to R300 000. Taxpayer's will therefore only be taxed at the top marginal rate of income tax in 2006 if they earn nearly three times as much income as the amount required in 1999.

The second to fifth "tax brackets" have also been increased in line with the first and sixth "tax brackets" and the 2006 brackets are now on average three times more than the "tax brackets" in 1999.

Overall effect of changes to individual tax tables

The combined effect of the above changes to the rebates, tax rates and "tax brackets" has considerably decreased the amount of income tax payable by individuals. The following table is an illustration of the income tax payable by an individual from 1999 to 2006, for an annual taxable income of R60 000 and an annual taxable income of R120 000:

Annual income	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006
60 000	15 850	14 870	13 700	12 860	12 200	10 800	5 000	4 500
120 000	42 150	40 870	37 400	34 660	29 700	25 600	19 270	18 100

There has been an overall reduction of fifty-seven percent, from 1999 to 2006, of tax payable by an individual earning R120 000. There has been an even greater reduction of seventy-two percent of tax payable by an individual earning R60 000. This, however, does not take into account the effect of inflation.

7.3.2 Other changes to tax legislation affecting individuals

In addition to the changes in the individual tax tables, the Minister of Finance has also adjusted the level of exempt interest allowable for individuals during the period 1999 to 2006. This has been done in order to encourage investment amongst individuals. The following is a table that illustrates the adjustments to the interest exemption over the last eight years.

	1998/ 1999	1999/ 2000	2000/ 2001	2001/ 2002	2002/ 2003	2003/ 2004	2004/ 2005	2005/ 2006
Under 65	2 000	2 000	3 000	4 000	6 000	10 000	10 000	15 000
Over 65	2 000	2 000	4 000	5 000	10 000	15 000	16 000	22 000

There has been a considerable increase in the interest exemption for individuals over the last five years. In terms of the assumptions made in Chapter Five, twenty percent of a retired individual's income is in the form of interest and therefore the increase in the interest exemption has had the affect of allowing specifically retired individuals, to earn a greater amount of tax-free income.

7.3.3 Effect of changes in tax legislation

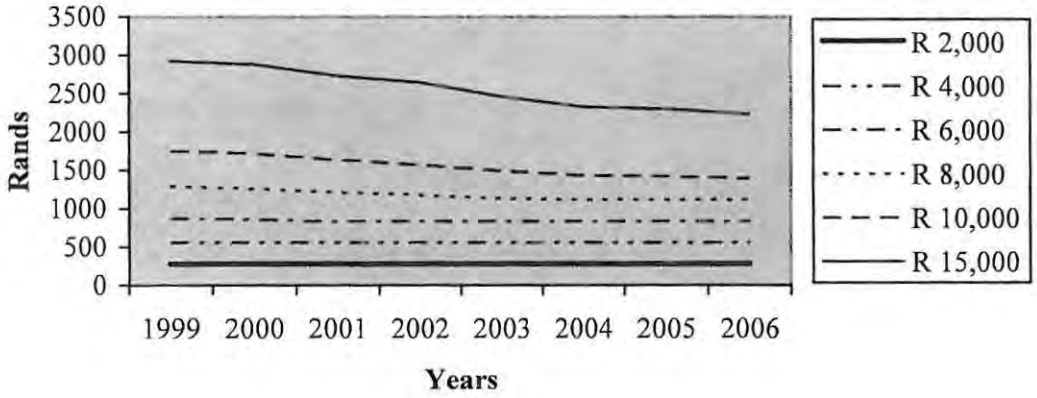
The changes in tax legislation discussed in paragraph 7.3.1 and paragraph 7.3.2 have had the affect of increasing the after-tax income of individuals. This has the following effects on retirement planning for individuals:

- Prior to retirement, individuals have a greater amount of disposable income available, therefore if retirement savings contributions remain constant they will form a smaller percentage of disposable income; and

- Individuals will pay less tax during retirement, therefore they will require less capital on retirement to maintain their standard of living.

The retirement planning model developed in Chapter Four was used to calculate the required contributions to a retirement savings plan in Chapter Five. The required contributions were calculated for various levels of after-tax income for the years 1999 to 2006. The following graph is a summary of these results and illustrates the effects of changes in tax legislation over the last eight years on the level of required retirement savings contributions, if an individual started saving at the age of twenty-five years.

Required contributions to a retirement savings plan for various levels of after-tax income



As the level of after-tax income increases, the reduction in required contributions to a retirement savings plan is greater. This is due to the fact that the changes in tax legislation have had no effect on the disposable after-tax income of individuals who earn low levels of after-tax income because they do not pay tax.

High income earners are subject to a higher "tax bracket" and are therefore subject to a higher marginal tax rate. Therefore the changes in tax legislation will have the biggest effect on the higher income earners.

This is illustrated through the calculation of the retirement contributions of an individual who earns R8 000 after-tax income and an individual who earns R15 000 after-tax income. The assumptions made in Chapter Three apply to these calculations.

R15 000
Commence saving for retirement at twenty-five years of age

	1998/1999 Tax year		2005/2006 Tax year	
	<65 years	**>65 years**	**<65 years**	**>65 years**
Income[2]				
Salary	299 307.62		234 808.79	
Interest		40 227.64		30 724.83
Dividends		10 056.91		7 681.21
Pension		140 796.75		107 536.91
Capital		10 056.91		7681.21
	299 307.62	201 131.18	234 808.79	153 624.16
Less: Exempt income				
Interest[3]		(2 000.00)		(22 000.00)
Dividends		(10 056.91)		(7 681.21)
Capital[4]		(10 056.91)		(7 681.21)
	299 307.62	179 018.06	234 808.79	116 261.74
Less: Deductions				
Medical expenses[5]		(12 000.00)		(12 000.00)
Taxable Income	299 307.62	167 018.06	234 808.79	104 261.74
Tax rate[6]	39.86%	34.21%	23.34%	9.23%
Taxation	119 307.62	57 131.18	54 808.79	9 624.16
Total Income	299 307.62	201 131.18	234 808.79	153 624.16
Taxation	(119 307.62)	(57 131.18)	(54 808.79)	(9 624.16)
Annual after-tax income	180 000.00	144 000.00	180 000.00	144 000.00
Monthly after-tax income	15 000.00	12 000.00	15 000.00	12 000.00

To obtain an after-tax income prior to retirement of R15 000 per month, an individual needed to earn a total income of R299 307.62 in 1999, however to obtain the same amount of after-tax income in 2006, an individual only needed to earn R234 808.79.

In addition, to earn eighty percent of after-tax income on retirement, an individual would have had to earn R201 131.18 in 1999, however in 2006 this amount decreased to R153 624.16. Therefore less capital would be required on retirement to sustain before-tax earnings of R153 624.16.

[2] The income for an individual is split between pension (70%), interest (20%), dividend (5%) and capital gains (5%)
[3] The interest exemption was R2 000 in 1999 and R22 000 in 2006, for individuals over the age of sixty-five years.
[4] The capital gain in 1999 is not subject to taxation and the capital gain in 2006 is less than the R10 000 individual exemption from capital gains tax.
[5] Medical expenses of R1 000 per month are assumed during retirement.
[6] The average tax rates have been calculated using the "Tax rates" worksheet which has been included in Appendix C

The following retirement annuity contributions would be required to accumulate sufficient capital to earn eighty percent of after-tax income during retirement. These contributions were calculated using the retirement planning model, developed in Chapter Four, as demonstrated in Appendix C:

	1998/1999	**2005/2006**
Monthly after-tax income	15 000	15 000
Required contributions	2 926.35	2 235.07
Required contributions as a percentage of after-tax income	19.5%	14.9%

There has been a 4.6 percentage point decrease in the percentage of after-tax income that is required to be contributed to a retirement savings plan to save adequately for retirement.

R8 000
Commence saving for retirement at twenty-five years of age

	1998/1999 Tax year		**2005/2006 Tax year**	
	<65 years	**>65 years**	**<65 years**	**>65 years**
Income				
Salary	146 511.26		111 924.33	
Interest		17 817.67		15 360.00
Dividends		4 454.42		3 840.00
Pension		62 361.83		53 760.00
Capital		4 454.42		3 840.00
	146 511.26	89 088.33	111 924.33	76 800.00
Less: Exempt income				
Interest		(2 000.00)		(15 360.00)
Dividends		(4 454.42)		(3 840.00)
Capital		(4 454.42)		(3 840.00)
	146 511.26	78 179.50	111 924.33	53 760.00
Less: Deductions				
Medical expenses		(12 000.00)	(403.78)	(12 000.00)
Taxable Income	146 511.26	66 179.50	111 520.55	41 760.00
Tax rate	34.48%	18.57%	14.28%	0.00%
Taxation	50 511.26	12 288.33	15 924.33	-
Total Income	146 511.26	89 088.33	111 924.33	76 800.00
Taxation	(50 511.26)	(12 288.33)	(15 924.33)	-
Annual after-tax income	96 000.00	76 800.00	96 000.00	76 800.00
Monthly after-tax income	8 000.00	6 400.00	8 000.00	6 400.00

To obtain an after-tax income prior to retirement of R8 000 per month, an individual needed to earn a total income of R146 511.26 in 1999, however to obtain the same amount of after-tax income in 2006, an individual only needed to earn R111 924.33.

In addition, to earn eighty percent of after-tax income on retirement, an individual would have had to earn R89 088 in 1999, however in 2006 this amount decreased to R76 800. Therefore less capital would be required on retirement to sustain before-tax earnings of R76 800.

The following retirement annuity contributions would be required to accumulate sufficient capital to earn eighty percent of after-tax income during retirement. These contributions were calculated using the retirement planning model in Appendix C:

	1998/1999	**2005/2006**
Monthly after-tax income	8 000	8 000
Required contributions	1 296.14	1 117.36
Required contributions as a percentage of after-tax income	16.2%	14.0%

There has been a 2.2 percentage point decrease in the percentage of after-tax income that is required to be contributed to a retirement savings plan to save adequately for retirement. This is compared to the four and a half percent decrease in the required contributions for individuals earning a monthly after-tax income of R15 000, prior to retirement.

Based on the assumptions in Chapter Five, an individual earning R8 000 after-tax income prior to retirement no longer pays income tax on retirement, therefore the decrease in contributions is less than for an individual earning R15 000 after-tax income.

7.4 Conclusion

The average inflation rate over the last eight years has been seven and a half percent. During the same period, however, the adjustments to the personal income tax brackets and rates by the Minister of Finance have had the effect of requiring an increase in pre-tax income of thirty one percent prior to being included in the next tax bracket. The adjustments to the tax brackets and rates have therefore been more than four times greater than the inflation rate over the last eight years.

These tax adjustments have had the effect of increasing the after-tax income of individuals both before and after retirement. Therefore a smaller percentage of after-tax income needs to be contributed to a retirement saving plan before retirement and less capital needs to be accumulated by individuals in order to achieve the same level of after-tax income after retirement.

It is therefore important to include the effects of changes in tax legislation in determining the monthly contributions to be made to a retirement savings plan. Should these effects not be included in a retirement planning model then it could have a significant effect on the level of required monthly contributions.

The most recent personal income tax tables were included in the retirement planning model developed in Chapter Four and were therefore taken into account when the variables were processed in Chapter Five. In Chapter Six when the variables were processed in the Old Mutual and Liberty Life retirement planning models it appeared, however, that the most recent personal income tax tables had not been used. The reason why this conclusion has been drawn relates to the fact that the required retirement savings plan contributions calculated by the Old Mutual and Liberty Life retirement planning models were greater than the required retirement savings plan contributions calculated by the retirement planning model developed in Chapter Four.

The effects of the changes in tax legislation have been highlighted in this chapter and emphasise the point that retirement planning models must be updated on an annual basis to ensure that the most current effects of taxation are included in the model. While the Old Mutual and Liberty Life models appear to be far more conservative, mainly because the latest tax rates have not been used and these have decreased steadily, there is no guarantee that tax rates will never increase in the future. These models would then understate the require level of savings for retirement.

The next chapter provides a summary of all the conclusions reached in the above chapters and highlights areas where further research may be conducted to further demonstrate the effects of taxation on retirement planning.

CHAPTER 8: CONCLUSIONS AND FURTHER RESEARCH AREAS

8.1 Introduction

The goal of the research was to firstly assess the awareness of individuals regarding the required level of contributions to a retirement savings plan. Once the awareness of individuals had been assessed and a general level of relative ignorance was demonstrated, it was necessary to evaluate existing retirement planning models which would be used to plan for retirement. This evaluation involved the illustration of the shortcomings in these retirement planning models relating to changes in tax legislation, by comparing their results to a retirement planning model that was developed and discussed in Chapter Four.

Firstly the results of the questionnaire conducted in Chapter Two illustrated that, even though individuals are saving towards retirement, they are not aware of the value of their savings. They are also not aware of whether or not their contributions are sufficient to ensure that they would continue their standard of living after retirement. The questionnaire did, however, indicate that the profession of individuals does have an effect on their level of knowledge regarding their retirement savings plans. Generally individuals in an accountancy profession or top management position had a greater level of awareness of their retirement savings plan values.

Despite the above observation, the majority of individuals who submitted the questionnaire indicated a lack of awareness of the value of their retirement savings plan. On average individuals believed that greater than ten times their annual salary would be required to fund their retirement. However, based on a calculation that was performed, they are only contributing a sufficient amount each month to a retirement saving plan, to accumulate six point eight times their annual salary. Therefore a need was created to evaluate existing retirement planning models to ensure that they assisted individuals appropriately to determine the savings needed to provide financially for retirement.

During the planning phase of the research it was discovered that even though there are a number of retirement planning tools available for individuals, none were found that took into account the full effects of income tax legislation in determining the level of contributions required for a retirement savings plan. Due to the lack of retirement planning models that incorporated the full effect of income tax legislation, a model was developed and discussed in Chapter Four, that included the effect of income tax in determining the required contributions to a retirement savings plan. The effect of income tax both before and after retirement was

considered. This is due to the fact that the level of income tax after retirement has an impact on the capital required at the date of retirement.

The model was then used to process the variables of age and income before tax, to determine the effect of earnings, age and changes in tax legislation on the level of an individual's monthly contributions to a retirement savings plan. This was discussed in Chapter Five. To effectively compare the different variables certain assumptions had to be made, as set out in Chapter Three, regarding the economic factors and factors specific to an individual.

The following is a summary of the results that were achieved from processing the variables of age and income after tax:

Effect of earnings

As the level of after-tax income increases, the level of retirement annuity contributions required also increases. This was expected. However, in addition to the contributions increasing, the percentage of after-tax income required to be contributed also increases.

Effect of age

As the age of an individual increases, the level of retirement annuity contributions required also increases. This too is to be expected. However, in addition to the contributions increasing, the percentage of after-tax income required to be contributed also increases.

Effect of changes in tax legislation

The changes in tax legislation over the last eight years has had the effect of increasing the net after-tax income of individuals. Individuals' contributions to a retirement savings plan will therefore form a smaller percentage of their after-tax income. In addition, a lower rate of income tax is payable by an individual after retirement and therefore less capital is required at the date of retirement in order to maintain an individual's standard of living.

In Chapter Six, the results from the retirement planning model that was developed in Chapter Four were compared to two existing retirement planning models, namely Old Mutual and Liberty Life. A comparison between the three models showed that the Old Mutual and Liberty Life retirement planning models did not include the effect of income tax exemptions in determining the required contributions to a retirement savings plan. These income tax exemptions included the interest rate exemption (section 10(1)(i)(xv) of the Income Tax Act), the dividend exemption (section 10(1)(k) of the Income Tax Act) and the medical expense deduction (section 18 of the Income Tax Act).

It also appeared that the Old Mutual and Liberty Life retirement planning models did not include the latest individual tax rates and rebates. This conclusion was reached due to the fact that the required contributions to a retirement savings plan calculated by the retirement planning model developed in Chapter Four, were lower than the required retirement savings plan contributions calculated by the Old Mutual and Liberty Life retirement planning models.

Once it was determined that the Old Mutual and Liberty Life retirement planning models did not include the full effects of the income tax legislation it was necessary to evaluate the effect, on the required level of retirement savings contributions, of not including changes in income tax legislation. This discussion in Chapter Seven clearly illustrated that the inclusion of the effect of income tax had the result of reducing the required contributions to a retirement savings plan. This discussion also illustrated the importance of updating a retirement savings plan on an annual basis, based on the changes in the income tax legislation.

Therefore, even though the Old Mutual and Liberty Life retirement planning models included the effect of income tax, it appeared that the rates that they used were not the latest income tax rates applicable to individuals. This had the result of increasing the required retirement savings plan contributions calculated by these models.

8.2 Further research areas

To compare the scenarios that were processed in the research, certain assumptions were made. Opportunities for further research would be created by adjusting these assumptions to determine how this would affect the results that were obtained.

Individuals retire at sixty-five years

The same retirement age was used for all the scenarios that were processed. Therefore an individual who started saving at the age of twenty-five years would have forty years to save and an individual who started saving at forty would have twenty-five years to save.

The results showed that if individuals started saving at an earlier age then they would need to contribute less to a retirement savings plan before they retired and still be able to maintain their standard of living on retirement.

A possible further research opportunity would be to determine how much earlier individuals would be able to retire if they started contributing to a retirement savings plan at the age of

twenty-five years and they contributed the same amount as if they had only commenced saving at the age of forty years. The research would involve processing a number of different scenarios and comparing the results.

Life expectancy of individuals

The life expectancy of individuals was assumed to be seventy-eight years. Due to the current situation in South Africa regarding the impact of HIV and AIDS, the life expectancy of individuals may change drastically in the years to come. Further research could be conducted into the effect of HIV and AIDS on the life expectancy of South Africans and its impact on retirement planning.

Inflation rate and return on investments

The inflation rate and return on investments was assumed to remain constant for the scenarios that were processed. These two factors are, however, continually changing based on both local and international economic factors.

Research could be done using a single individual as a case study, relating to an individual who commenced working fifty years ago and investigating how the rate of inflation and return on investments would have affected the contributions to a retirement savings plan during the individual's working career. This could then be used to predict the future impact on retirement savings of the inflation rate and return on investments.

8.3 Conclusion

The goal of the research was to illustrate the shortcomings in existing retirement planning models with regard to the inclusion of the effects of income tax legislation and to determine the effect of changes in tax legislation on an individual's ability to adequately provide for retirement. It was found that the changes in tax legislation over the last eight years have had a significant impact on an individual's ability to save for retirement and it is envisaged that future tax changes will continue to have an impact on this ability to save. It is therefore important that retirement planning models take into account these changes in tax legislation in the future.

REFERENCES

APPLEGARTH, G. 2003. **Envision the retirement you want, then plan for it.** Available: http://moneycentral.msn.com/articles/retire/create/1212.asp [accessed 17 February 2003]

BANKRATE.COM. 2003. **11 ways to save after retirement.** Available: http://moneycentral.msn.com/content/Retirementandwills/Retireinstyle/P34811.asp [accessed 17 May 2003]

BARKER, R. 2002. "Setting retirees on the right path", **Business Week,** 3690: 153-154

CAMERON, B and HEYSTEK, M. 1998. **Retirement, the amazing and scary truth.** Witkoppen: Worth Publishing.

CLARK, AG. 2002. **Damage control your retirement income.** Cape Town: Human & Rousseau.

FULMER, D. 1999. "Plotting retirement should begin young", **Crain's Cleveland Business,** 20(12): 17-18

Get a ballpark estimate of your retirement needs. Available: http://www.asec.org/ballpark/blpkcomp.htm [accessed 17 May 2003]

HAMP-ADAMS, P and MIDDLETON, I. 1992. **Retirement and Estate Planning Made Simple.** Cape Town: Struik Publishers.

HARPER, P. 2003. **How a civil servant built a fabulous retirement.** Available: http://moneycentral.msn.com/content/Retirementandwills/Retireinstyle/P42069.asp [accessed 17 May 2003]

How long will my money last? Available: http://www.smartmoney.com/retirement/now/index.cfm?story=moneylast [accessed 17 May 2003]

JAHNKE, W. 2001. "Doing the Right Thing", **Journal of Financial Planning,** 14(9): 42-44.

Liberty Life retirement planning model. Available: http://www.liberty.co.za [accessed 1 August 2005]

Life course planning. Available: http://www.aoa.gov/May2003/Factsheets/Lifecourse.html [accessed 17 May 2003]

LITTMAN, M. 1998. "A new direction", **Crain's Chicago Business,** 21(12): PSR1, 2p

MONEYMAX. 2003. "Retirement". Available: http://www.moneymax.co.za/retirement/ [accessed 1 October 2003]

NYCE, SA and SCHIEBER, SJ. 21 December 2001. "DRAFT: Our Assumptions About Aging and What We Are Doing About It".

Old Mutual retirement planning model. Available: http://www.oldmutual.co.za [accessed 1 August 2005]

Pension and benefits counselling. Available: http://www.aoa.gov/factsheets/pension.html [accessed 17 May 2003]

RAPACKI, S. 1998. "Young workers all ears for golden year options", **Crain's Cleveland Business,** 19(3): 19-20

Retirement. Available: http://www.investorguide.com/iguretireintro.html [accessed 17 May 2003]

ROTHENBERG, M. 1995/1996. "Seven blind spots in planning retirement", **Dollarsense,** Winter 1995/1996: 10-11

SCHIFFERS, M. 1998. "Make your dreams come true", **Kiplinger's Personal Finance Magazine,** 51(3): 44-45

SCHROEDER, F. 2003. **Aids to cut life expectancy by 15 years.** Available: http://www.iol.co.za [accessed 24 September 2003]

SMARTMONEY. 2003. "Retirement worksheets". Available: http://www.smartmoney.com/retirement/planning [accessed 17 May 2003]

SOLDO, BJ and AGREE, EM. 1988. "America's elderly", **Population Bulletin,** 43(3): 1-53

TAYLOR, G. 2002. "Stochastic control of funding systems", **Insurance: Mathematics and Economics,** 30(3): 323-350

THE WORLD BANK GROUP. **Life expectancy**. Available: http://www.worldbank.org/depweb/english/modules/social/life/ [accessed 24 September 2003]

Top 10 ways to beat the clock and prepare for retirement. Available: http://www.asec.org/tools/topten.htm [accessed 17 May 2003]

WESTON, L. 2003. **What really matters in retirement.** Available: http://moneycentral.msn.com/content/Retirementandwills/Createaplan/P34162.asp [accessed 17 May 2003]

WOLFRAM RESEARCH. 2003. **Life Expectancy.** Available: http://mathworld.wolfram.com/LifeExpectancy.html [accessed 1 October 2003]

APPENDIX A

RHODES UNIVERSITY
Where leaders learn

QUESTIONNAIRE: RETIREMENT PLANNING

Prepared by: Andrew Barnes
Rhodes University (Student No: 69680548)

I have prepared this questionnaire in order to obtain background information for my thesis on retirement planning. Retirement planning is not something that is thought about as often as it should be and this questionnaire has been designed to test attitudes towards retirement planning and at the same time to gauge levels of awareness of some of the important aspects that need to be considered.

Please take 10 to 15 minutes out of your time to complete this questionnaire. If you wish to receive feedback please fill in your name and contact details. If you prefer to do so, you may remain anonymous.

Name: _____

Email address: _____

Telephone number: _____

In order to maintain your current lifestyle during retirement, money needs to be invested during your working life for use during retirement. This investment is done by way of contributions to a retirement savings plan (which includes all forms of savings for retirement). The percentage of your salary that needs to be contributed to a retirement savings plan is dependent on the age at which you start saving for retirement as well as the rate of income tax payable by you before and after retirement.

IN THE QUESTIONS THAT FOLLOW, PLEASE INDICATE YOUR CHOICE BY TICKING THE APPROPRIATE BOX.

1. Your occupation may determine your exposure to the necessity for retirement funding. What is your occupation?

- ☐ Accountancy
- ☐ Education
- ☐ Student
- ☐ Top Management
- ☐ Engineering
- ☐ Architecture
- ☐ Legal
- ☐ Middle Management
- ☐ Medical
- ☐ Self employed
- ☐ Public service
- ☐ Finance
- ☐ Property
- ☐ Actuarial
- ☐ Information technology
- ☐ Other: Please specify_____

The number of years you have left until your official retirement date and your current level of savings has an impact on the amount that you still need to invest during your working life.

2. What is your current age?

- ☐ Less than 30 years
- ☐ 31 years – 40 years
- ☐ 41 years – 50 years
- ☐ 51 years – 60 years
- ☐ Greater than 61 years

3. At what age do you anticipate retiring?

- ☐ 55 years – 60 years
- ☐ 61 years – 65 years
- ☐ 66 years – 70 years
- ☐ Other: Please specify _____

4. How many times your present annual salary do you think you need to have invested by the time you retire in order to maintain the same standard of living after retirement?

- ☐ 2 to 3 times
- ☐ 4 to 5 times
- ☐ 6 to 7 times
- ☐ 8 to 9 times
- ☐ 10 times
- ☐ greater than 10 times

5. Are you currently saving towards your retirement?

- ☐ Yes
- ☐ No

If you have answered "yes" to question 5, please complete questions 6, 7, 8 and 9. If you have answered "no" then go to question 10.

6. At what age did you start contributing to a retirement savings plan?

- ☐ Less than 30 years
- ☐ 31 years – 40 years
- ☐ 41 years – 50 years
- ☐ 51 years – 60 years
- ☐ Greater than 61 years

7. If you are currently saving towards your retirement, which forms of savings are you using? (You may tick more than one option.)

- ☐ Pension fund
- ☐ Provident fund
- ☐ Retirement annuity fund
- ☐ Unit trust investment
- ☐ Money market investment
- ☐ Other: Please specify_____

8. If you are currently saving towards your retirement, what percentage of your salary do you contribute to the above forms of retirement savings?

- ☐ 0% - 4%
- ☐ 5% - 10%
- ☐ 11% - 15%
- ☐ 16% - 20%
- ☐ 21% - 25%
- ☐ greater than 26%

9. If you are currently saving towards your retirement by way of a pension, provident or retirement annuity fund, do you know what the current market value of your fund is?

- ☐ Yes
- ☐ No

Your contributions to pension, provident or retirement annuity funds are managed by fund managers. The performance of these funds is dependent on the expertise of the fund managers as well as external economic factors.

10. Are you aware of who the fund manager is for your pension, provident or retirement annuity fund?

☐ Yes
☐ No

11. Fund managers invest your contributions in a portfolio which includes different kinds of investments including shares, bonds, property and cash. The split between these investments determines the risk profile of the fund. Are you aware of the risk profile of your pension/provident/retirement annuity fund?

☐ Yes
☐ No

12. What do you think the average inflation rate has been over the last 5 years?

☐ 5% - 6%
☐ 6% - 7%
☐ 7% - 8%
☐ 8% - 9%
☐ 10% - 11%
☐ 12% - 13%
☐ 14% - 15%

13. The difference between the inflation rate and the rate of return on your retirement savings is the REAL RATE OF RETURN on your investments. If the real rate of return is a negative figure then you have lost buying power and if the real rate of return is positive then your savings have gained extra buying power. Do you know if you retirement savings have achieved a positive real rate of return?

☐ Yes
☐ No

14. On average, do you know what percentage of your monthly income you pay to the South African Revenue Service as Income Tax?

☐ Yes
☐ No

Thank you for taking time to respond to this questionnaire. Should you have any further comments on any of the above questions, or on any other aspect of retirement planning, please fill them in below (or on a separate sheet of paper).

APPENDIX B

Calculation of the value of retirement savings in paragraph 2.5.

Workings
Retirement Fund

Age	Annual Contributions	Years to retirement	Value of annual contributions on retirement at a return of 10%	Cumulative Total
25	7,500.00	34	191,607.52	191,607.52
26	8,025.00	33	186,381.86	377,989.39
27	8,586.75	32	181,298.72	559,288.11
28	9,187.82	31	176,354.21	735,642.32
29	9,830.97	30	171,544.55	907,186.87
30	10,519.14	29	166,866.06	1,074,052.94
31	11,255.48	28	162,315.17	1,236,368.11
32	12,043.36	27	157,888.39	1,394,256.50
33	12,886.40	26	153,582.35	1,547,838.85
34	13,788.44	25	149,393.74	1,697,232.59
35	14,753.64	24	145,319.36	1,842,551.95
36	15,786.39	23	141,356.11	1,983,908.06
37	16,891.44	22	137,500.94	2,121,409.00
38	18,073.84	21	133,750.91	2,255,159.91
39	19,339.01	20	130,103.16	2,385,263.07
40	20,692.74	19	126,554.89	2,511,817.97
41	22,141.23	18	123,103.40	2,634,921.37
42	23,691.11	17	119,746.03	2,754,667.40
43	25,349.49	16	116,480.23	2,871,147.63
44	27,123.96	15	113,303.50	2,984,451.13
45	29,022.63	14	110,213.40	3,094,664.53
46	31,054.22	13	107,207.58	3,201,872.11
47	33,228.01	12	104,283.74	3,306,155.85
48	35,553.97	11	101,439.64	3,407,595.49
49	38,042.75	10	98,673.10	3,506,268.59
50	40,705.74	9	95,982.02	3,602,250.61
51	43,555.15	8	93,364.33	3,695,614.93
52	46,604.01	7	90,818.03	3,786,432.96
53	49,866.29	6	88,341.17	3,874,774.13
54	53,356.93	5	85,931.87	3,960,705.99
55	57,091.91	4	83,588.27	4,044,294.26
56	61,088.35	3	81,308.59	4,125,602.85
57	65,364.53	2	79,091.08	4,204,693.94
58	69,940.05	1	76,934.05	4,281,627.99
59	74,835.85	0	74,835.85	4,356,463.84

APPENDIX C: EXAMPLE

Retirement planning model incorporating the impact of Income Tax

The example set out below is an illustration of a retirement plan for a 25 year old individual who earns R 10 000 after-tax income per month.

Retirement Funding

Name: John Brown

A. Information Input Form

B. Summary of information and results

1	Current Age (years)	25
2	Projected age of retirement (years)	65
3	Life expectancy (years)	78
4	Current Monthly Gross Earnings (R)	12,452.99
5	Projected Monthly Gross Earnings Required on Retirement (R)	8,208.89
6	Amount to be saved before retirement (R)	17,361,271.58
7	Future Value of Current Savings (R)	-
8	Monthly Increase in Contribution Required (R)	1,433.17
9	Total Monthly Retirement Contributions (R)	1,433.17

APPENDIX C (continued)

Information Input

Name: John Brown

General Information

Name	John Brown
Age (Years)	25
Predicted age of retirement (Years)	65

Pension, Provident, Retirement Annuity

Annual percentage increase in contributions:

Pension	0%
Provident	0%
RAF	0%
Disability Risk Insurance	0%

Current value of fund:

Pension	-
Provident	-
RAF	-
Disability Risk Insurance	-

Required additional contributions

Annual Increase	7%

Budget

Current Expenses
Expenses on retirement
Current Income
Income on retirement
Income split on retirement

Economic Factors

Inflation rate	7%
Rate of return on investments	10%

APPENDIX C (continued)

This worksheet is for illustration purposes only. A life expectancy of 78 years has been used according to the assumptions in Chapter Three.

Life Expectancy Calculation

Name: John Brown
Return to Summary

Current Age	25
Therefore Life Expectancy	78

Extract from the English Life Table 12

English Life Table 12		
Age	**Expected years left**	**Total years**
20	50.57	70.57
21	49.63	70.63
22	48.69	70.69
23	47.74	70.74
24	46.80	70.80
25	45.84	70.84
26	44.89	70.89
27	43.93	70.93
28	42.98	70.98
29	42.02	71.02
30	41.06	71.06

Extract from the United States Life Table 2000

United States Life Table 2000		
Age	**Expected years left**	**Total years**
20	57.8	77.8
21	56.9	77.9
22	55.9	77.9
23	55.0	78.0
24	54.0	78.0
25	53.1	78.1
26	52.1	78.1
27	51.2	78.2
28	50.2	78.2
29	49.3	78.3
30	48.3	78.3

APPENDIX C (continued)

This schedule is an illustration of the tax tables that were used for the computation of the taxable income. A schedule has been compiled for each tax year from 1999 to 2006.

Tax Tables

Name: Joe Soap
Return to Summary

Extract from tax tables

Tax Tables (2003/2004)

	Tax payable		Percentage tax payable	
Annual taxable income	**<65**	**>65**	**<65**	**>65**
	R	**R**	**%**	**%**
60,000	5,400.00	2,300.00	9.00%	3.83%
61,000	5,580.00	2,480.00	9.15%	4.07%
62,000	5,760.00	2,660.00	9.29%	4.29%
63,000	5,940.00	2,840.00	9.43%	4.51%
64,000	6,120.00	3,020.00	9.56%	4.72%
65,000	6,300.00	3,200.00	9.69%	4.92%
66,000	6,480.00	3,380.00	9.82%	5.12%
67,000	6,660.00	3,560.00	9.94%	5.31%
68,000	6,840.00	3,740.00	10.06%	5.50%
69,000	7,020.00	3,920.00	10.17%	5.68%
70,000	7,200.00	4,100.00	10.29%	5.86%
145,000	27,950.00	24,850.00	19.28%	17.14%
146,000	28,300.00	25,200.00	19.38%	17.26%
147,000	28,650.00	25,550.00	19.49%	17.38%
148,000	29,000.00	25,900.00	19.59%	17.50%
149,000	29,350.00	26,250.00	19.70%	17.62%
150,000	29,700.00	26,600.00	19.80%	17.73%
151,000	30,050.00	26,950.00	19.90%	17.85%
152,000	30,400.00	27,300.00	20.00%	17.96%
153,000	30,750.00	27,650.00	20.10%	18.07%
154,000	31,100.00	28,000.00	20.19%	18.18%
155,000	31,450.00	28,350.00	20.29%	18.29%

APPENDIX C (continued)

Tax Computation

Name: John Brown
Return to Summary

	Current R	On retirement: >65 R
Income		
Salary	149,435.85	-
Interest	-	19,701.33
Dividends	-	4,925.33
Pension	-	68,954.67
Annuity	-	-
Capital	-	4,925.33
Other	-	-
	149,435.85	98,506.67
Less : Exempt income		
Interest	-	-15,000.00
Dividends	-	-4,925.33
Capital exempt	-	-4,925.33
	149,435.85	73,656.00
Less : Deductions		
Pension	-	-
Retirement Annuity Fund	-	-
Medical expenses	-	-12,000.00
Taxable income	149,435.85	61,656.00
Tax rate	19.70%	4.07%
Taxation	**29,435.85**	**2,506.67**

APPENDIX C (continued)

Monthly Budget on Retirement

Name: John Brown

Return to Summary

Income Mix on retirement

Pension/RAF	70%
Annuity	0%
Interest	20%
Dividends	5%
Capital	5%
Other	0%
	100%

Monthly Budget

	Current Budget R	Budget on retirement: >65 R
Income		
Salary	12,452.99	
Interest	-	1,641.78
Dividends		410.44
Pension/RAF		5,746.22
Annuity		-
Capital		410.44
Other		-
Total Income	12,452.99	8,208.89
Taxation	2,452.99	208.89
Net Income After Taxation	10,000.00	8,000.00

APPENDIX C (continued)

Monthly Budget on Retirement (continued)

Expenses

Pension	-	
Provident	-	
Disability Risk insurance	-	
Retirement annuity		
Medical expenses	500.00	1,000.00
Rent/mortgage bond		
Unit Trusts		
Car repayment		
Food		
Clothes		
Water, electricity, rates		
Petrol, vehicle maintenance		
Life assurance		
Household insurance		
Motor vehicle insurance		
Education (Own or children)		
Entertainment		
Other		
Total Expenses	500.00	1,000.00
Net Surplus/(Deficit)	11,952.99	7,208.89

APPENDIX C (continued)

Investment Required on Retirement

Name: John Brown
Return to Summary

Age of retirement :	65
Life expectancy :	78
Amount to be saved before retirement :	**17,361,271.58**

Workings

Age	Inflation	Expected return on investments	Annual Amount Required	Value of annual amt at retirement	Cumulative Total
			R	R	R
	7%	10%			
65			1,475,083.98	1,475,083.98	1,475,083.98
66			1,578,339.86	1,434,854.42	2,909,938.40
67			1,688,823.65	1,395,722.02	4,305,660.42
68			1,807,041.31	1,357,656.88	5,663,317.30
69			1,933,534.20	1,320,629.87	6,983,947.18
70			2,068,881.59	1,284,612.69	8,268,559.87
71			2,213,703.30	1,249,577.80	9,518,137.67
72			2,368,662.53	1,215,498.41	10,733,636.08
73			2,534,468.91	1,182,348.45	11,915,984.53
74			2,711,881.73	1,150,102.58	13,066,087.12
75			2,901,713.46	1,118,736.15	14,184,823.27
76			3,104,833.40	1,088,225.16	15,273,048.43
77			3,322,171.74	1,058,546.30	16,331,594.73
78			3,554,723.76	1,029,676.85	17,361,271.58

APPENDIX C (continued)

Amount Already Saved

Name: John Brown
Return to Summary

	Monthly Contributions R	Annual increase in premiums	Value at 25 R	No. years until retirement	Expected PV on Retirement @ 10% R
Pension Fund	-	0%	-	40	-
Provident Fund	-	0%	-	40	-
Retirement Annuity Fund	-	0%	-	40	-
Deferred Compensation					
Disability Risk insurance	-	0%	-	40	-
					-

APPENDIX C (continued)

Required annual contribution to retirement

Name: John Brown

Return to Summary

Shortfall/(Surplus) on Savings	**R**
Required Investment on Retirement	17,361,271.58
Future value of Current Savings	-
Shortfall/(Surplus)	17,361,271.58
Additional Monthly Contributions Required	
Number of years until retirement	40
Annual increase in contributions	7%
Therefore required monthly increase	**R 1,433.17**

APPENDIX C (continued)

Required annual contribution to retirement (continued)
Workings

Age	Annual Contr	Years to retirement	Annual Return 10%	Cumulative Total
	R		R	R
25	17,198.01	39.00	707,608.15	707,608.15
26	18,401.87	38.00	688,309.75	1,395,917.91
27	19,690.00	37.00	669,537.67	2,065,455.57
28	21,068.30	36.00	651,277.55	2,716,733.12
29	22,543.08	35.00	633,515.43	3,350,248.55
30	24,121.09	34.00	616,237.74	3,966,486.29
31	25,809.57	33.00	599,431.26	4,565,917.55
32	27,616.24	32.00	583,083.13	5,149,000.68
33	29,549.38	31.00	567,180.86	5,716,181.54
34	31,617.83	30.00	551,712.29	6,267,893.84
35	33,831.08	29.00	536,665.60	6,804,559.43
36	36,199.26	28.00	522,029.26	7,326,588.69
37	38,733.21	27.00	507,792.10	7,834,380.79
38	41,444.53	26.00	493,943.22	8,328,324.02
39	44,345.65	25.00	480,472.05	8,808,796.06
40	47,449.84	24.00	467,368.26	9,276,164.33
41	50,771.33	23.00	454,621.86	9,730,786.18
42	54,325.32	22.00	442,223.08	10,173,009.26
43	58,128.10	21.00	430,162.45	10,603,171.71
44	62,197.06	20.00	418,430.74	11,021,602.45
45	66,550.86	19.00	407,019.00	11,428,621.45
46	71,209.42	18.00	395,918.48	11,824,539.93
47	76,194.08	17.00	385,120.70	12,209,660.63
48	81,527.66	16.00	374,617.41	12,584,278.04
49	87,234.60	15.00	364,400.57	12,948,678.61
50	93,341.02	14.00	354,462.37	13,303,140.98
51	99,874.89	13.00	344,795.22	13,647,936.20
52	106,866.14	12.00	335,391.71	13,983,327.92
53	114,346.77	11.00	326,244.67	14,309,572.58
54	122,351.04	10.00	317,347.08	14,626,919.67
55	130,915.61	9.00	308,692.16	14,935,611.83
56	140,079.70	8.00	300,273.29	15,235,885.12
57	149,885.28	7.00	292,084.02	15,527,969.13
58	160,377.25	6.00	284,118.09	15,812,087.22
59	171,603.66	5.00	276,369.41	16,088,456.63
60	183,615.92	4.00	268,832.06	16,357,288.70
61	196,469.03	3.00	261,500.28	16,618,788.98
62	210,221.86	2.00	254,368.46	16,873,157.43
63	224,937.39	1.00	247,431.13	17,120,588.57
64	240,683.01	0.00	240,683.01	17,361,271.58

APPENDIX D

Individual Income Tax Tables:

1998/1999 Tax year

Taxable income	**Rates of tax**	
Does not exceed R31 000		19% of each R1 of taxable income
Exceeds R 31 000 but does not exceed R 46 000	R5 890 plus	30% of the amount that exceeds R 31 000
Exceeds R 46 000 but does not exceed R 60 000	R10 390 plus	39% of the amount that exceeds R 46 000
Exceeds R 60 000 but does not exceed R 70 000	R15 850 plus	43% of the amount that exceeds R 60 000
Exceeds R 70 000 but does not exceed R 120 000	R20 150 plus	44% of the amount that exceeds R 70 000
Exceeds R 120 000	R42 150 plus	45% of the amount that exceeds R 120 000

Rebates:	
Primary	R 3 515
Over 65	R 2 660

1999/2000 Tax year

Taxable income	**Rates of tax**	
Does not exceed R 33 000		19% of each R1 of taxable income
Exceeds R 33 000 but does not exceed R 50 000	R6 270 plus	30% of the amount that exceeds R 33 000
Exceeds R 50 000 but does not exceed R 60 000	R11 370 plus	35% of the amount that exceeds R 50 000
Exceeds R 60 000 but does not exceed R 70 000	R14 870 plus	40% of the amount that exceeds R 60 000
Exceeds R 70 000 but does not exceed R 120 000	R18 870 plus	44% of the amount that exceeds R 70 000
Exceeds R 120 000	R40 870 plus	45% of the amount that exceeds R 120 000

Rebates:	
Primary	R 3 710
Over 65	R 2 775

APPENDIX D (continued)

2000/2001 Tax year

Taxable income	**Rates of tax**	
Does not exceed R 35 000		18% of each R1 of taxable income
Exceeds R 35 000 but does not exceed R 45 000	R6 300 plus	26% of the amount that exceeds R 35 000
Exceeds R 45 000 but does not exceed R 60 000	R8 900 plus	32% of the amount that exceeds R 45 000
Exceeds R 60 000 but does not exceed R 70 000	R13 700 plus	37% of the amount that exceeds R 60 000
Exceeds R 70 000 but does not exceed R 200 000	R17 400 plus	40% of the amount that exceeds R 70 000
Exceeds R 200 000	R69 400 plus	42% of the amount that exceeds R 200 000

Rebates:	
Primary	R 3 800
Over 65	R 2 900

2001/2002 Tax year

Taxable income	**Rates of tax**	
Does not exceed R 38 000		18% of each R1 of taxable income
Exceeds R 38 000 but does not exceed R 55 000	R6 840 plus	26% of the amount that exceeds R 38 000
Exceeds R 55 000 but does not exceed R 80 000	R11 260 plus	32% of the amount that exceeds R 55 000
Exceeds R 80 000 but does not exceed R 100 000	R19 260 plus	37% of the amount that exceeds R 80 000
Exceeds R 100 000 but does not exceed R 215 000	R26 660 plus	40% of the amount that exceeds R 100 000
Exceeds R 215 000	R72 660 plus	42% of the amount that exceeds R 215 000

Rebates:	
Primary	R 4 140
Over 65	R 3 000

APPENDIX D (continued)

2002/2003 Tax year

Taxable income	**Rates of tax**	
Does not exceed R 40 000		18% of each R1 of taxable income
Exceeds R 40 000 but does not exceed R 80 000	R7 200 plus	25% of the amount that exceeds R 40 000
Exceeds R 80 000 but does not exceed R 110 000	R17 200 plus	30% of the amount that exceeds R 80 000
Exceeds R 110 000 but does not exceed R 170 000	R26 200 plus	35% of the amount that exceeds R 110 000
Exceeds R 170 000 but does not exceed R 240 000	R47 200 plus	38% of the amount that exceeds R 170 000
Exceeds R 240 000	R73 800 plus	40% of the amount that exceeds R 240 000

Rebates:	
Primary	R 4 860
Over 65	R 3 000

2003/2004 Tax year

Taxable income	**Rates of tax**	
Does not exceed R 70 000		18% of each R1 of taxable income
Exceeds R 70 000 but does not exceed R 110 000	R12 600 plus	25% of the amount that exceeds R 70 000
Exceeds R 110 000 but does not exceed R 140 000	R22 600 plus	30% of the amount that exceeds R 110 000
Exceeds R 140 000 but does not exceed R 180 000	R31 600 plus	35% of the amount that exceeds R 140 000
Exceeds R 180 000 but does not exceed R 255 000	R45 600 plus	38% of the amount that exceeds R 180 000
Exceeds R 255 000	R74 100 plus	40% of the amount that exceeds R 255 000

Rebates:	
Primary	R 5 400
Over 65	R 3 100

APPENDIX D (continued)

2004/2005 Tax year

Taxable income	**Rates of tax**	
Does not exceed R 74 000		18% of each R1 of taxable income
Exceeds R 74 000 but does not exceed R 115 000	R13 320 plus	25% of the amount that exceeds R 40 000
Exceeds R 115 000 but does not exceed R 155 000	R23 570 plus	30% of the amount that exceeds R 80 000
Exceeds R 155 000 but does not exceed R 195 000	R35 570 plus	35% of the amount that exceeds R 110 000
Exceeds R 195 000 but does not exceed R 270 000	R49 570 plus	38% of the amount that exceeds R 170 000
Exceeds R 270 000	R78 070 plus	40% of the amount that exceeds R 240 000

Rebates:	
Primary	R 5 800
Over 65	R 3 200

2005/2006 Tax year

Taxable income	**Rates of tax**	
Does not exceed R 80 000		18% of each R1 of taxable income
Exceeds R 80 000 but does not exceed R 130 000	R14 400 plus	25% of the amount that exceeds R 70 000
Exceeds R 130 000 but does not exceed R 180 000	R26 900 plus	30% of the amount that exceeds R 110 000
Exceeds R 180 000 but does not exceed R 230 000	R41 900 plus	35% of the amount that exceeds R 140 000
Exceeds R 230 000 but does not exceed R 300 000	R59 400 plus	38% of the amount that exceeds R 180 000
Exceeds R 300 000	R86 000 plus	40% of the amount that exceeds R 255 000

Rebates:	
Primary	R 5 400
Over 65	R 3 100

APPENDIX E

Results of the information processed to determine the effect of pre-retirement income, age and changes in the tax legislation on the level of an individual's monthly contributions to a "retirement savings plan". The figures represent the retirement annuity contributions required in order to save sufficiently for retirement based on the assumptions discussed in Chapter Three.

1998/1999 Tax Rates

		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	279.34	558.68	869.41	1296.14	1756.05	2926.35
	30	346.13	692.27	1077.29	1606.07	2175.94	3626.08
	35	437.17	874.34	1360.63	2028.48	2748.23	4579.77
	40	567.05	1134.1	1764.87	2631.13	3564.72	5940.4

1999/2000 Tax Rates

		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	279.34	558.68	861.24	1262.91	1718.87	2885.89
	30	346.13	692.27	1067.18	1564.89	2129.88	3575.95
	35	437.17	874.34	1347.85	1976.47	2690.05	4516.45
	40	567.05	1134.1	1748.3	2563.67	3489.26	5858.27

2000/2001 Tax Rates

		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	279.34	558.68	838.02	1214.79	1641.16	2734.36
	30	346.13	692.27	1038.4	1505.26	2033.58	3388.19
	35	437.17	874.34	1311.51	1901.16	2568.43	4279.31
	40	567.05	1134.1	1701.15	2465.98	3331.5	5550.68

2001/2002 Tax Rates

		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	279.34	558.68	838.02	1182.1	1573.82	2650.33
	30	346.13	692.27	1038.4	1464.76	1950.14	3284.07
	35	437.17	874.34	1311.51	1850	2463.04	4147.8
	40	567.05	1134.1	1701.15	2399.63	3194.8	5380.1

2002/2003 Tax Rates

		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	279.34	558.68	838.02	1136.99	1497.08	2465.11
	30	346.13	692.27	1038.4	1408.86	1855.05	3054.56
	35	437.17	874.34	1311.51	1779.4	2342.95	3857.93
	40	567.05	1134.1	1701.15	2308.06	3039.03	5004.11

APPENDIX E (continued)

2003/2004 Tax Rates

		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	279.34	558.68	838.02	1117.36	1433.17	2331.15
	30	346.13	692.27	1038.40	1384.54	1775.86	2888.57
	35	437.17	874.34	1311.51	1748.68	2242.92	3648.28
	40	567.05	1134.1	1701.15	2268.20	2909.29	4732.17

2004/2005 Tax Rates

		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	279.34	558.68	838.02	1117.36	1422.89	2304.39
	30	346.13	692.27	1038.40	1384.54	1760.31	2855.41
	35	437.17	874.34	1311.51	1748.68	2223.29	3606.40
	40	567.05	1134.1	1701.15	2268.20	2883.81	4677.85

2005/2006 Tax Rates

		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	279.34	558.68	838.02	1117.36	1396.70	2235.07
	30	346.13	692.27	1038.40	1384.54	1730.67	2769.51
	35	437.17	874.34	1311.51	1748.68	2185.85	3497.91
	40	567.05	1134.1	1701.15	2268.20	2835.26	4537.12

APPENDIX F

Results of the information processed to determine the effect of pre-retirement income, age and changes in the tax legislation on the level of an individual's monthly contributions to a "retirement savings plan". The figures represent the percentage of after tax income that is required to be contributed to a retirement annuity fund, in order to sufficiently save for retirement.

1998/1999 Tax Rates

		% of Income after tax per month					
		2000	4000	6000	8000	10000	15000
Age	25	13.97%	13.97%	14.49%	16.20%	17.56%	19.51%
	30	17.31%	17.31%	17.95%	20.08%	21.76%	24.17%
	35	21.86%	21.86%	22.68%	25.36%	27.48%	30.53%
	40	28.35%	28.35%	29.41%	32.89%	35.65%	39.60%

1999/2000 Tax Rates

		% of Income after tax per month					
		2000	4000	6000	8000	10000	15000
Age	25	13.97%	13.97%	14.35%	15.79%	17.19%	19.24%
	30	17.31%	17.31%	17.79%	19.56%	21.30%	23.84%
	35	21.86%	21.86%	22.46%	24.71%	26.90%	30.11%
	40	28.35%	28.35%	29.14%	32.05%	34.89%	39.06%

2000/2001 Tax Rates

		% of Income after tax per month					
		2000	4000	6000	8000	10000	15000
Age	25	13.97%	13.97%	13.97%	15.18%	16.41%	18.23%
	30	17.31%	17.31%	17.31%	18.82%	20.34%	22.59%
	35	21.86%	21.86%	21.86%	23.76%	25.68%	28.53%
	40	28.35%	28.35%	28.35%	30.82%	33.32%	37.00%

2001/2002 Tax Rates

		% of Income after tax per month					
		2000	4000	6000	8000	10000	15000
Age	25	13.97%	13.97%	13.97%	14.78%	15.74%	17.67%
	30	17.31%	17.31%	17.31%	18.31%	19.50%	21.89%
	35	21.86%	21.86%	21.86%	23.13%	24.63%	27.65%
	40	28.35%	28.35%	28.35%	30.00%	31.95%	35.87%

2002/2003 Tax Rates

		% of Income after tax per month					
		2000	4000	6000	8000	10000	15000
Age	25	13.97%	13.97%	13.97%	14.21%	14.97%	16.43%
	30	17.31%	17.31%	17.31%	17.61%	18.55%	20.36%
	35	21.86%	21.86%	21.86%	22.24%	23.43%	25.72%
	40	28.35%	28.35%	28.35%	28.85%	30.39%	33.36%

APPENDIX F (continued)

2003/2004 Tax Rates

		% of Income after tax per month					
		2000	4000	6000	8000	10000	15000
Age	25	13.97%	13.97%	13.97%	13.97%	14.33%	15.54%
	30	17.31%	17.31%	17.31%	17.31%	17.76%	19.26%
	35	21.86%	21.86%	21.86%	21.86%	22.43%	24.32%
	40	28.35%	28.35%	28.35%	28.35%	29.09%	31.55%

2004/2005 Tax Rates

		% of Income after tax per month					
		2000	4000	6000	8000	10000	15000
Age	25	13.97%	13.97%	13.97%	13.97%	14.23%	15.36%
	30	17.31%	17.31%	17.31%	17.31%	17.60%	19.04%
	35	21.86%	21.86%	21.86%	21.86%	22.23%	24.04%
	40	28.35%	28.35%	28.35%	28.35%	28.84%	31.19%

2005/2006 Tax Rates

		% of Income after tax per month					
		2000	4000	6000	8000	10000	15000
Age	25	13.97%	13.97%	13.97%	13.97%	13.97%	14.90%
	30	17.31%	17.31%	17.31%	17.31%	17.31%	18.46%
	35	21.86%	21.86%	21.86%	21.86%	21.86%	23.32%
	40	28.35%	28.35%	28.35%	28.35%	28.35%	30.25%

Appendix G

Results of the information processed in the Old Mutual retirement planning tool. The variables of age and income were processed for both a male and a female and an average was then obtained for the two assumptions.

Male

		Income before tax per Month (R)					
		2000	4167	6635	9327	12093	19567
		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	283	590	940	1321	1712	2771
	30	351	731	1164	1636	2122	3433
	35	443	923	1470	2067	2680	4336
	40	575	1198	1907	2681	3476	5624

Female

		Income before tax per Month (R)					
		2000	4167	6635	9327	12093	19567
		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	342	712	1134	1594	2067	3344
	30	424	882	1405	1975	2561	4144
	35	535	1115	1775	2495	3235	5234
	40	694	1446	2302	3236	4196	6789

Average

		Income before tax per Month (R)					
		2000	4167	6635	9327	12093	19567
		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	313	651	1037	1458	1890	3058
	30	388	807	1285	1806	2342	3789
	35	489	1019	1623	2281	2958	4785
	40	635	1322	2105	2959	3836	6207

Appendix G (continued)

Results of the information processed in the Old Mutual retirement planning tool as a percentage of after-tax income.

Male

		% of Income after tax per month					
		2000	4000	6000	8000	10000	15000
Age	25	14.15%	14.75%	15.67%	16.51%	17.12%	18.47%
	30	17.55%	18.28%	19.40%	20.45%	21.22%	22.89%
	35	22.15%	23.08%	24.50%	25.84%	26.80%	28.91%
	40	28.75%	29.95%	31.78%	33.51%	34.76%	27.49%

Female

		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	17.10%	17.80%	18.90%	19.93%	20.67%	22.29%
	30	21.20%	22.05%	23.42%	24.69%	25.61%	27.63%
	35	26.75%	27.88%	29.58%	31.19%	32.35%	34.89%
	40	34.70%	36.15%	38.37%	40.45%	41.96%	45.26%

Average

		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	15.63%	16.28%	17.28%	18.22%	18.90%	20.38%
	30	19.38%	20.16%	21.41%	22.57%	23.42%	25.26%
	35	24.45%	25.48%	27.04%	28.51%	29.58%	31.90%
	40	31.73%	33.05%	35.08%	36.98%	38.36%	41.38%

Appendix H

Results of the information processed in the Liberty Life retirement calculator.

		Income before tax per Month (R)					
		2000	4167	6635	9327	12093	19567
		Income after tax Per Month (R)					
		2000	4000	6000	8000	10000	15000
Age	25	296	617	983	1382	1791	2898
	30	367	765	1218	1712	2220	3591
	35	464	966	1538	2162	2803	4536
	40	601	1253	1995	2804	3636	5884

Results of the information processed in the Liberty Life retirement calculator as a percentage of after-tax income.

		% of Income after tax per month					
		2000	4000	6000	8000	10000	15000
Age	25	14.81%	15.43%	16.38%	17.27%	17.91%	19.32%
	30	18.35%	19.12%	20.30%	21.40%	22.20%	23.94%
	35	23.18%	24.15%	25.63%	27.03%	28.03%	30.24%
	40	30.07%	31.32%	33.25%	35.06%	36.36%	39.22%