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# **Group Life Insurance In Kuwait: Problems and Prospects**

by

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*789*

## Declaration

- 1) I compose this thesis.
- 2) This thesis has not been accepted in any previous application for a degree.
- 3) All verbatim extracts have been distinguished by quotation marks and the sources of my information have been specifically acknowledged.

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## ABSTRACT

The Kuwaiti government obliged firms to cover part of employee's risks through legislation in 1965 and 1977. Employers should cover risks as death or job injury due to or during work. This had affected the group life insurance (GLI) market. The thesis examines the economics of this market. Problem of choosing the right life table with respect to Kuwaiti mortality rates is tested. The efficiency of using English life tables to estimate mortality rates in Kuwait GLI market is examined. The effects of GLI underwriters on the market are investigated. The Social Security Services (SSS) are offered for Kuwaitis only, Non-Kuwaitis face more economical insecurity than Kuwaitis do. Therefore, the demand for employees' group investment plan to cover future security facing Kuwaiti and non - Kuwaiti workers, in particular, is also considered.

The thesis suggests several methods to solve the problems facing the Kuwait GLI market. Kuwaiti Mortality rates are estimated using data from both the Social Security Association (SSA) and a sample of term group life insurees to be compared with English and American life tables. Methods of avoiding lack of information, adverse selection, and moral hazard in Kuwait GLI market are proposed. Finally, the advantages of introducing group investment plan are examined, and it was shown that these could alleviate SSS problems. Use of group investment plan should reduce the cost of the SSS for Kuwaitis, secure part of Non-Kuwaitis risks, and assist insurers to avoid or reduce their economic problems.



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## **List of Abbreviations**

<b>AIC</b>	<b>: Al Ahlyah Insurance Company.</b>
<b>ALICO</b>	<b>: American Life Insurance Company.</b>
<b>ERISA</b>	<b>: The Employee Retirement Income Security Act (in the US).</b>
<b>GDP</b>	<b>: Gross Domestic Product.</b>
<b>GIC</b>	<b>: Gulf Insurance Company.</b>
<b>GLI</b>	<b>: Group Life Insurance.</b>
<b>GLP</b>	<b>: Group Life Insurance Premium Rate.</b>
<b>GNP</b>	<b>: Gross National Product.</b>
<b>ILI</b>	<b>: Individual Life Insurance.</b>
<b>INC</b>	<b>: Income Per Capita.</b>
<b>KD</b>	<b>: Kuwaiti Dinar.</b>
<b>KIC</b>	<b>: Kuwait Insurance Company.</b>
<b>KRC</b>	<b>: Kuwait Reinsurance Company.</b>
<b>LMS</b>	<b>: Last Monthly Salary.</b>
<b>NIP</b>	<b>: National Income at Price.</b>
<b>NSP</b>	<b>: Net Single Premium.</b>
<b>OASDHI</b>	<b>: Old-Age, Survivors, Disability, and Health Insurance (in the US).</b>
<b>RP</b>	<b>: Retirement Pension.</b>
<b>SSA</b>	<b>: Social Security Association (in Kuwait).</b>
<b>SSC</b>	<b>: Social Security Contribution.</b>
<b>SSS</b>	<b>: Social Security System.</b>



## Chapter 1

### *Introduction*

#### **1.1 ... Summary of Research Plan:**

Group Life insurance (GLI) is defined<sup>1</sup> as a form of life insurance that provides life cover for a number of persons (employees) in a single contract. The American Council of Life insurance (1996) defines GLI as *“Life insurance that usually does not require medical examinations on a group of people under a master policy. It is typically issued to an employer for the benefit of employees, or to members of an association“*. Also, Dorfman and Adelman (ibid. p. 586) define GLI as *“Insurance provided to groups of people usually through employee groups. One master contract is issued while individual certificates are given to the members“*. In the Kuwaiti GLI market, no individual certificates are given to the members of a group.

Similarly, Rejda (1995, p. 342) argue that *“group life insurance is an important form of life insurance that provides life insurance on a number of persons in a single master contract”*. This author, as did the others, mentioned that physical examinations are not required.

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<sup>1</sup> See for example Rejda (1989, page 8).



One type of GLI is group term life insurance, which offers term life cover mostly for one year. This policy is the main one sold in GLI markets. For example it represents 99 % of total GLI policies in force<sup>2</sup>. Employers buy this policy to cover their obligation toward employee's families in the case of an employee's death. Employers usually seek a sum assured equal to one or two years of an employee's annual salary in the USA, for example, and a minimum of three years (usually no more than 1500 days' salary) of employee's annual salary in Kuwait.

In addition, Rejda (1995, 444) argues that *“group term insurance has the major advantage of providing low-cost protection to employees that can be used to supplement individual life insurance policies. However, it has two disadvantages. First, the insurance is temporary and terminates when the individual is no longer part of the group. Second, it is expensive for an older worker to convert to an individual policy after retirement”*. In USA, a member of a group life policy may convert to an individual life policy at retirement. However, this type of conversion is not popular in Kuwait. This indicates that employees in Kuwait have less incentive to invest part of their income under life insurance. In chapter 6 we will show how and why should employees in Kuwait save part from their salaries through group insurance.

Usually GLI is offered under an Employee Benefit Program (EBP). Newkirk (1996) defines EBP as *“A program through which various benefits are offered to employees by their employers to cover such contingencies as medical expenses, disability income, retirement and death”*.

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<sup>2</sup> See Rejda (1995, p. 444).

Moreover, Rubin (1991) defines GLI with respect to EBP as *“A basic employee benefit under which an employer buys a master policy and issues certificates to employees denoting participation in the plan. Group life is also available through unions and associations.*

*It is usually issued as yearly renewable term insurance although some plans provide permanent insurance. Employers may pay all the cost, or share it with employees”.*

Using Rubin’s definition of GLI, while looking to the Kuwait GLI market, we found that employees do not understand the insurance coverage they are offered. In fact, employees do not receive the certificate of insurance from their employers, and therefore they have no idea about the cover that they are offered. This suggests the following questions: is this the case because employers do not trust employees who may misappropriate the insurance offered? Is it that insurers try to avoid large losses due to employees’ behavior when they know about insurance terms and cover? Finally, is it due to the insurer’s large losses in this market of which both employers and insurers do not know the cause but try to avoid through acts such as hiding policy information from employees? The heads of life insurance departments in two main companies in Kuwait answered the above questions with yes.

GLI has grown rapidly in the past twenty years in Kuwait as in many other countries. In Kuwait, GLI enjoys the largest share of the life insurance market (about 86.5 % of the total sum assured in 1995<sup>3</sup>). The majority of policies in the market are group term life insurance policies, which are renewable annually.

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<sup>3</sup> Reference: Annual Statistical Abstract (1996, table 224, p. 257).



During the last twenty years the Kuwaiti life insurance market has experienced an increase in group life policies with respect to both the sum assured and the number of insurees.

In Kuwait, Law No. 38 enacted in 1964 and upgraded by Act 8 in 1965<sup>4</sup> had an effect on the GLI market. The law obliged all employers to pay the equivalent of 1500 days' salary as compensation should an employee die and an indemnity<sup>5</sup> in case of job injury, if any of these events occurred because of or during work.

The labour force in Kuwait depends on foreign workers (84.2 % are Non-Kuwaitis and 15.8 % are Kuwaitis recorded as in the 1995 census). However, only Kuwaitis are covered by the Social Security System (SSS); but the SSS does not cover job injury. Kuwaiti workers enjoy a generous Social Security System (SSS) offered by the Social Security Association (SSA). However, the majority of the labour force have no social security and therefore face income insecurity.

Law No. 38 forced employees and employers to choose one of the following channels to cover death and job injury risks:

- 1) *Individual Insurance*: Employees buy individual term life insurance, which include accident and job injury coverage.
- 2) *Group Insurance*: Employers buy these policies for their employees to avoid large losses caused by the obligation they faced due to Act 8/1965.

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<sup>4</sup> Source: Al-Kuwait Al-Yom (1965, page 6), official government newspaper, issue No. 553.

<sup>5</sup> The act assigns a table of percentage of 2000 days' salary for job injuries based on the nature of loss that the employee experiences due to an accident.

- 3) *Self control risk*: Some large firms, as well as governmental Associations and Ministries, established a fund for their employees, which covers death and job injury risks.
- 4) *Social Organizations*: Islamic charity associations, government social services, family gifts to each other, which help cover death and job injury risks.

As the demand for GLI increased in Kuwait, it was expected that insurers would benefit from it and make profits. This expectation was based on the high number of Non-Kuwaiti workers expected to join group policies due to the new labour laws (Law 38 and Act 8).

Despite the above and as we will show, insurers have suffered losses in the GLI sector. The aim of this thesis is to examine and solve the problems associated with this market and to make suggestions as to its future conduct.

## **1.2 ... The Kuwait GLI Market:**

The Kuwaiti life insurance market began in 1956 when the American Life Insurance Company (ALICO) opened a branch in Kuwait. This was followed by companies from England and India and the opening of Kuwaiti insurance companies. The market grew rapidly from the middle of the 1970's.



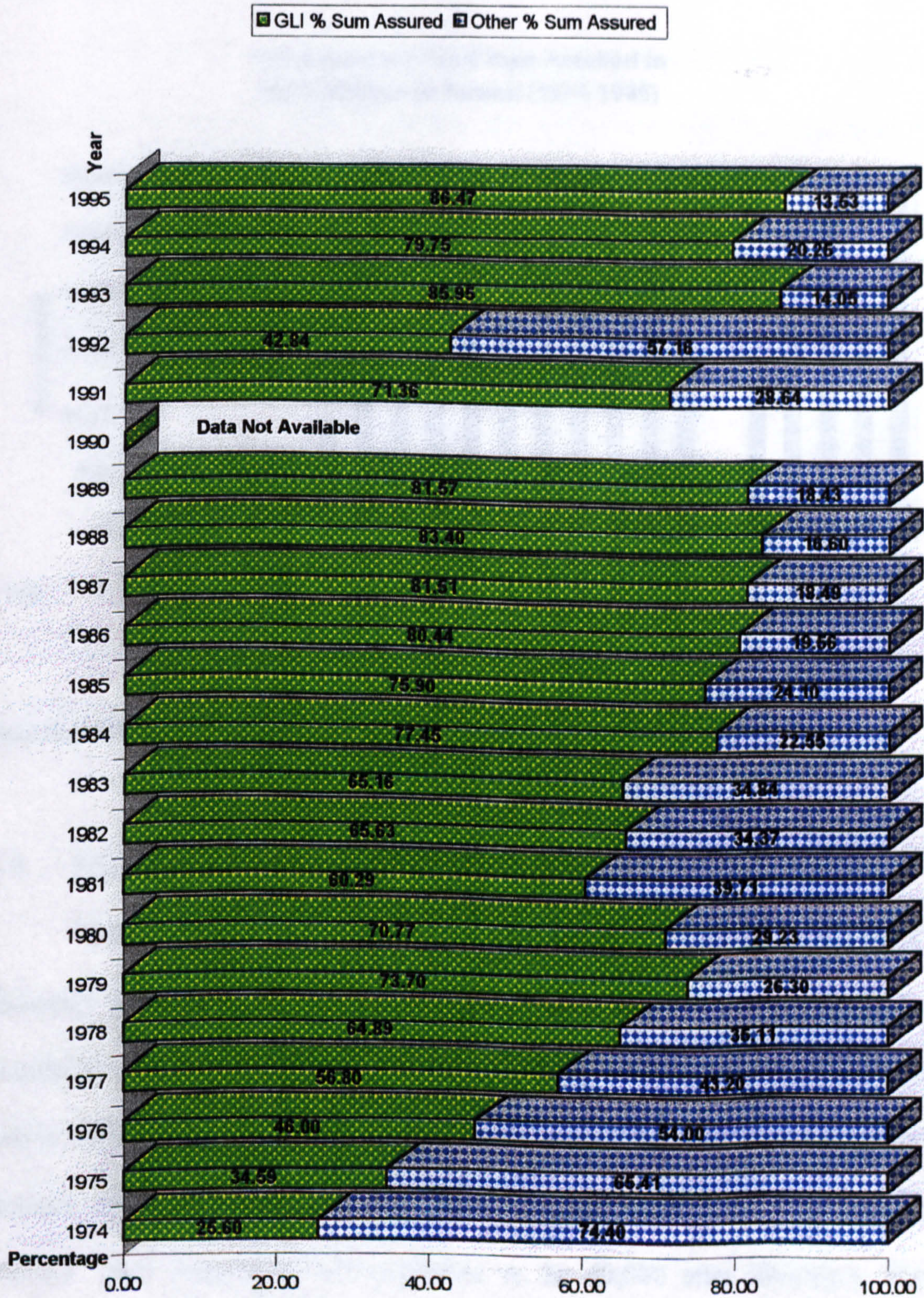
Chart 1.1 shows this growth with respect to the total sum assured for the period 1974-1995. Notwithstanding, there were losses caused by the Iraqi invasion of Kuwait (2<sup>nd</sup> August 1990) and the Gulf War to liberate Kuwait, which was achieved on 26<sup>th</sup> February 1991, that produced a drop in all forms of spending for at least a year.

We have to mention here that the Gulf War resulted in the absence of data for the year 1990. Therefore, all charts and tables followed will not include data for the year 1990. Data for the years 1991 and 1992 may be unusual compared to other years due to war-induced losses and the rebuilding of Kuwait especially during those years.

Also chart 1.2 shows that the life insurance market in Kuwait has increased sharply since 1974, and was affected during the Gulf War.



Chart 1.1 ... Sum Assured in GLI and other life insurance sectors (1974-1995)

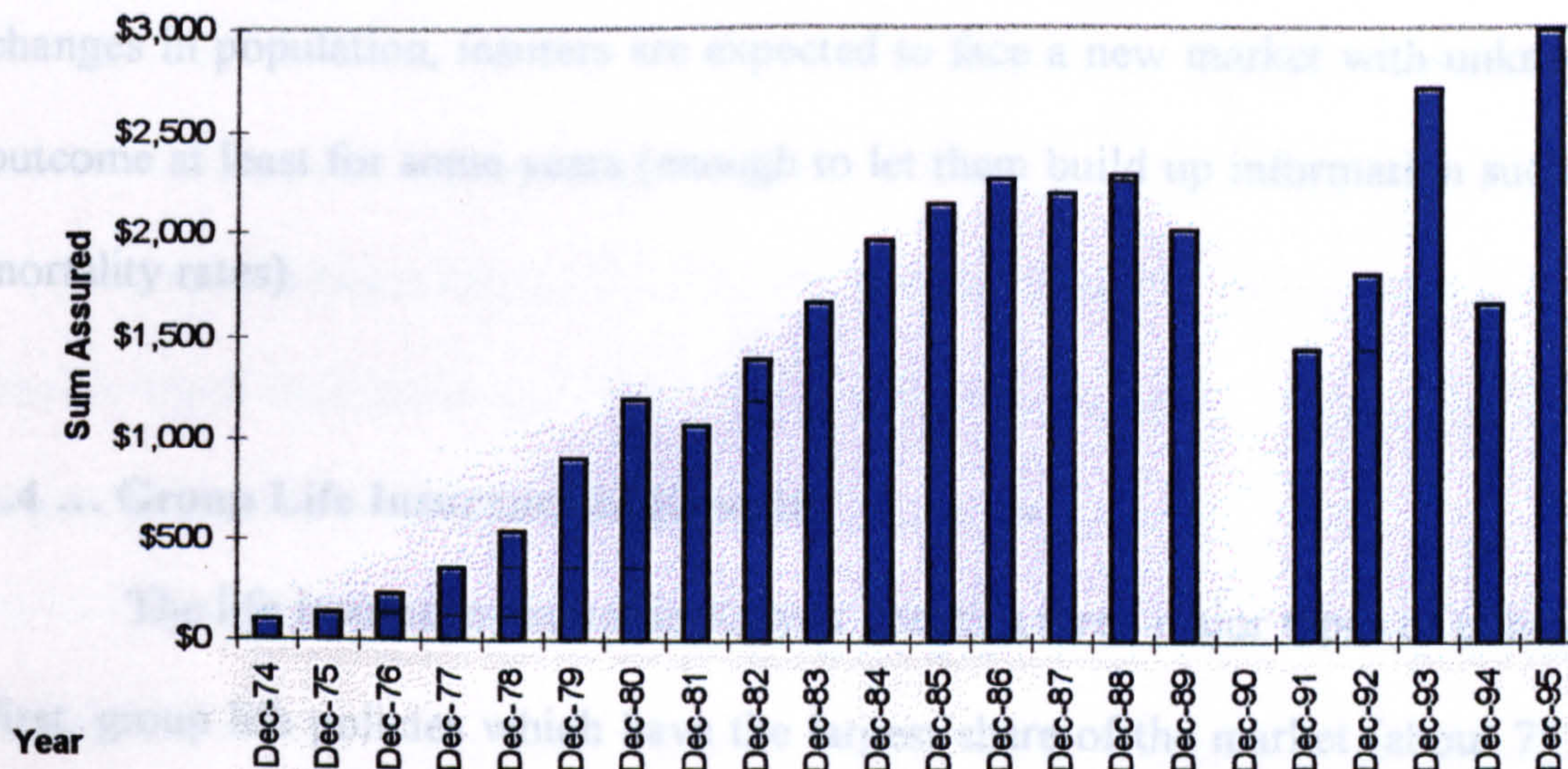


Source: Annual Statistical Abstract (Kuwait, 1985, 1994, and 1996)



**Chart 1.2 ...** large change in Kuwait's population and labour force affected financial markets.

**Life Insurance Total Sum Assured in US \$ Millions in Kuwait (1974-1995)**



**Source: Annual Statistical Abstract (Kuwait, 1985, 1994, and 1996)**

### 1.3 ... Population Structure and GLI Market:

Based on the 1995 census, the population in Kuwait is 1,575,983. Kuwaitis are 655,820 (41.6 %) and Non-Kuwaitis are 920,163 (58.6 %). The population structure changed due to the Gulf War. Many workers in the private sector were Palestinians who left the country during the Gulf War for political reasons. Before the Iraqi invasion, about 450,000 Palestinians were living in Kuwait. Their population was estimated to be 40,000 after liberation. They planned to live permanently in Kuwait, whereas their replacements may not do so.

*Source: Annual Statistical Abstract (1996)*

*Last source*



This large change in Kuwait's population and labour force affected financial markets.

As discussed, the Labour Law of 1964 pushed employers to buy GLI policies. The demand for GLI has clearly increased since then. As a result of the changes in population, insurers are expected to face a new market with unknown outcome at least for some years (enough to let them build up information such as mortality rates).

#### **1.4 ... Group Life Insurance in Kuwait:**

The life insurance market in Kuwait contains three major types of policies. First, group life policies which have the largest share of the market (about 75 % on average during the period 1974 to 1995 with respect to total sum assured<sup>6</sup>). The majority of these policies are renewable yearly.

Second, endowment policies such as pure endowment, universal life and joint life endowment. These have the largest share of the individual life insurance (ILI) market. This type of insurance acquired about 21 % of the life insurance market during 1974 to 1995<sup>7</sup>.

Third, term life policies which are offered in two forms, yearly renewable or five years term life. Whole life policies have very little demand in Kuwait, and are rarely sold in this market.

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<sup>6</sup> Sources: Annual Statistical Abstract (1996).

<sup>7</sup> Last source.



Chart 1.1 clearly shows that the GLI sector enjoys the largest portion of the life insurance market. This indicates the importance of this study, which focuses on the main product of the Kuwait life insurance industry.

The GLI market in Kuwait has two distinctive features. First, the labour law of 1964 forced employers to insure their employees. Second, non-Kuwaiti labour which represents more than 80 % of the workforce on average in any firm.

Those changes helped build the GLI market since the 1970's. The increase was so rapid that there was some doubt that insurers could achieve the basic requirements of policies, such as underwriting; pricing; ... etc.

During the last twenty years no study has been made of the Kuwait GLI market. Therefore, this thesis focuses on the GLI market and in particular concentrates on the problems that may face it.

### **1.5 ... The Social Security System (SSS):**

Law No. 61 established the Social Security System (SSS) in Kuwait of 1977. The law compelled the Social Security Association (SSA) founded in 1977 to manage the SSS. The SSS offers life cover, job injury protection, sickness and maternity leave, and pensions for all members who are legally recognized as Kuwaitis. However, the SSS in the same year (1977) stopped covering job injury risks. The changes in the SSS and labour law also increased GLI (most GLI policies cover risks of premature death and job injury) demand since 1977.

### 1.6 ... Research Objectives:

The aim of this research is to study the Kuwait GLI problems.

First, we will test the efficiency of the life tables used by insurers in Kuwait with respect to GLI insurees' mortality rate. Using actual Kuwaiti experience, the thesis will develop for the first time a life table that conforms to the GLI mortality rate and can provide normal profits.

Second, the study will focus on methods and processes of pricing and underwriting<sup>8</sup> group life insurance policies. Also, the thesis aims at finding optimal methods of managing GLI underwriting to avoid losses. This will include the processes of pricing, choosing the right life table, methods of classifying insurees' risks and information collection in GLI policies.

Finally, this work suggests changes in group insurance that would avoid income insecurity among non-Kuwaiti workers through the use of commercial GLI. These suggestions would have the added benefit of securing non-Kuwaiti workers' retirement and improve Kuwaiti's income at retirement.

### 1.7 ... The Research Methodology and Plan:

Chapter 2 is the theoretical chapter of this thesis. It contains a literature review and discussion of problems related to GLI policies and methods of avoiding those problems.

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<sup>8</sup> Rubin (1991, p. 435) defines underwriting as "*the process of examining, accepting, or rejecting insurance risks, and classifying those selected, in order to charge the proper premium for each. The purpose of underwriting is to spread the risk among a pool of insurees in a manner that is equitable for the insurees and profitable for the insurer*".

Chapter 3 focuses on the background to the study. Data on Kuwait is presented focusing on all factors related to the life insurance industry. It includes a description of the Social Security System in Kuwait.

Chapter 4 describes mortality rates in Kuwait using the SSS data and a sample of GLI actual claims. The rates are graduated<sup>9</sup> (smoothed) to find an efficient life table conforming to the Kuwaiti GLI market and doing normal profits. Chapter 5 tests the efficiency of the life table suggested in chapter 4. This chapter also suggests techniques to test and upgrade underwriters' methods of insurees' risk classification in the GLI market. This aims at finding the procedures that underwriters should follow in order to avoid GLI losses.

Chapter 6 discusses the introduction of private group investment plan under GLI policies. The aim is to show the benefits that insurers, insurees, and the society more generally might receive. Finally, chapter 7 concludes.

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<sup>9</sup> Graduation is defined by Miller (1946, p. 4) as "*the process of securing, from an irregular series values of a continuous variable, a smooth regular series of values consistent in a general way with the observed series of values*".



## Chapter 2

### *Theories and Literature Review*

#### **2.1 ... Introduction:**

This chapter introduces different aspects of GLI including underwriting, pricing, marketing, adverse selection, and moral hazard and information asymmetry. GLI will be compared with individual life insurance (ILI).

#### **2.2 ... GLI Characteristics**

Newkirk (1996, pages 27-33) describe characteristics of GLI policies, highlighting that:

- 1) GLI policies are offered for a group rather than for an individual as one master policy. The master policy covers a group of individuals who share one employer or union. The insurer looks at the group as a whole; no individual underwriting steps are involved.
- 2) Usually no medical examination is required and the cost of insurance is lower than equivalent ILI policies. On the other hand, renewing the group policy can be experience rated. Rejda (1989, page 447) argues that experience rating is used for pricing, explaining that *“if the group is sufficiently large, the actual loss experience is a major factor in determining the premiums that are charged”*. As most GLI policies are annually renewed, experience rating is a good method of predicting future claims and so avoiding losses.

- 3) The flow of insureds has an effect on the GLI operation's efficiency. When the group has a large number of members leaving and joining, administrative costs increase. However, slow turnover of insureds in a group could lead to a large number of older individuals being covered. Mortality rates and therefore claims will be higher.
- 4) GLI benefits are usually predetermined, unlike ILI benefits. Most likely, employers offer a fixed life cover for their employees under the group policy. The sum assured may be based on the employee's salary or it could be a flat amount for the whole group.
- 5) In GLI, insurers require a minimum number of insureds. They also require a minimum percentage of employees of one firm (about 75 %) to be covered in the group. This is a mechanism, which prevents the insurer only covering the relatively high risks or unhealthy insureds.
- 6) Finally, members of the group may contribute part of the cost or the employer may pay the whole cost as a benefit for the employees.

### 2.2.1 ... GLI Advantages:

The greatest advantage of GLI is its low cost if compared to ILI. Reasons for this are:

- 1) Transaction costs are limited as the policy deals with a large number of individuals rather than one individual.
- 2) The broker's or the agent's commission is also limited under GLI policies as the insurer deals with many insureds under a single policy.

3) In some countries (for example USA and UK) GLI premiums can be considered as a nontaxable income for employers. However, in Kuwait there is no such advantage as there is no income tax.

The above are some of the reasons that encourage employers to buy GLI policies.

### 2.3 ... GLI Principles and Adverse Selection:

Adverse selection with respect to life insurance is defined in various insurance textbooks. Dorfman and Adelman (1992, pp. 36, 154, 490, 518, 526, 543, and 581) describe adverse selection in different ways concerning life insurance. For example, they argue (ibid. p. 154) "*people who feel they will become sick will tend to seek coverage*". It is clear that this definition of adverse selection applies in the ILI market.

However, in the GLI market insurees cannot seek cover when they fear illness or death. This is why insurees under GLI policies are not required to be medically examined. In contrast, in the ILI market, insurers aim to examine insuree's health to avoid adverse selection by limiting the number of unhealthy insurees. As a result, in ILI policies, one can use health screening to test whether the insurance applicant is seeking cover because of existing health problems.



Adverse selection may occur in GLI market under certain circumstances. Consider a group of fifty members where forty of its members work in oil fields, and the remainder work in offices<sup>1</sup>. An unexpectedly high proportion of high-risk workers might lead to their claims being higher than the insurance company expects. This is a form of adverse selection which could be avoided by adding additional charges for high-risk insurees within the group, but which might not seem worth the transactions costs to the insurance company.

Nevertheless, a group of the same size might comprise only office workers forty of whom are unhealthy. Again adverse selection would apply. This problem could be avoided by requiring medical exams for insurees. But GLI is traditionally provided without medical examination because insurers consider it unprofitable to embark on this costly process.

#### **2.4 ... The Importance of Life Table Efficiency:**

Marshall (1993, p. 124-126) shows that life insurance premium is calculated through two main steps. First the net single premium is calculated. Then interest on the premium and premium loading is added. Bowers et al, (1986, p. 84) argue that a life insurance policy's net single premium is the present value of its expected future claims.

For example for a term life insurance policy this is calculated by multiplying the policy face amount (sum assured) times the probability of death for an insuree (obtained from a life table). This is also known as the actuarial

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<sup>1</sup> An individual who works in an office would be less risk of dying (because of an accident for example) than others who work in oil fields, or any work out of office.

present value of a life policy. Insurers invest the income to build a policy reserve.

The policy reserve should cover future claims when they occur.

Finally, the net single premium is loaded with an amount that covers the following<sup>2</sup>:

- 1) Salaries of insurer's commission paid to the sellers of policies.
- 2) Costs of office buildings used.
- 3) Computer and data base costs; underwriting; and any other transaction costs.

### 2.5 ... Types of GLI Policies:

Group life insurance policies commonly provide cover for employees of a firm over a relatively short period of time. A common type is the yearly renewable term GLI policies, which form the bulk of the market (for example, in both USA and Kuwait this policy represents 97 % of total GLI policies<sup>3</sup>). Some employers add health cover or pensions to provide an additional and optional service to their employees. At present there is no market in Kuwait for ILI policies such as endowment, term life, universal life, and pensions. Also, health insurance has so far made a limited appearance in this market.

In the USA there are some GLI policies that offer ILI characteristics such as group paid-up life insurance, which cover the insuree's life as a reduced term, together with an increase in whole life cover to be used at retirement. Also, they market a group universal life policy, which provides permanent insurance protection with cash value accumulation.

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<sup>2</sup> See Marshall (1993, p. 125).

<sup>3</sup> Sources: Rejda (1995, p. 444), Kuwait Insurance Company and Gulf Insurance Company.



Finally, one group life policy offered in the US is known as the survivor income benefit insurance<sup>4</sup> (SIBI). The policy provides the employee's survivors (in case of his/her death or at retirement) a pension for a certain time. The policy objective is to grant the family of a deceased employee an extra income to top up social security benefits.

As yet, from this description, it appears that the Kuwaiti GLI market is relatively unsophisticated. We shall argue in chapter 6 that additional products might not only be attractive to workers in the Kuwaiti labour market, but also be necessary to counteract serious problems, which are emerging in the Kuwaiti social security system.

## 2.6 ... GLI Pricing:

This section explains the relationship between life tables and GLI policies. The aim is to show the importance of choosing the right life table when pricing life insurance. In addition, we study the outcome of choosing the wrong life table.

GLI pricing is similar to life insurance pricing. This is based on three main factors:

- 1) Mortality rates, which are based on life tables. Chart 2.1 show that mortality rates increase as individuals age increase. We would therefore expect insurance costs to rise with age.
- 2) The interest rates that the insurer will use to invest the premiums to cover future claims.
- 3) Other loading which include commissions, marketing expenses, marginal profits, and other transaction costs.

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<sup>4</sup> See Rejda (1989, p. 450).



In addition, one might wish to take account of other risk factors such as type of job. However, due to transactions costs, the information used in GLI to classify employees is necessarily much less extensive than that which would be used in ILI.

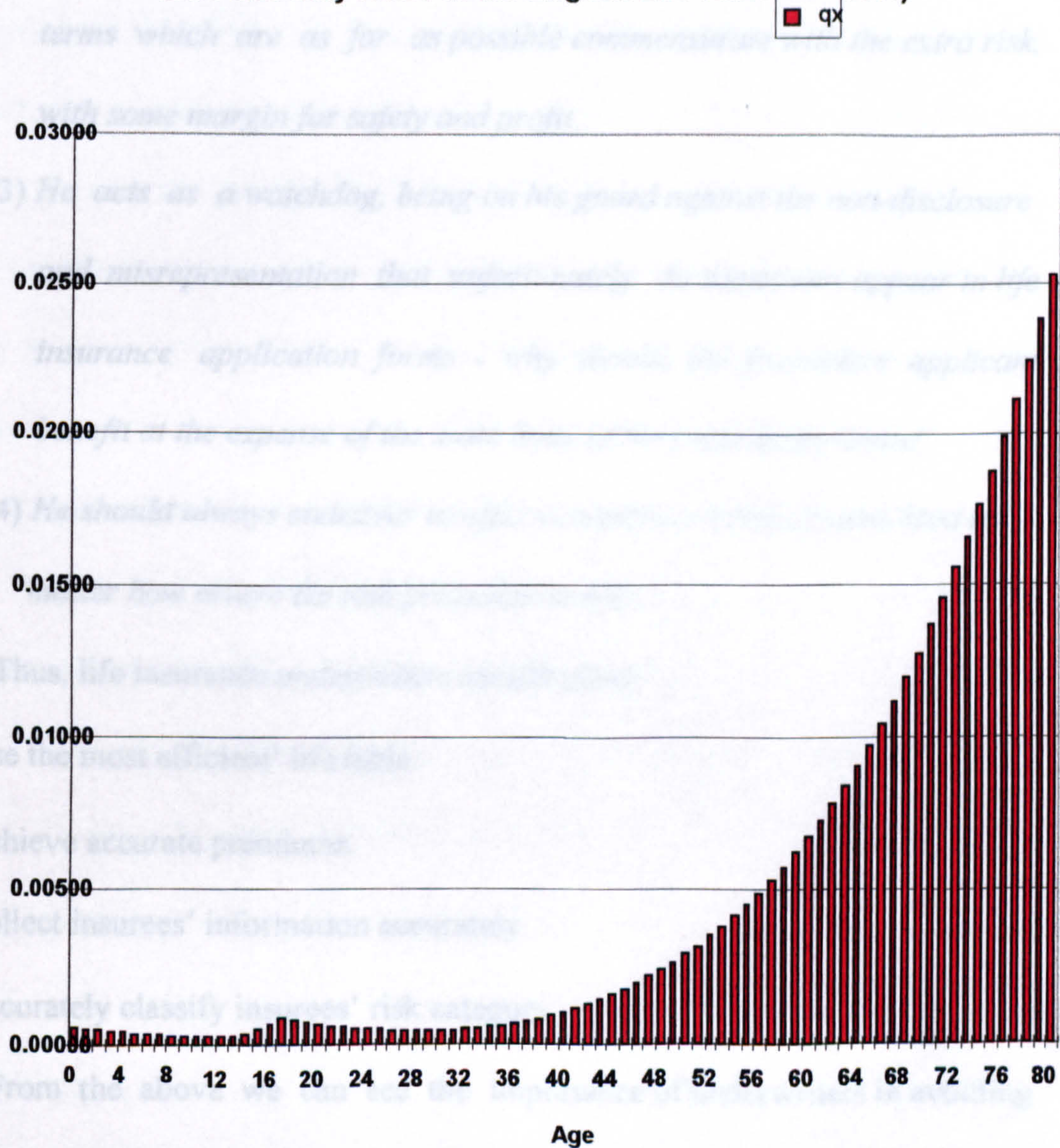
To offer GLI at a competitive price, insurance companies sell such policies through life insurance departments and even through their own underwriters. This increases the amount of commissions paid to agents, brokers, and underwriters. An increase in GLI sales does not mean insurers should expect an increase in profits. This depends on the future claims that will occur. A profit-maximizing insurance company, when pricing GLI, should aim for accuracy in predicting future claims rather than attracting more sales by under-pricing insurance.

In Kuwait, GLI market is distributed between the four nation insurance companies. They agree in the size of portion that each company may have, however pricing methods is to be assigned by each company separately. As a result competition and the above discussion applies in this market.



Chart 2.1 ...

Male Mortality Rates in the English Life Table 1967-1970



Source: Neill (1977, p. 418).

### 2.7 ... Underwriting GLI:

Sankey (1991, P. 1) suggests that a life insurance underwriter should be concerned about the following:

“1) Ensure that the overall mortality or death claims experience of those clients he accepts at standard terms (or “ordinary rates”) is no worse



*than that assumed by his actuarial colleague in setting the premium rates and contract terms.*

- 2) Where he is clearly unable to offer ordinary rates he will quote special terms which are as far as possible commensurate with the extra risk, with some margin for safety and profit.*
- 3) He acts as a watchdog, being on his guard against the non-disclosure and misrepresentation that unfortunately do sometimes appear in life insurance application forms - why should the fraudulent applicant benefit at the expense of the main body of honest policyholders?*
- 4) He should always endeavor to offer acceptance terms of some kind no matter how severe the risk presented to him."*

Thus, life insurance underwriters should strive:

- 1) To use the most efficient<sup>5</sup> life table.
- 2) To achieve accurate premiums.
- 3) To collect insurees' information accurately.
- 4) To accurately classify insurees' risk category.

From the above we can see the importance of underwriters in avoiding insurers' losses in life insurance markets. Further, Mehr and Gustavson (1987); Rejda (1989); Dorfman & Adelman (1992); Sedqy (1976), and Greene (1973) agree that the factors which determine life insurance underwriting are: age, gender, type of the insurance, occupation, family and personal health history, health condition, and income.

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<sup>5</sup> The efficient life table is the one that minimizes the gap between actual and expected claims based on previous mortality experience.



Moreover, they also agree that in GLI underwriting, insurees' health history and condition can be ignored. They assume that employers hire healthy employees and therefore, no medical examination is necessary. The assumption that they are a representative cross-section of the population reduces transaction costs for issuing the group insurance policy. However, some insurers require health examination for small groups (for example less than 30 employees) because it is more difficult to be sure that the sample group is representative when the sample is small. Insurers aim to avoid large losses from small groups in which the theory of large numbers does not apply. Underwriters have to determine what are the factors of risk classification for a group term life insurance policy as we have seen above. American underwriters omit health factors in the underwriting process. Similarly, in Kuwait, underwriters ignore gender, residence, family, personal history, physical condition and physique. The reason is to reduce transaction costs<sup>6</sup>.

### 2.7.1 ... Information:

Cummins et al, (1983, p. 97) argue "*... in the case of conventionally underwritten contracts sufficient mortality information possibly could be obtained to prevent adverse selection*". The authors point to the insuree's risk class and its relation to mortality rate expectations. The risk class should be obtained from the information provided by the insuree.

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<sup>6</sup> Salvatore (1986, p. 387) defines transaction costs as "*those costs that arise in order to facilitate a business transaction. Most transaction costs arise from the existence, and represent the fee or earnings, of middlemen*".

Besides, one of the main legal insurance principles is *utmost good faith*. Diacon and Carter (1984, p.49) argue that “*the doctrine of utmost good faith means that all parties to the contract are legally obliged to disclose all material information.*” New information is necessary to change the insurer’s decision to accept the insurance application or to change its cost. Also, insurers have to provide insureds with all policy information that could lead insureds to a less favorable contract. Both parties should have full information about the nature of the contract.

In insurance markets, lack of information could cause insurers’ losses. When an insurer has less information than the insured does, (on factors relevant to the insurance risk), information asymmetry is said to exist. Information asymmetry is a term taken from the economics of information, which applies when two parties to a contract have different levels of information regarding the circumstances surrounding the contract.

Parties with an informational advantage may seek to exploit their knowledge to increase their utility. On the other hand, those who know that they are at an informational disadvantage may refuse to contract.

In GLI markets, insureds’ information may affect the risk classification process, and so the pricing. Over pricing may result an increase in high-risk insureds (firms) whom will buy GLI policies at a higher price as other insurers might reject them. Under pricing may cause losses.



### 2.7.2 ... The groups size and sum assured:

The group size should not be less than a certain number. For example in the USA, some States require a minimum size of 30 members but other States require 100 members as a minimum<sup>7</sup>. In all cases most insurers require that the group size should be at least 75% of the firm or organization's employees taking into consideration the minimum required number.

From the insurer's viewpoint, the larger the group is, the less is the likelihood that losses could occur. Also, most insurers require a maximum limit of insurance cover to avoid large claims. For example in Kuwait, insurers assign KD 50,000 as a maximum life covers for any member of a group.

### 2.7.3 ... Life Tables and GLI:

There is a difference between using a life table to calculate ILI and GLI premiums. In ILI, insurers deal with one insuree, whereas in GLI they deal with a group of insurees. As a result, for calculating ILI premiums, insurers use a conservative life table where mortality rates are high (for example the English life table 1924-1929<sup>8</sup>). This, in a sense, allows for an implicit risk premium associated with the ILI market.

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<sup>7</sup> Rejda (1995, p. 442) argues that there are two reasons for a minimum requirements number of group insurees. *"First, if a large proportion of eligible employees participate, adverse selection is reduced, since the possibility of insuring a large proportion of unhealthy lives is reduced. Second, if a high proportion of eligible members participate, the expense rate per insured member or per unit of insurance can be reduced."*

<sup>8</sup> See appendix 2.1.



On the other hand using a low mortality rate' life table for GLI policies (for example the English life table 1967-1970<sup>9</sup>) decreases the insurance premium. Insurers should therefore test for the most efficient life table for each sector (ILI or GLI) separately. As we will see in chapter 3, in Kuwait most insurers use the English life table 1967-1970 for the ILI and GLI sectors. Therefore, one might expect that GLI insurees are charged too little.

### 2.8 ... Moral Hazard:

Rejda (1991, p. 5) defines moral hazard "*as dishonesty or character defects in an individual that increase the chance of loss*". In fact, moral hazard occurs in two main ways<sup>10</sup>:

First, the act by individuals or firms to intentionally increase the probability of loss or cause its occurrence (which results in an increase in the expected frequency of losses). Second, the act by individuals or firms to inflate the size of the loss, for example, through giving incorrect information about the loss (which results in an increase in the severity of expected losses). Furthermore, moral hazard may be caused by the existence of insurance. But Rejda (ibid. p. 5) defines this as "Morale Hazard" which he defines as "*carelessness or indifference to a loss because of the existence of insurance*".

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<sup>9</sup> See appendix 2.2.

<sup>10</sup> See Denenberg et al, (1964).

There is no substantive difference between morale hazard and moral hazard; both are caused by insurees and result in an increase in the frequency or severity of loss. Therefore, moral hazard is the risk of an action by an insuree to increase the possibility or the severity of loss occurrence or to pretend it has occurred or exaggerate its severity. In life insurance, moral hazard is difficult to identify if it occurs.

Moral hazard as an insurance problem was first discussed by Arrow (1963, p. 961). Health insurance was an example of insurance that may give rise to moral hazard existing in insurance markets where insurees may act against insurers' expectations by intentionally increasing the probability and severity of claims. However, Arrow (ibid.) discusses the physician's actions (as a third party in the insurance contract) to increase the treatment charges that insurers pay. Arrow (ibid. p. 962) argues that "*it is probably true that hospitalization and surgery are more under the casual inspection of others than is general practice and therefore less subject to moral hazard*".

In the GLI market, moral hazard may occur in a number of ways. For example, assume a foreign worker left Kuwait for a holiday and his family claimed that he died at home and send a death certificate. The insuree might still be alive and receive the claim using a falsified death certificate. If the insurer cannot discover the truth, moral hazard applies.

In the GLI market, cheating by underwriters, insurers, insureds, or employers can occur. In Kuwait, underwriters act as agents and receive commissions in GLI sales. Therefore, they may cheat (for example in choosing a particular life table that decreases premiums but may increase losses) to increase sales and their commissions.

In this situation, underwriters may cheat so as to reduce insurers' profits. The result is that actual claims exceed the expected and the insurer suffers losses. Also, insureds and employers may cheat when providing information to reduce the cost of insurance.

## 2.9 ... Conclusions:

The chapter has discussed GLI from several aspects and has shown the differences between GLI and ILI in general. GLI is usually offered for a group of employees under an annual term policy. No medical examination is required and the cost of insurance is less than ILI's cost. The size of the group should be at least 75 % of total employees and no less than 30 members.

Further, the issue of adverse selection was discussed with respect to GLI. It was suggested that adverse selection might occur in small groups. Choosing the right life table was found to be the most important factor in pricing GLI.

Information asymmetry may affect GLI profits as well as ILI. Adverse selection can clearly be avoided in ILI markets if information is good enough. However, in GLI markets, adverse selection may be avoided in small groups only if sufficient information is available.



Finally, moral hazard and cheating can occur in ILI markets. But in GLI markets those problems are less likely to be important and it is hard to prove them. The outcome of those problems is that actual claims exceed expected claims. Moral hazard or cheating may occur by the act of underwriters, insurers, insureds, or employers. To prove the existence of these problems, the researcher has to collect information on these actors in the GLI markets.



## Chapter 3

### *Group Insurance in Kuwait*

#### **3.1 ... Introduction:**

This chapter describes the insurance market in Kuwait and focuses on mortality rates. Section 3.2 introduces the Kuwaiti insurance system. Section 3.3 gives statistics on population, migration, economics, education and health services and life expectancy in Kuwait. The relationship between the labour force and insurance in Kuwait is discussed in section 3.4. Section 3.5 describes the insurance market in Kuwait, while section 3.6 focuses on the life insurance and the GLI market. The SSS in Kuwait is explained in section 3.7. Section 3.8 is the chapter conclusion.

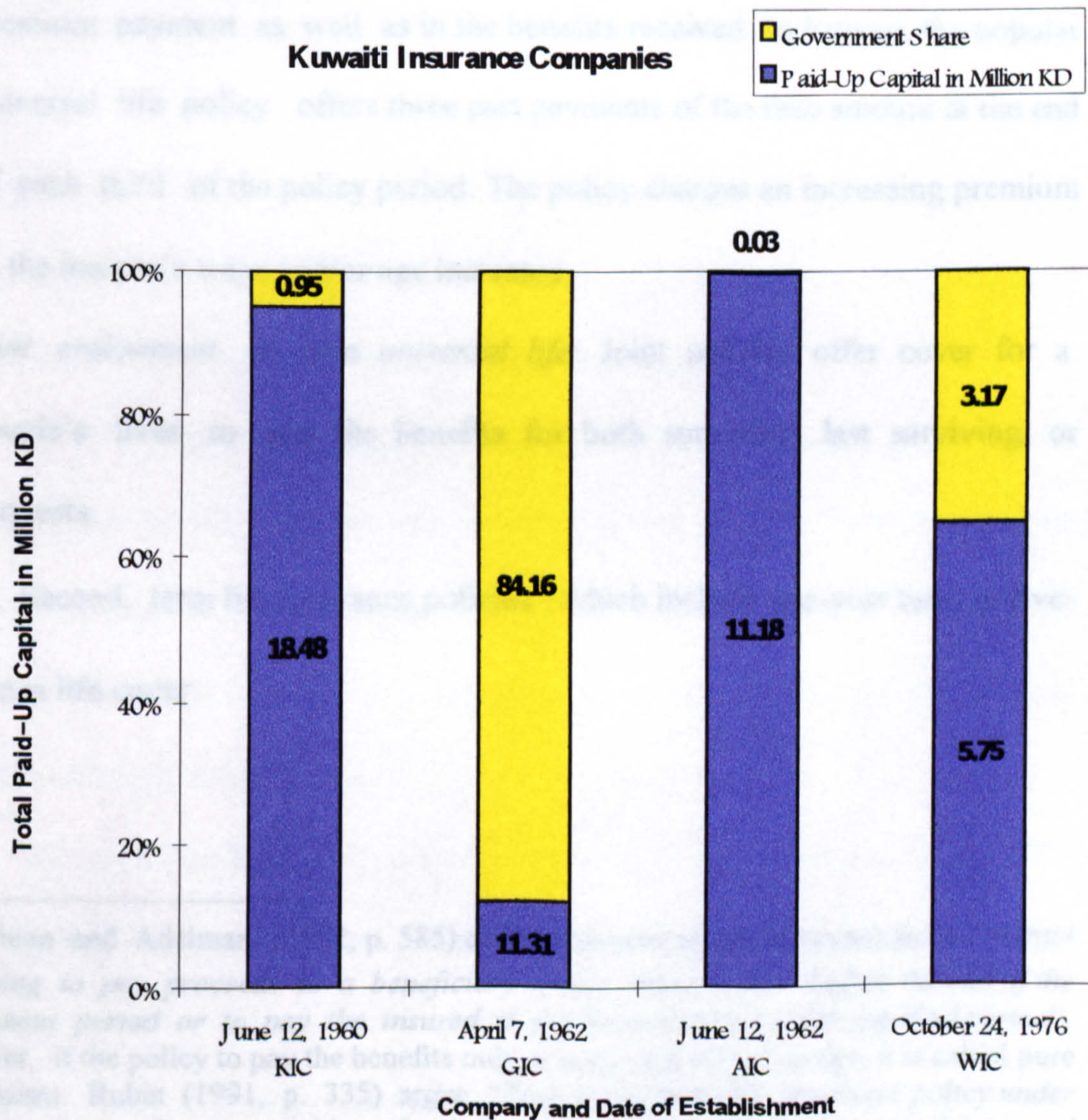
#### **3.2 ... Kuwait Insurance Market:**

Some English and Indian insurance companies first introduced insurance into Kuwait in 1956. The American Life Insurance Company (ALICO) introduced life insurance for the first time in Kuwait in 1956. In 1961 and 1962 three Kuwaiti insurance companies were established: Kuwait Insurance Company (KIC); Al-Ahlyah Insurance Company (AIC); and Gulf Insurance Company (GIC). The Warba Insurance Company, also a Kuwaiti company, was established in 1976.



The Government and the four Kuwaiti companies established the Kuwait Reinsurance Company (KRC) in 1979. Chart 3.1 shows some Kuwaiti insurance companies' figures. The figures for ALICO are not available since they wish to protect commercial confidentiality. Also the KRC figures were not listed in the annual statistical abstract.

Chart 3.1...



Source: Annual Statistical Abstract (1996, table 226. P. 259).



### 3.2.1 ... The Life Insurance Market:

The Kuwait life insurance market is divided into three sectors. First, endowment<sup>1</sup> policies, which include the following main, three types:

- 1) *Pure endowment*: A policy that promises the insuree to pay him/her the amount of life cover only if he/she survives till the end of the policy period.
- 2) *Universal life*: Is an endowment policy that is flexible in the method of premium payment as well as in the benefits received. In Kuwait, the popular universal life policy offers three part payments of the face amount at the end of each third of the policy period. The policy charges an increasing premium as the insuree's wage and/or age increases.
- 3) *Joint endowment or joint universal life*: Joint policies offer cover for a couple's lives to pay the benefits for both surviving, last surviving, or bequests.

Second, term life insurance policies<sup>2</sup>, which include one-year term or five-year term life cover.

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<sup>1</sup> Dorfman and Adelman (1992, p. 585) define endowment life insurance as "a contract promising to pay proceeds to a beneficiary if the insured dies before the end of the endowment period or to pay the insured if the insured survives the specified period". However, if the policy to pay the benefits only at surviving to certain age, it is called pure endowment. Rubin (1991, p. 335) argue "Pure endowment life insurance policy under which its face value is payable only if the insured survives to the end of the stated endowment period; no benefit is paid if the insured dies during the endowment period".

<sup>2</sup> Dorfman and Adelman (ibid. p. 594) define term life insurance as "a type of life insurance ending at a predetermined time. This type of coverage does not involve savings and has a relatively low initial premium that typically increases with the insuree's age. Term life insurance is appropriately used for temporary needs or where the need for protection is great and premium dollars are limited".



Term life policies can be converted to whole life<sup>3</sup> or endowment policies.

Third, group life, which are mostly term GLI policies. Term GLI policies represent about 75 % of the Kuwaiti life insurance market and about 97 % of the GLI market.

### 3.2.2 ... Group Life Insurance Market In Kuwait:

The level of insurance premiums increased in Kuwait between 1974 and 1995 as measured by the ratio of total premiums earned to total sum assured for each sector. GLI policies in Kuwait, which started in 1974, are mostly yearly renewable term life policies, which cover premature death, accident and job injury risks. According to KIC and GIC, 99 % of their group policies are yearly-renewed term life policies with accident and job injury coverage.

Term GLI grew in the last twenty years to become the major policy sold in life insurance market. The reasons behind this fast growth were the Act No. 8/1965 and the SSA cancellation of job injury cover in 1977<sup>4</sup>. It became customary for death indemnity to be three years' salary if the employer was not negligent of safety requirements.

We mentioned earlier in chapter 1, the increasing proportion of GLI in the life insurance sector as measured by the sum assured (see chart 1.1 in page 7). The GLI sum assured in force increased from 25 % to 85 % of the total life sum assured in force. This indicates a demand increase for GLI policies from 1974 to

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<sup>3</sup> Mehr and Gustavson (1987, p. 7) argue that "*the insurer may agree to pay a death claim no matter when death occurs. This type of coverage is called whole life insurance and generally contains a saving element, called the policy cash value*".

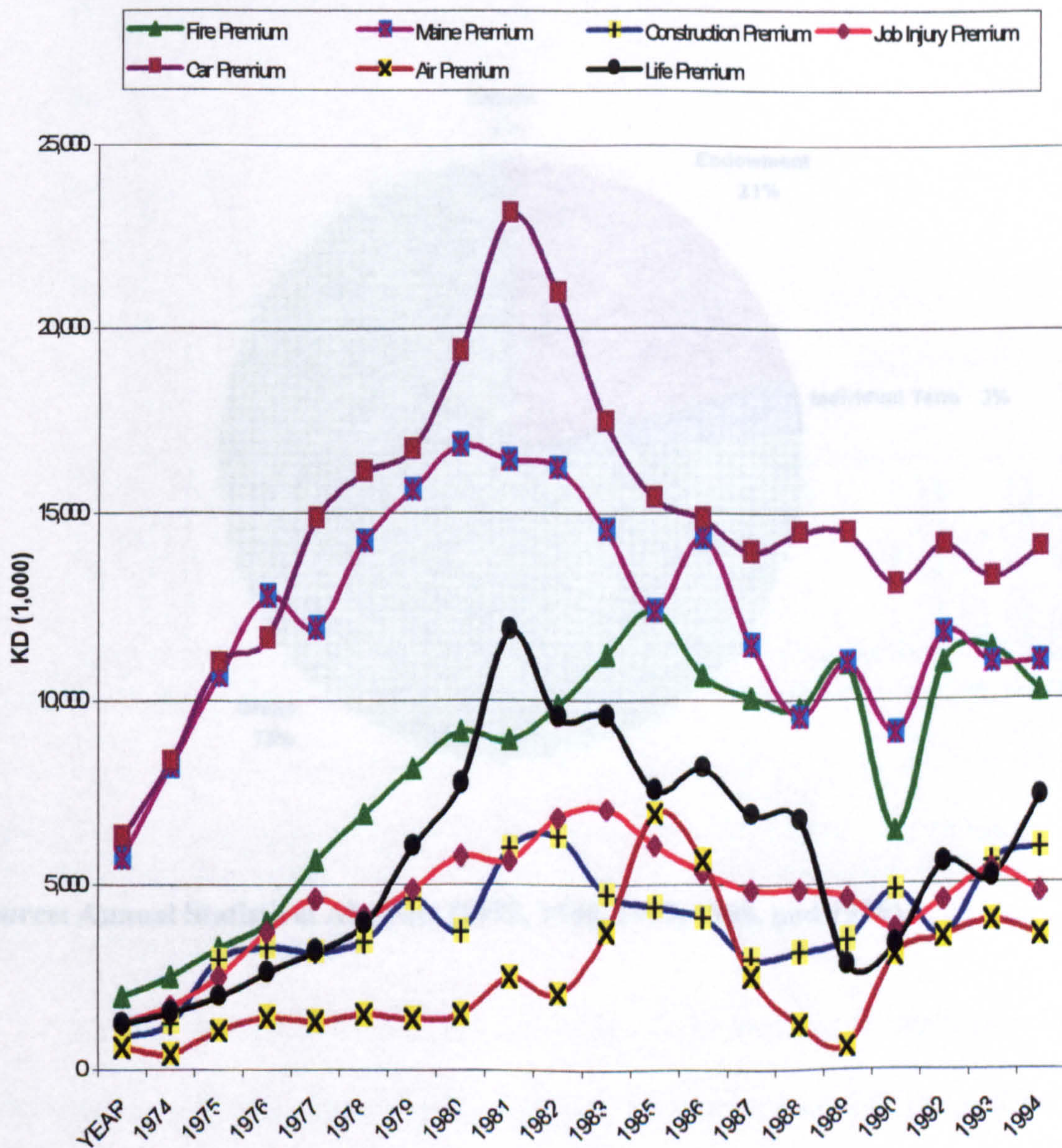
<sup>4</sup> See Behbehani (1979).



1995, with the exception of 1990 due to the Gulf War in which no data were available. Likewise, as the number of GLI policies increased, the ratio of average premiums collected to the sum assured from all types of life insurance decreased<sup>5</sup> because GLI policies are cheaper than ILI policies, other pricing factors being held constant.

Annual Statistical Abstracts 1974

Chart 3.2... Average Premium in Kuwait Insurance Market (1974-1995)



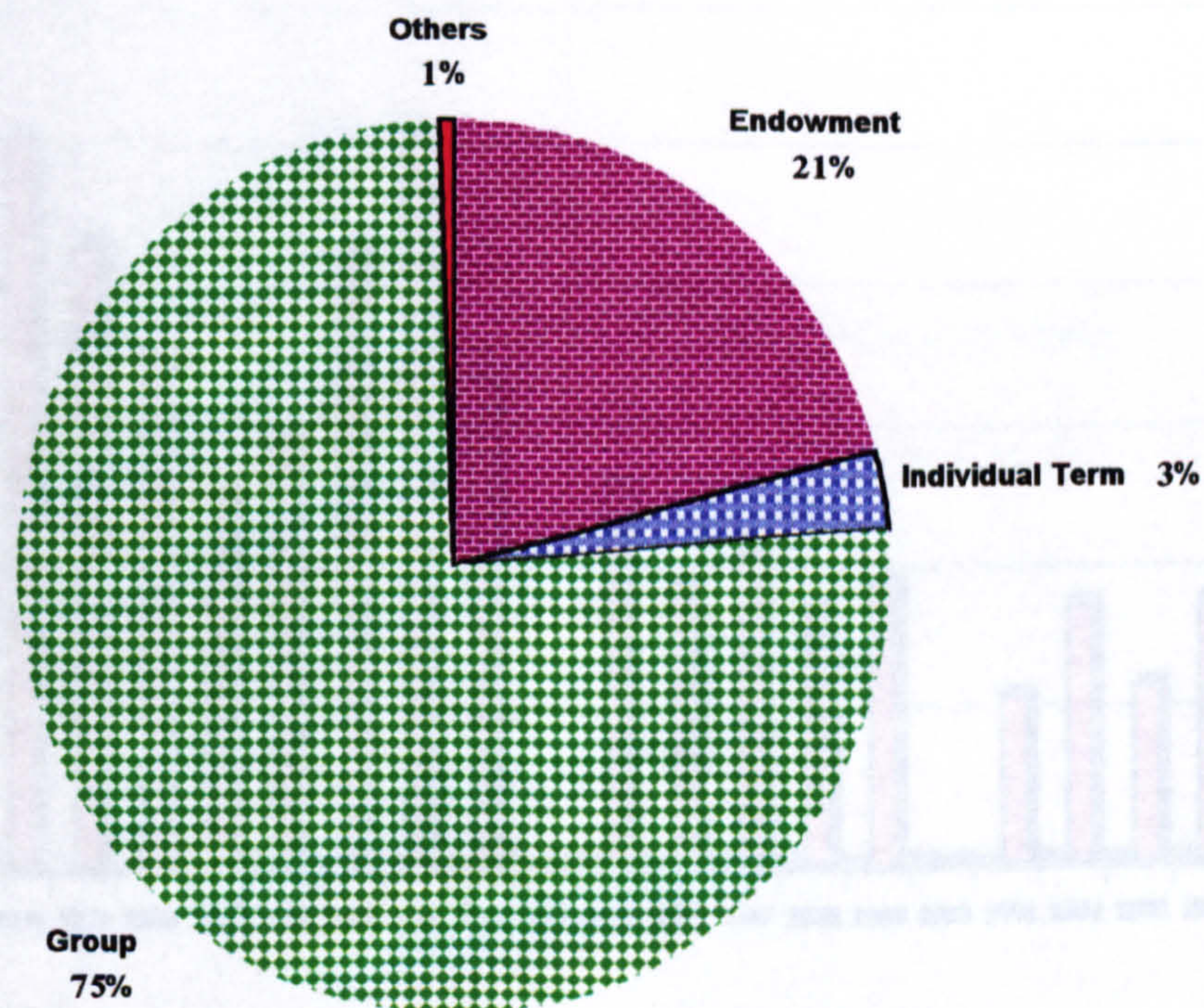
Source: Annual Statistical Abstract (1975, 1980, 1985, 1988, and 1996).  
 Note: Prices is 1 KD per 1000 KD of insurance cover annually.

<sup>5</sup> See Chart 3.2 in page 33.



Further, chart 3.3 confirms the distribution of the life insurance market in Kuwait. Chart 3.4 shows that the GLI premium level per unit cover dropped sharply between 1974 and 1995 due to increased competition.

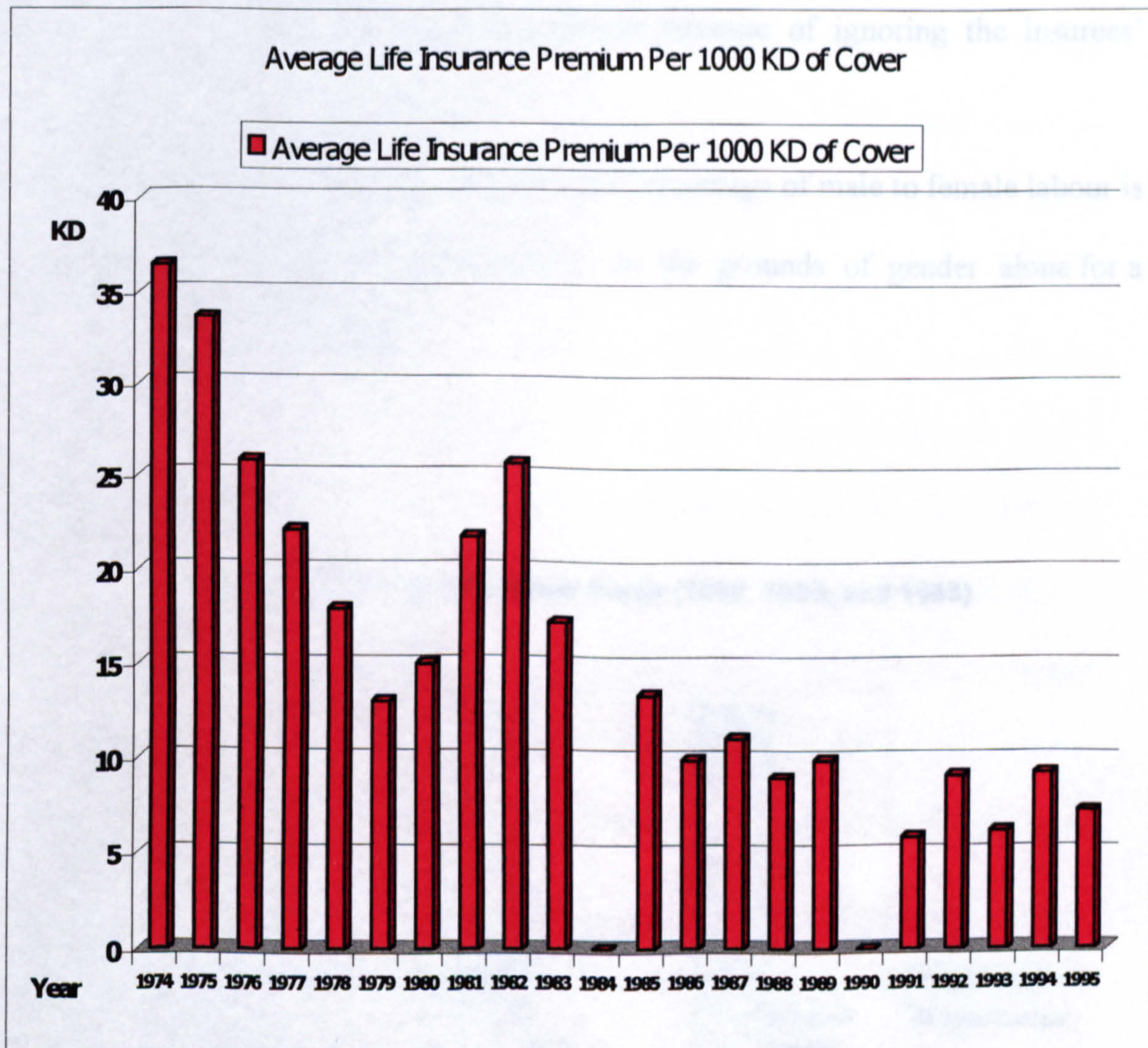
**Chart 3.3 ... Life Insurance Market in Kuwait (Average Sum Assured 1974 to 1995).**



Source: Annual Statistical Abstract (1975, 1980, 1985, 1988, and 1996).



Chart 3.4 ...



Source: Annual Statistical Abstract for the years (1980, 1985, 1994, and 1996).

Note: Data were missed for 1984, and not available for 1990 due to the Gulf War.

### 3.2.4 ... GLI Underwriting:

In GLI markets, the middlemen are agents, brokers, or underwriters. GLI underwriters not only classify insuree's risk levels, but may also be involved in pricing and marketing group policies. Sometimes underwriters act as actuaries to price a GLI policy. For example, in Kuwait, for the purpose of pricing GLI policies, underwriters ignore insurees' gender as a risk-classifying factor and use

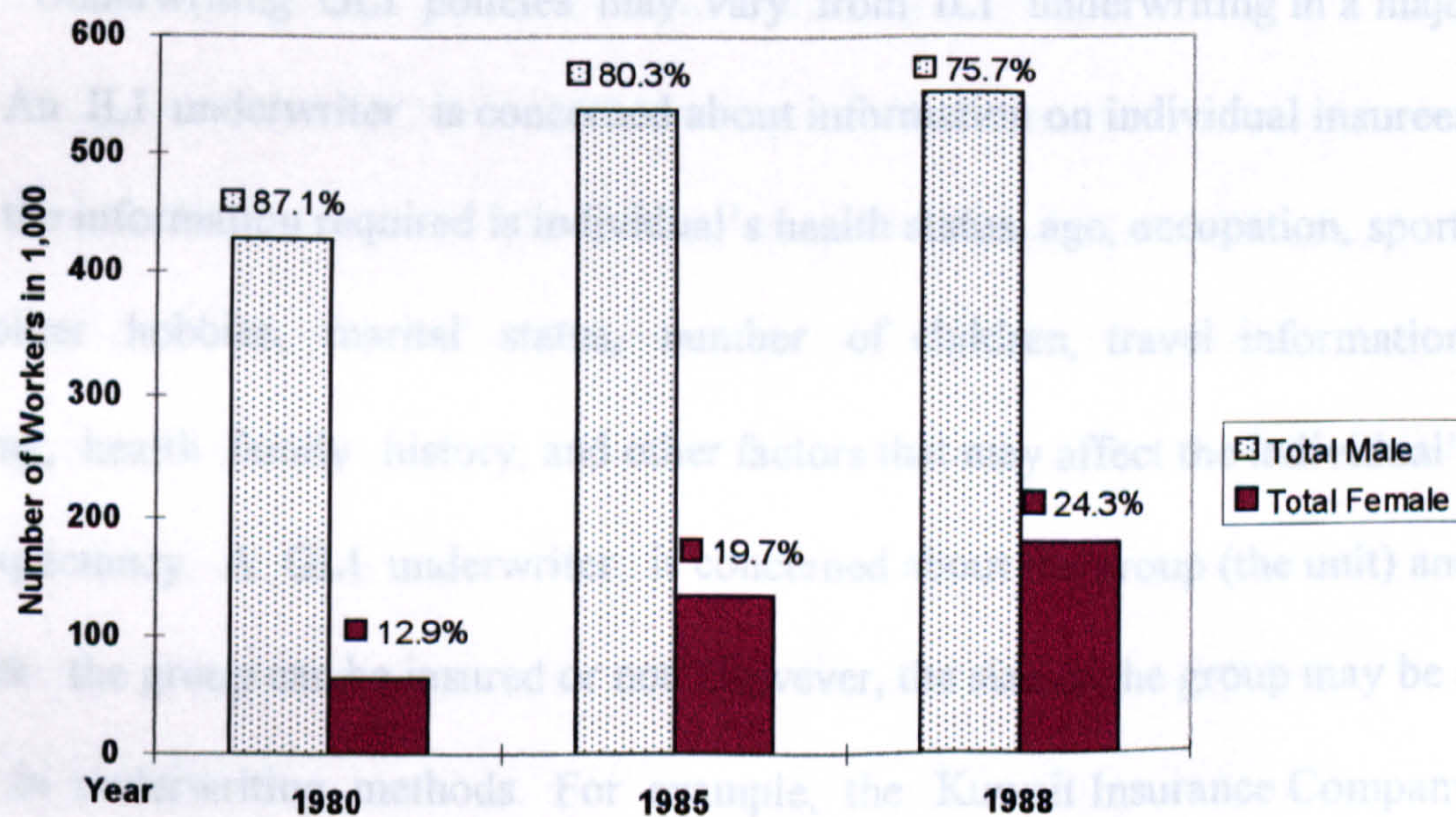


the English male life table 1967 - 1970 to determine expected future death rate. The probability of death for males (who constitute the majority of workers, see chart 3.5) is higher than that for females in all life tables. Therefore, there is no risk of having higher losses than expected because of ignoring the insurees' gender.

However, as chart 3.5 shows, the percentage of male to female labour is decreasing. Thus, there is an argument on the grounds of gender alone for a change in the life table used.

Chart 3.5 ...

**Kuwait Male and Female Labour Force (1980, 1985, and 1988)**



Source: Annual Statistical Abstract, Kuwait (1980, 1985, and 1994).



There are only three factors that are used by underwriters to price GLI policies in Kuwait. These are age, occupation and the sum assured. The occupation determines whether an individual is classified as high-risk or low-risk with regard to his/her type and place of work. A high-risk individual would be loaded 10 % more than a low-risk individual when calculating the group premium.

Underwriters decide the rate of premiums based on the insuree's risk category and the mortality rate according to the insuree's age using a life table. I would like to suggest that the use of the English male life tables 1967 - 1970 to underwrite the group term life insurance policies in Kuwait might be deficient.

Underwriting GLI policies may vary from ILI underwriting in a major way. An ILI underwriter is concerned about information on individual insurees. Here, the information required is individual's health status, age, occupation, sports and other hobbies, marital status, number of children, travel information, smoking, health family history, and other factors that may affect the individual's life expectancy. A GLI underwriter is concerned about the group (the unit) and whether the group can be insured or not. However, the size of the group may be a factor in underwriting methods. For example, the Kuwait Insurance Company underwriters deal with a small size group (less than 30 members) as a set of individual policies focusing on each member separately. This may increase the GLI premium.

Therefore, GLI underwriting methods can be affected by the size of the group.



### 3.3 ... Mortality Rate Issues in Kuwait:

Benjamin and Pollard (1980, p. 400-428) discussed the aspects that affect mortality rates in any country. They studied all possible social and economic factors that may affect the mortality rates of a society. The authors highlighted the following factors that affect mortality rates: the level of living; nutrition; occupation; urbanization; housing; climate and geography, and education and culture.

Following this argument, in the following subsections we discuss mortality risk factors in Kuwait.

#### 3.3.1 ... Population Density, Gender and Mortality Rates:

Benjamin and Pollard (1980) argue that mortality rates increase as population density increases. The authors observed the death rate of England and Wales in 1971 in relation to the population of an area or City. They found that, as population density increased, the number of deaths per 1,000 observed persons increased. Table 3.2 shows their results.

**Table 3.2 ... Number of Deaths per 1,000 in England and Wales (1971):**

<b>Population Density</b>	<b>Average Number of Deaths Per 1,000</b>
Conurbation	12.5
Areas outside conurbation, Urban areas with population of 100,000 and over	12.5
Urban with population over 50,000 and under 100,000	11.4
Urban areas with population under 50,000	11.4
Rural districts	10.5

**Source: Benjamin and Pollard (1980, p.414)**



Further, the authors (*ibid.* 1980, p. 4-8) and any other actuarial textbook would agree that males have higher mortality rates than females. Table 3.3 show that male mortality rates are higher than female for all age groups. Therefore, as the female percentage increases in a society, population mortality rates should decrease.

**Table 3.3 ... England and Wales, 1971-rates of mortality per 1,000.**

Age group	Males	Females
0 -	19.78	15.12
1 - 4	0.76	0.64
5 - 9	0.44	0.29
10 - 14	0.37	0.23
15 - 19	0.90	0.38
20 - 24	0.94	0.42
25 - 34	0.98	0.61
35 - 44	2.32	1.59
45 - 54	7.12	4.34
55 - 64	20.3	10.1
65 - 74	51.8	26.5
75 - 84	118.7	77.8
85 and over	243.1	193.0

Source: Benjamin and Pollard (1971, p. 6)



Based on the above discussion, we study Kuwait population, density, and male to female ratio with respect to their bearing on mortality rates. Table 3.4 shows the density of population per square kilometer and male to female ratios for the whole population (Kuwaiti or Non-Kuwaiti).

**Table 3.4 ... Population Density in Kuwait (1965 - 1995):**

Census Year	Nationality	Population Per KM.	Ratio Male to Female
		Square	
1965	Kuwaiti	9.5	103.5
1965	Non-Kuwaiti	16.8	204.4
1965	<i>Total</i>	<i>26.3</i>	<i>158.2</i>
1975	Kuwaiti	17.3	98.9
1975	Non-Kuwaiti	38.5	131.9
1975	<i>Total</i>	<i>55.8</i>	<i>120.9</i>
1985	Kuwaiti	26.4	102.5
1985	Non-Kuwaiti	68.9	145.5
1985	<i>Total</i>	<i>95.3</i>	<i>131.9</i>
1995	Kuwaiti	36.8	98.8
1995	Non-Kuwaiti	51.6	177.3
1995	<i>Total</i>	<i>88.4</i>	<i>138.2</i>

**Source: Annual Statistical Abstract (Kuwait 1996, table 9, and p. 25).**

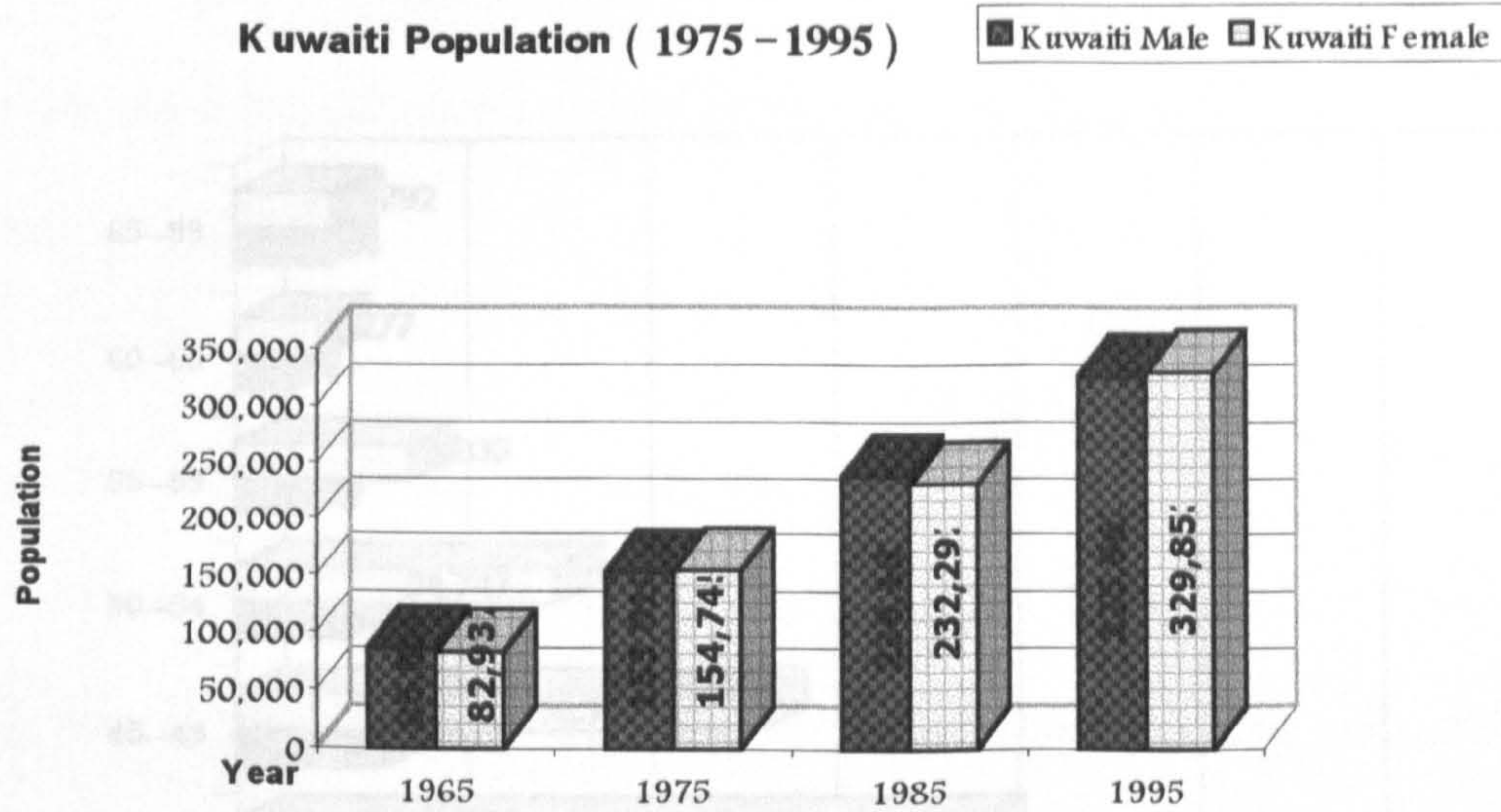
Charts 3.6 and 3.7 display the population of Kuwait (Kuwaiti and Non-Kuwaiti) over the period from 1965 to 1995. The Table and Charts show that the population of Kuwait grew rapidly between 1965 and 1985, but after 1990 due to the Gulf War, the population of Non-Kuwaitis clearly decreased.

Also, the table shows that population density increased sharply between 1965 and 1985. Further, it shows that the share of males in the population (not the workforce) is increasing. Medical care and lifestyle have improved in Kuwait.



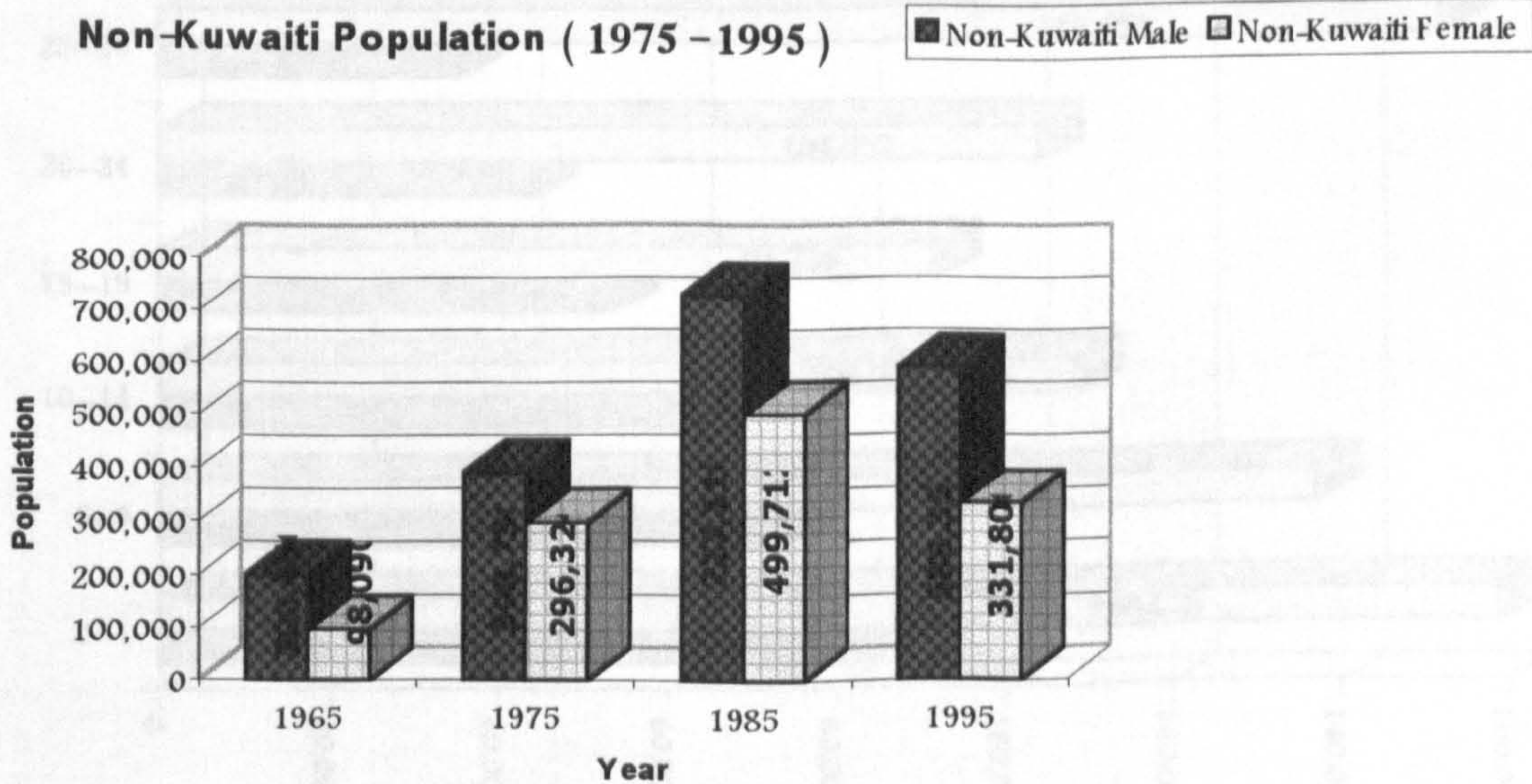
All of the above results of table 3.2 suggest that the Kuwaiti mortality rate may have increased since the 1970's. However, insurers in Kuwait still use the English life table 1967-1970, which they have used since the 1970s.

Chart 3.6...



Source: Annual Statistics Abstract (Kuwait 1996, table 9, and p. 25).

Chart 3.7 ...



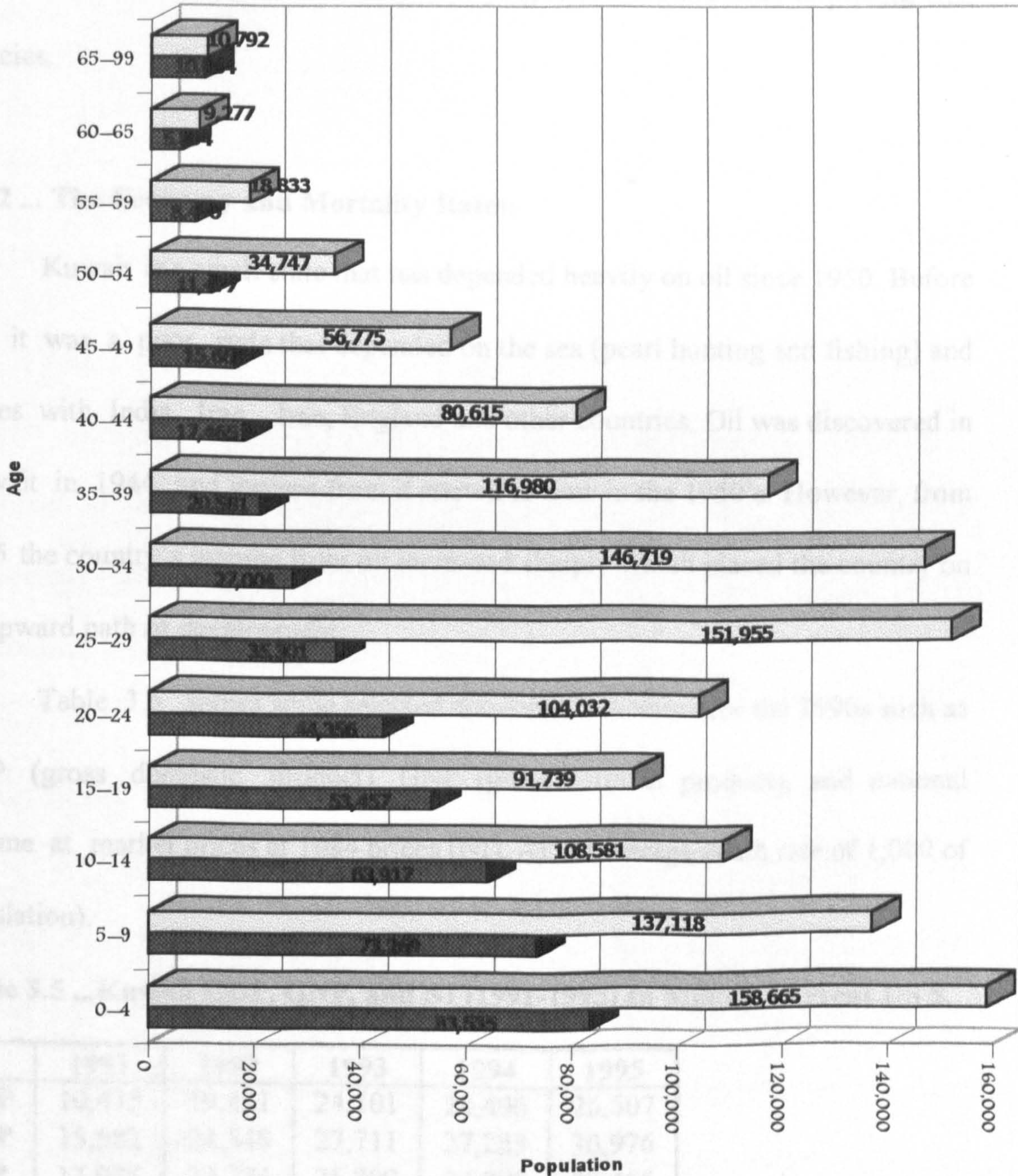
Source: Annual Statistics Abstract (Kuwait 1996, table 9, and p. 25).



Chart 3.8...

Kuwaiti Population Age Category

□ Non-Kuwaiti  
■ Kuwaiti



Source: Annual Statistics Abstract (Kuwait, 1996), Kuwait 1995 Census.



Finally, chart 3.8 shows the age distribution for the Kuwait population based on the 1995 census. The non-Kuwaiti mortality rates suggest that a high number of deaths occur between the ages of 20 and 50. Recall that most GLI insurees are aged between 20 and 50. Insurers therefore have to be wary about the use of standard life tables when they are trying to achieve accuracy in pricing GLI policies.

### 3.3.2 ... The Economy and Mortality Rates:

Kuwait is a small state that has depended heavily on oil since 1950. Before that it was a poor state that depended on the sea (pearl hunting and fishing) and trades with India, Iraq, Iran, England and other countries. Oil was discovered in Kuwait in 1944 and income from it started to flow in the 1950's. However, from 1965 the country's income from oil increased sharply which placed the country on an upward path of development.

Table 3.5 shows some selected economic indicators for the 1990s such as GDP (gross domestic product), GNP (gross national product), and national income at market prices at 1984 prices (NI), ADR (average death rate of 1,000 of population).

**Table 3.5 ...Kuwait GDP, GNP, and NI (1991-1995) In Million Current US \$.**

	1991	1992	1993	1994	1995
<b>GDP</b>	10,435	19,421	24,101	24,496	26,507
<b>GNP</b>	15,582	24,548	27,711	27,253	30,976
<b>NIP</b>	13,925	22,774	25,809	24,898	28,465
<b>ADR</b>	5.2	5.9	4.8	4.5	4.7

Sources: Annual Statistics Abstract (1996, Table 197, p. 233 and Table 37, p. 55).  
Annual Statistics Abstract (1994, Table 36, p. 51).



Table 3.7 ... Education Indicators for Non-Kuwaitis (1980-1988).

Education Level	1980	1985	1988
Illiterate	29.5	24.1	18.5
Literate	20.9	21.3	18.2
Primary	16.0	15.4	17.5
Intermediate	13.2	15.7	20.0
Secondary	11.3	13.0	15.1
College	1.5	2.4	2.5
University	7.6	8.1	8.2
ADR	7.6	5.9	5.4

Sources: Annual Statistics Abstract (1993, Table 14, p. 30 and Table 35, p. 51).

Annual Statistics Abstract (1989, Table 69, p. 87).

Notes: Age of observed population is 10 years and above, and figures are percentage out of the total population.

Tables 3.6 and 3.7 show that the education level of both Kuwaiti and Non-Kuwaiti segments of the population improved between 1980 and 1988. Free provision of education implies that mortality rates for both sections of the population should decrease. We argue that well educated persons take preventative actions that improve their health, for example diet or sports.

### 3.3.4 ... Health Care:

Health services in Kuwait are provided free to citizens and are similar to those in the UK system. The Kuwaiti government funds the Health Ministry to provide services for all individuals living in Kuwait. After the Gulf War, because of the government budget deficit, the Health Ministry budget was reduced. As a result, the Health Ministry started to charge patients for some more expensive medical treatments.



Kuwait had one of the highest incomes per capita in the world. But this has changed over the last few years, especially after the Iraqi invasion. For example<sup>6</sup>, income per capita was \$ 19,840 in 1985, but fell to \$ 12,640 in 1991 just after the invasion, rising to \$ 15,640 in 1993.

Increased affluence should reduce mortality rates and increase life expectancy. El-Mansoury and Makhoulf (1987) showed that Kuwaiti mortality rates decreased during 1980 to 1985 and attributed this to the improvement in the Kuwait economy, health care development, and standard of living.

### 3.3.3 ... Education and Mortality Rates:

The more educated the people are, the lower the mortality rates. Benjamin and Pollard (ibid. p. 416) argue that as the education level in a society increases mortality rates decrease.

In Kuwait, the government offers a free education service for the public from nursery to university. Table 3.6 shows education levels in Kuwait.

**Table 3.6 ... Education Indicators for Kuwaitis (1980 - 1988).**

Education Level	1980	1985	1988
Illiterate	27.1	17.8	15.2
Literate	14.3	11.0	8.7
Primary	24.1	24.7	21.0
Intermediate	19.6	24.3	29.8
Secondary	9.2	11.8	13.1
College	2.4	4.7	5.7
University	3.3	5.7	6.5
ADR	7.6	5.9	5.4

Sources: Annual Statistics Abstract (1993, Table 14, p. 30 and Table 35, p. 51).

Annual Statistics Abstract (1989, Table 69, p. 87).

Notes: Age of observed population is 10 years and above, and figures are percentage out of the total population.

<sup>6</sup> See Appendix 2.2 (Table 24 p. 205, the united nation 1992 report).



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Table 3.8 ... Kuwait Health Care Indicators (1985 - 1995).

	1985	100* 1985	1995	100* 1995
Hospitals	16	0.00094	16	0.00102
GP Centers	62	0.00365	71	0.00451
Dentists	277	0.01632	962	0.06104
Physicians	2,528	0.14894	2,788	0.17691
Other Practitioners	11,137	0.65616	1,616	0.80052
Total Hospitals Beds	6,305	0.37147	4,409	0.27976
ADR	5.9		4.7	

Sources: Annual Statistical Abstract (1996, Tables 293, p. 363).

Annual Statistics Abstract (1993, Table 35, p. 51).

Annual Statistics Abstract (1989, Table 69, p. 87).

Note: \* Means for each 100 of the total population.

Table 3.8 shows some of Kuwait health services figures. Clearly an almost free health care system might negatively affect the demand for health insurance policies, but as charges for health treatment increase, the demand for health insurance should also rise.

At present a health insurance market does not exist but such a market might emerge as medical treatment expenses increase. Improvement in health services may have been expected to reduce mortality rates.

### 3.3.5 ... Housing and Mortality Rates:

The government provides one of the best housing systems in the world for Kuwaitis. All Kuwaiti couples can apply for a house provided by the Housing Ministry as soon as they get married. After about eight to ten years of this application, the Housing Ministry will offer a choice-between the following: a brand new house built on 400 m<sup>2</sup> land or land of 400 m<sup>2</sup> along with a loan of about KD 70,000 with no interest towards the cost of building a house.



Moreover, during the waiting period before the offer of housing, the couples receive a monthly sum of KD 150 towards rent. In addition, if a couple decides to buy a house during the waiting period instead of waiting for the house, the government provides them with a KD 70,000 interest free loan. In this case the couple should be able to get a loan from a bank or make their own investment in order to cover remaining costs. An average house in Kuwait may cost from KD 75,000 to KD 200,000.

The housing system inevitably affects the amount of life insurance demanded by a family earner. The family earner has no need to provide housing expenses for the survivors of the family as government effectively provides this. Thus, the housing program in Kuwait may affect life insurance demand negatively for two reasons:

First, the necessary sum assured is reduced, as mortgages are relatively small. Repayments on government loans are very low. For example, the payment per month is about KD 80 (£ 165) and represents 10 % of the monthly salary for an average Kuwaiti worker with a family.

Second, government-housing loans, unlike bank loans, do not require life cover equal to the loan until the loan is paid off. If the borrower of a government loan (of KD 70,000) dies before paying off the loan, the family repays the loan in installments from the Social Security pension of the borrower. Further, housing loan characteristics are not the same as in the UK where loans are through banks and building societies. Moreover, if a family's only earner died, it is exempted from repaying the loan. This can affect life insurance demand decreasing the



amount of life cover demanded by a family earner. Provision of very generous housing benefits by the government may also reduce Kuwaiti mortality rates.

### 3.3.6 ... The Climate:

Benjamin and Pollard (ibid. p. 415-416) argue that countries with cold weather experience less mortality rates than warm countries. They argue that this is because the populations of warm weather countries are more exposed to viruses and other infections.

In conclusion, there are a number of factors, which might lead us to believe that mortality rates in the UK and Kuwait would differ.

### 3.4 ... The Workforce:

Kuwait is a small state that depends on an immigrant labour force. Table 3.9 and chart 3.9 show that 85 % of the total labour force in Kuwait are Non-Kuwaiti's. The majority of these immigrants are male.

The majority of Non-Kuwaiti workers do not join any social or individual insurance plan either in Kuwait or in their home countries; 87 % of them had no social insurance according to a survey carried out by the author<sup>7</sup>.

The Labour Law of 1965<sup>8</sup> caused an increase in terms GLI policies. It became effective in 1977 when the SSA canceled job injury cover. Although these policies cover premature death risk, they do not cover old age risk since pensions are not provided.

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<sup>7</sup> See Behbehani (1989).

<sup>8</sup> This law is described in details in subsection 2.5.1.

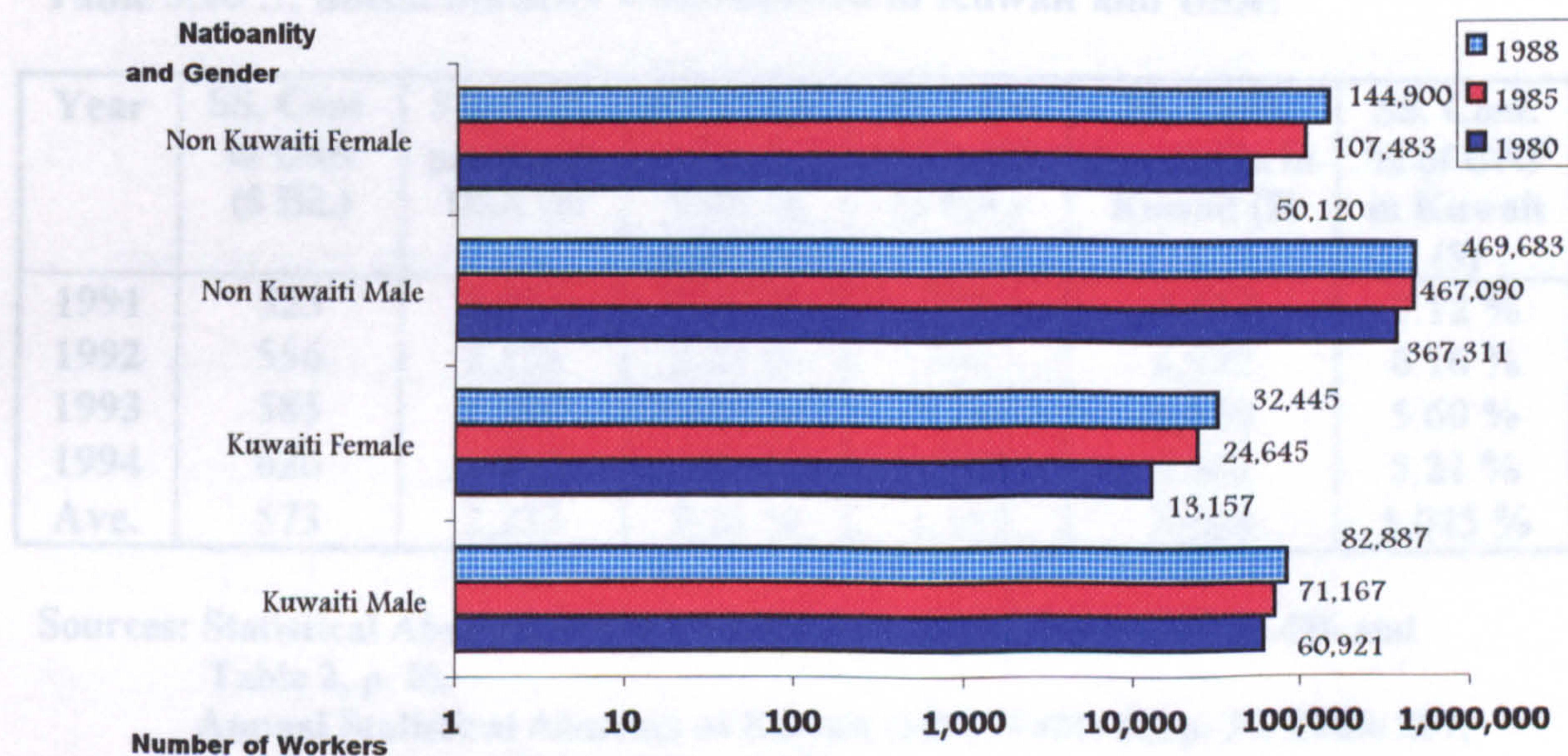


Table 3.9 ... Labour Force Distribution in Kuwait:

YEAR	Kuwaiti Male	Kuwaiti Female	Non - Kuwaiti Male	Non - Kuwaiti Female	Total Workers	Total Population
1980	60,921	13,157	367,311	50,120	491,509	1,357,952
1985	71,167	24,645	467,090	107,483	670,385	1,697,301
1988	82,887	32,445	469,683	144,900	729,915	1,878,000

Source: Annual Statistical Abstract, Kuwait 1993.

Chart 3.9 ... Kuwait Labour Force for the Years (1980, 1985, and 1988).



Source: Annual Statistical Abstract, Kuwait 1993.



### 3.5 ... The Social Security System in Kuwait:

Law No. 61 established the Social Security Association (SSA) in Kuwait in 1977. Only Kuwaitis can be members of this system. The employer makes a monthly contribution equal to 10 % of the monthly salary of each member. Employees contribute 5 % of their monthly salaries.

Table 3.10 compares employers (mostly the government) contribution for the SSS per head of population and as a percentage of GNP in both Kuwait and the USA.

**Table 3.10 ... Social Security Contribution in Kuwait and USA:**

Year	SS. Cont. in USA (\$ Bil.)	SS. Cont. per capita USA (\$)	SS. Cont. % of GNP in USA (\$)	SS. Cont. in Kuwait (\$ Mil.)	SS. Cont. per capita in Kuwait (\$)	SS. Cont. % of GNP in Kuwait (\$)
1991	525	2,081	9.16 %	783	4,168	3.12 %
1992	556	2,178	9.23 %	960	4,932	6.16 %
1993	585	2,269	9.22 %	1,331	6,609	5.69 %
1994	626	2,402	9.30 %	1,392	6,682	5.21 %
Ave.	573	2,233	9.23 %	1,117	5,598	5.045 %

Sources: Statistical Abstract of the United States (1995, Table 705, p. 456 and Table 2, p. 8).

Annual Statistical Abstract of Kuwait (1994, Table 10, p. 25, Table 207, p. 238 - 239, and Table 216, p. 247).

Note: Cont. = Contribution.

Note the lower contributions in Kuwait - suggesting that, if life expectancy were the same in Kuwait as in the US, SS contributions would be too low to provide adequately for old age.



### 3.5.1 ... The benefits:

The system provides cover for old age (retirement pension), disability, sickness and maternity, retirement grants, premature death donation, and loans. The SSS Act No. 61/1976 defined beneficiaries as spouses, children, parents, brothers, and sisters of the member or the member himself. We now briefly describe these benefits:

#### I - Retirement Pension:

Members are eligible for a retirement pension according to the following:

- 1) If a member dies any time after enrolling in the system whether he/she was working or a retiree, beneficiaries will be eligible for a retirement pension.
- 2) A member can receive a retirement pension if he/she reached the retirement requirements (age of 50 and minimum of 25 years of work for males, and age 45 and a minimum of 20 years of work for females).
- 3) The retirement pension is calculated as follows: Let;

“LMS” = Last Monthly Salary.

“RP” = Retirement Monthly Pension.

“KD” = Kuwaiti Dinar Which is equal to = £ 2.23 at current exchange rates<sup>9</sup>.

The Formula applied is,  $RP = (0.65 * LMS)$  for up to the first 20 years of membership +  $(0.02 * LMS)$  for each additional year of membership<sup>10</sup>.

<sup>9</sup> Exchange rate in 3<sup>rd</sup> December 1996.

<sup>10</sup> RP should be no less than 65 % and no more than 95 % of LMS.



4) If the retired member dies, his/her beneficiaries should receive the pension according to the definition of beneficiaries rules mentioned in section 2.6.1.

II - *Disability*: The SSS Act No. 61/76 divides disability into three levels as follows:

1 - *Temporary Disability*: If a member becomes disabled for a short period of time, less than six months with no more than 50 % disability<sup>11</sup>, he/she will receive a full monthly salary during this period from the SSA.

2 - *Full Disability*: If a member has more than 50 % disability, he/she can retire regardless of the number of membership years, receiving 65 % of LMS as a retirement pension.

3 - *Disability because of job injury*: If a member has an accident because of, or during, his/her work and becomes disabled, he/she will be eligible to receive the benefit according to the above rules of temporary or full disability plus an indemnity for the injury.

III - *Sickness and Maternity*: The SSS Act provides members (who have been members for at least 10 years) with a choice of retiring if they became sick because of their type of work. Nevertheless, if a member was sick for a period between 30 and 180 days, the SSA pays the salary if a monthly medical report approves his/her sickness.

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<sup>11</sup> The medical report team is required to estimate a disability percentage for the member.



Moreover, female members can receive maternity benefit, which is a two-month postnatal *maternity leave* with 85 % of LMS. Also, they can choose to have a further four-month's leave at 45 % of LMS. Again there are no maternity expenses as health services are provided free.

IV - *Retirement Grant*: A retiree will be eligible to get a retirement grant. This grant is paid as a lump sum at the day of retiring. The grant is calculated as follows: Let; RG = Retirement Grant.

$$RG = (0.57 * 60 * LMS) + (0.2 * \text{number of months of working after twenty years}^{12} * LMS).$$

V - *Premature Death Grant*: The SSA pays a lump-sum payment of 200 % of LMS at once for the beneficiaries of the member if he/she prematurely dies, to cover funeral expenses.

VI - *Loans*: Loans are available from the SSA only for retirees. After a retiree takes a loan, the SSA deducts a monthly *loan repayment* amount from his/her pension until the loan is repaid or the retiree dies. The maximum amount of loans is set according to a fixed interest rate, age of retiree, and the amount of the retiree's pension. Nevertheless, SSA loans differ from bank loans in two ways. First, the SSA interest rate is lower than the bank's interest rate. Second, if the retiree dies after getting the loan from the SSA, his/her family will not be obliged to pay off the loan at once. The SSA will get the unpaid amount from the pensions

<sup>12</sup> For example, 0.25 for three month of additional membership period.



paid to his/her beneficiaries, and failing that the government pays the remainder of the loan to the SSA.

Al-Houmoud (1979) compared the Kuwaiti SSS with other systems such as those of Libya and the UK. Not surprisingly, the author claimed that Kuwait SSS is more generous than these systems.

### **3.5.2 ... Social Security and Group Life Insurance:**

Given the generous provision in the Kuwaiti SSS, it is not surprising that the demand for life insurance is low. Nevertheless, the continued existence of this generosity is questionable. It is dependent on continued oil revenues and on the ability of the government to meet its current and future SSS obligations. The overall low level of contributions relative to GDP suggests that this may be the case. In consequence, we think that insurers should plan to offer group pension policies as an alternative "safety net".

### **3.6 ... Conclusions:**

This Chapter described the insurance and life insurance market in Kuwait, and the problems facing the life insurance industry. It also explained the SSS in Kuwait. The following are our conclusions:

- 1) Life insurance market in Kuwait is immature. Group life insurance policies represent three-quarter the life insurance market on average between 1974 and 1995. Life insurance premium decreased and the amount of sum assured increased between 1974 and 1995.



- 2) Labour force in Kuwait had increased between 1980 and 1988. During this period, female workers increased from 12.9 % to 24.3 % (almost doubled).
- 3) The chapter studied the factors that affect on mortality rates with respect to Kuwait. The relation ship between mortality rates and population density, gender, the economy, education, health care, housing, and climate was discussed.
- 4) Workforce and the Social Security System in Kuwait were explained briefly. The chapter focused on the benefits and its calculations. The aim was to relate Social Security System to GLI in Kuwait.



## Chapter 4

### *Mortality Rates in Kuwait*

#### **4.1 ... Introduction:**

The used life tables by Kuwaiti insurers are not based on any Kuwaiti mortality rates. This is because of several reasons. First, to construct a Kuwaiti life table, a large data for a long period of time is required. This is not available. Second, assuming a Kuwaiti life table was constructed, it would be risky to use it in pricing at least for the first years as no previous experience applies.

The efficiency of applying the English life table 1967-1970 to the GLI market is examined in this chapter. The chapter introduces estimated mortality rates for Kuwait based on the SSS data. The chapter aims at comparing estimated mortality rates from the SSS, a sample of GLI insurees, the El-Mansoury study, and some English and American life tables<sup>1</sup>.

This comparison is expected to prove that the life table used in pricing GLI policies in Kuwait is inefficient. The main objective is to find the most efficient life table that GLI insurers should use in the Kuwaiti market.

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<sup>1</sup> See Appendixes 4.1 and 4.2.



#### 4.2 ... Life Expectancy:

Marshall (1993, p. 124) defines mortality rates as “*the chance of dying at a specified age*”. The author (ibid.) argues that “*a mortality table shows the number of persons living and the number of persons dying at that age for each age. The mortality rate can be calculated by dividing the number dying by the number living*”. Life expectancy is the estimated age at death for a life based on others’ previous death experience at certain age.

El-Mansoury et al, (1991) estimated the mortality rates for the population of Kuwait through a sample of ILI insurees from June 1985 to June 1989. Their results appear in Table 4.1.

**Table 4.1 ... Expected Deaths Comparison between Kuwait, USA, and UK:**

Age Group	Exposed to Risk <sup>2</sup>	Actual Deaths by El-Mansoury	Estimated Deaths per 1,000 by El-Mansoury	Expected Deaths per 1,000 by CSO 58	Expected Deaths per 1,000 by 24-29
20 – 24	7,245	15	14.9	13.47	26.90
25 – 29	7,455	15	15.66	14.91	30.22
30 – 34	11,295	25	28.31	25.27	54.23
35 – 39	13,815	45	53.07	39.23	83.21
40 – 44	12,795	88	83.69	53.74	97.32
45 – 49	9,195	92	91.88	59.03	89.89
50 – 54	8,325	125	118.49	83.58	116.43
55 – 59	3,495	73	70.8	54.76	71.01
60 – 65	1,620	75	57.14	41.65	52.48

Source: El-Mansoury et al, (1991, p. 8).

Note: Expected deaths by the life tables CSO 58 and 24-29 is calculated through multiplying the average mortality rate for the age group by the number of exposed to risk for the same age group. For example 26.90 in the last column is calculated using the English life table 24-29 (see appendix 2.1 in page 134) as follows:

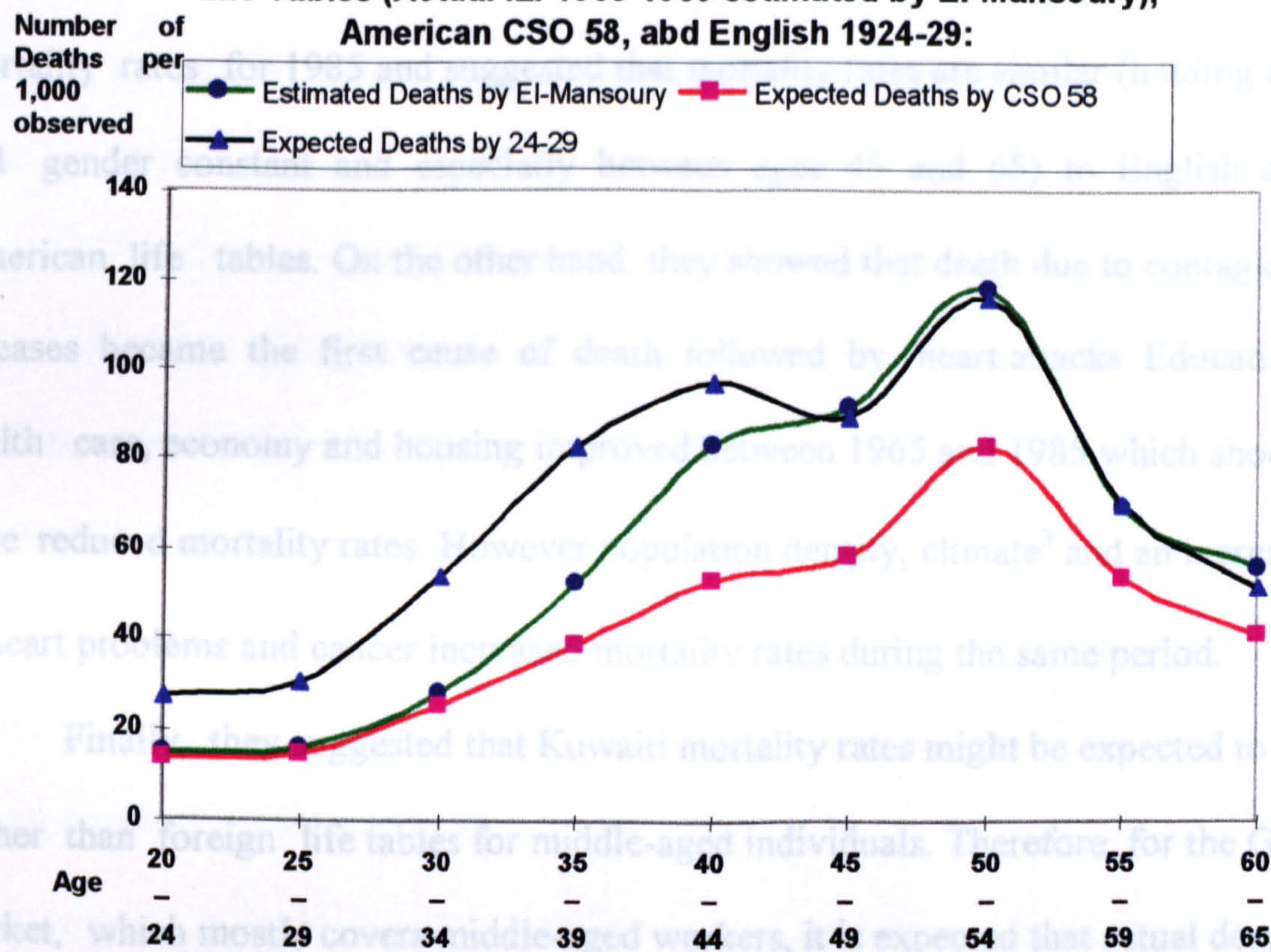
$$\text{Expected Deaths Per 1000} = q_x^{24} \times \text{Exposed to Risk}$$

$$26.90 = 0.003713 \times 7,245$$

<sup>2</sup> The number of observed lives by El-Mansoury et al, (1991).



**Chart 4.0 ... Expected Deaths in the Kuwaiti ILI Market based on Life Tables (Actual ILI 1985-1989 estimated by El-Mansoury), American CSO 58, and English 1924-29:**



Source: El-Mansoury et al, (1991, p. 7), Neill (1977), Bowers et al, (1986).

Table 4.1 and Chart 4.0 show estimated deaths in a sample of ILI policies using three sources of mortality rates (Kuwait ILI sample estimated mortality rates, American life table CSO 1958, and the English life table 1924-29). They show that mortality rates in Kuwait are higher than predicted by UK and US life tables. But in practice, insurers in Kuwait use UK or US life tables for both ILI and GLI pricing. This has resulted in a gap between estimated and actual deaths in the ILI market as the authors (ibid.) found. However, researchers have not previously considered the implications of using foreign life tables for GLI pricing.

Further, El-Mansoury and Makhoulf (1987) in their study of Kuwaiti mortality found that there were a large number of deaths of middle-aged



individuals caused by heart problems and cancer. They showed that mortality rates dropped between 1965 and 1985. They also estimated Kuwaiti male and female mortality rates for 1985 and suggested that mortality rates are similar (holding age and gender constant and especially between ages 45 and 65) to English and American life tables. On the other hand, they showed that death due to contagious diseases became the first cause of death followed by heart attacks. Education, health care, economy and housing improved between 1965 and 1985 which should have reduced mortality rates. However population density, climate<sup>3</sup> and an increase in heart problems and cancer increased mortality rates during the same period.

Finally, they suggested that Kuwaiti mortality rates might be expected to be higher than foreign life tables for middle-aged individuals. Therefore, for the GLI market, which mostly covers middle-aged workers, it is expected that actual deaths will be higher than expected using foreign life tables.

#### **4.3 ... GLI Mortality Rates and the Problem:**

I have hypothesized that the Kuwaiti GLI market suffers from inaccurate estimation of insurees' mortality rates. In Kuwait, insurers use the English life table 1967-1970 to estimate the probability of death for group insurees. Insurers may suffer losses if mortality rates in Kuwait are higher than implied by this table.

I therefore now compare actual mortality rates in both the GLI market and the SSS with the English life table 1967-1970. In addition, past studies of mortality rates in Kuwait are discussed.

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<sup>3</sup> An unstable weather may cause an increase in diseases that may affect mortality rates.



#### 4.3.1 ... The Required Data:

The required data is a sample of GLI insurees' information on age, and age at death during the period of observation. A similar data set should be collected from the SSS for comparison. There is a better chance to collect data from all SSS members.

Most life tables are based on at least four year's observations (such as the English tables during the periods 1924-1929 or 1967-1970). Therefore, we have selected a similar four-year period (1992-1995).

The sample of GLI insurees does include information on insuree's age, premiums, and sum assured. Similar data can be collected from SSS for the same period, however it covers only Kuwaiti workers.

#### 4.3.2 ... The Data From KIC:

Kuwait Insurance Company, KIC, is one of the main data sources for this research. The data collected from KIC represents a sample of group term life insurance policies of the Kuwaiti GLI market. The data covers 12 policies including 6412 insurees amongst whom there were 64 deaths between 1992 and 1995. The following subsections explain the reported data, the characteristics of the group policy, the insuree's information; the period of investigation and the underwriting process.

#### 4.3.3 ... The Policy, Coverage, and Underwriting:

The policy does not require a medical examination. Further, underwriters do not discriminate on the basis of gender or nationality. Therefore, the insuree's



data do not include health status, gender, or nationality. This information, however, is available for insurees when death occurs.

Underwriters allocate members to low and high-risk categories based on their job title. An employee who works outdoors is classed as high-risk; otherwise he/she is classed as a low-risk individual.

The underwriter's source of information about the insuree's job title is the employers. Employers submit the number of employees who work in the office and the numbers who work in the field. The insurer's database of the group insurees, however, does not show-together insuree's name, job title and salary (a factor bearing on the sum assured, which equals three years' salary) along with the employee's risk class<sup>4</sup>. Appendix 4.3 shows a sample from the KIC database of the group insurees, which is also discussed in section 4.3.4.

#### **4.3.4 ... Period Of Investigation:**

The period of investigation for the group sample policies is from 1<sup>st</sup> January 1992 to 31<sup>st</sup> December 1995. The observed insurees held the policies during these four years. All of the insurees who left the group for reasons other than death (such as quitting their jobs or retiring) were omitted from this study.

#### **4.3.5 ... The Observed Insurees:**

The following is the information available about each of the 6412 observed insurees (also see appendix 4.2):

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<sup>4</sup> Whether or not the employee works in the office.



- 1) *Age*: The age of the insuree is calculated using the nearest birthday method (as an age approximation method).
- 2) *Monthly Salary*: The monthly salary for each insuree in Kuwaiti Dinar. It remained the same during the period of investigation.
- 3) *Sum Assured*: Each insuree cover equaled 36 times his/her monthly salary.
- 4) *Risk Class*: Low or high-risk insurees.
- 5) *The Annual Premium*: Appendix 4.4 shows the annual premiums for one year's term life cover. Recall that the policy has other coverage (accidents and job injury). However, the insurer provides information on the part of the total premium paid by each insuree for term life cover only.

Further, the data on the 64 deaths that occurred during the period of investigation include additional information over and above the 5 terms stated above which are:

- 1) *Gender*: The sex of the insuree is only available when a death claim is submitted. Underwriters do not ask for insuree's gender in the insurance application. As mentioned above, insurers assume that all members of GLI policies are male.
- 2) *Nationality*: Insuree's nationality is specified in the death certificate.
- 3) *Age at Death*: Insuree's exact age at death is available.
- 4) *Death reason and location*: The death certificate submitted by the insuree's beneficiaries specifies the cause of the death and the place where the person died.



#### 4.3.6 ... The Social Security Association (SSA):

From the Social Security Association (SSA) five annual publications were collected, covering the years 1992 to 1995. The motive was to estimate mortality rates for Kuwaiti workers aged 20 to 60 using real life data. The annual book of the SSS covers all Kuwaiti members joining the SSS. The collected annual volumes gives information on the number of workers; members' salaries; contributions; pensions paid to retirees with their relative age; and number of deaths during the five years of observation. These data are used to estimate mortality rates for Kuwaiti males during the period.

#### 4.3.7 ... Data Problems:

In Kuwait, as a small country with a limited number of insurance companies, competition between insurers results in a reluctance to release information and data on life insurance policies. However, in spite of these difficulties we have collected detailed information from two major life insurers in Kuwait, KIC and GIC. KIC gave access to GLI and ILI policies, and GIC gave access to ILI policies. We faced difficulties in the data and information collected from the public sector. Nevertheless, we eventually managed to collect the required data from the public authorities. These authorities are the Department of Insurance at the Ministry of Commerce, the Social Security Association (SSA), and the Ministry of Planning.

Major problems occurred because of the Gulf War (1991). During the seven months (2<sup>nd</sup> August 1990 to 26<sup>th</sup> February 1991) of the Iraqi occupation of Kuwait,



the Iraqi army used all of the government buildings, and most of Insurance companies' buildings, for military campaigns. Therefore, many files for bookkeeping, and databases in the computer mainframes, were lost.

Insurance companies combined the years 1990 and 1991 in one financial report. The same problem also occurred with the Annual Statistical Abstracts and the Department of Insurance in the Ministry of Commerce in their reports for the year 1991. They combined the years 1990 and 1991.

Due to possible unreliability, these data were ignored. Hence, the data collected for hypothesis testing were based on the years after 1991 to avoid inaccuracies.

Further, the age interval in the SSA data was adjusted from 10 to 5 years using the graphic graduation method. Benjamin and Pollard (1970, p. 254) explain this method as graphical graduation of rates of decrement. They argue "*rates of decrement are calculated from the available data and represented graphically by points. A smooth curve, its shape suggested by the lie of points, is drawn to pass as near to these points as possible while still providing a reasonable progression of rates, and smoothed decrements are read from the curve*".

Finally, the currency used in Kuwait is the Kuwaiti Dinar (KD).

#### 4.4 ... Life Table Efficiency:

In this section, Kuwaiti mortality rates are first estimated using real life data from the SSA and then compared with mortality rates of a sample of group term life insurees' death claims based on American and English life tables. The



discrepancy between the actual and expected deaths gives a measure of the efficiency of particular life table in the Kuwaiti GLI market.

In earlier studies, El-Mansoury et al. (1991) developed a method for estimating mortality rates for Kuwaitis based on ILI mortality. Their study covers the four-year period from 1/7/85 to 30/6/89 and the ages observed were between 20 and 75. Mortality rates were graduated using the Kernel method<sup>5</sup>. The data covers 583 deaths out of 75,615 observed insurees, Kuwaitis and Non-Kuwaitis, over a five-year interval.

Table 4.1 and Chart 4.2 show that mortality rates of the ILI sample of insurees were higher than those given by the other life tables between ages 35 and 65.

El-Mansoury et al. (1991) indicates possible evidence of adverse selection and/or moral hazard in the ILI (aged 35 to 65) market in Kuwait. They argue that as the actual death claims exceed the expected, adverse selection and/or moral hazard may occur. However, other causes may be the reason such as hidden information or misclassification.

The use of unsuitable life tables by the underwriters suggests the possibility of miscalculating (causing losses) by underwriters, rather than adverse selection by insurees. As discussed in chapter 2, underwriters may be aware of the use of inefficient estimation of mortality rates. However, attempts to increase sales and underwriters' commissions based on incorrect information may be interpreted as a

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<sup>5</sup> El Mansoury and Morgan (1987) suggested that the Kernel method of graduation is an excellent non-parametric method to graduate mortality rates, especially when data is missing.



principal-agent problem causing adverse selection in the GLI market. This suggests a need for a test of life table efficiency for GLI markets.

#### 4.4.1 ... Methodology:

Mortality rates are estimated for Kuwaiti male population for the period 31st Jan 1991 to 31<sup>st</sup> Dec 1995 using data from the SSA. Then the estimated mortality rates of the SSA data are compared with GLI insurees' actual deaths. The comparison is expected to be realistic as the ages of workers (members) are between 20 and 60 in both schemes. Furthermore, the age categories are the same as in the El-Mansoury et al. (1991) study to permit comparisons with GLI insurees' actual deaths and SSA estimated mortality rates.

The crude mortality rates of Kuwaiti males is first measured, and then graduated. These are computed by dividing actual deaths by the number of observed individuals. Usually the crude data would not be smoothed, but life tables are usually smoothed since samples are likely to be more "lumpy" than the underlying population.

Graduation (or smoothing) is defined by Cockerell (1987, p. 100) as "*the adjustment of crude data in a statistical table to produce smooth functions*". However, it is important to distinguish between smooth curves and graduation. King (1987, p. 114) argues that "*What is the real object of graduation? Many would reply, 'to get a smooth curve'; but that is not quite correct. The reply should be, 'to get the most probable deaths'*".



Kimeldorf and Jones (1967, p. 126) also argue “*We view graduation not merely as smoothing, but as the more general process of estimating the true rates which actually prevail in the population*”.

There are several methods of graduation. Among the best known are the graphical method, the finite principal method, and curve-fitting method. The authors also suggested another method that is known as “graduation by reference to a standard table”. This is applied when the data are sparse. The graduated mortality rates are developed using an existing life table as a reference. This method is discussed and applied in the following section.

#### 4.4.2 ... Graduation by reference to a standard table:

Here we introduce the graduation method by reference to a standard table. We graduate both the SSS data and the GLI data with reference to the English life table 1924-29. As chart 4.3 shows, this table is closer to the actual Kuwaiti mortality rates than the English 1967-70 table and both the US tables.

The raw data used are on the following variables:

- $N_i$  The number of observed individuals in age group  $i$ .
- $A_i$  The number of actual deaths in age group  $i$  (in either the SSS or GLI data).
- $q_i^E$  The mortality rate for age group  $i$  from the English life table 1924-29.

From these variables, we may derive:

$E_i = q_i^E \times N_i$ , The expected deaths according to the reference life table.

$q_i^A = \frac{A_i}{N_i}$ , The actual mortality rate for age group  $i$ .



We then perform the Ordinary Least Square regression:

$$A_i = a + bE_i + e_i, i = 1, 2, \dots, 9$$

From this equation, the predicted number of deaths in each group is the predicted value of  $A_i$ , which we denote as  $G_i$ :

We then obtain the *graduation* mortality rates as

$$q_i^G = \frac{G_i}{N_i}$$

Thus the chosen method of graduation achieves mortality rates that the linear transformation of the reference table that fits best to the actual rates. In effect the English table is adjusted to correct for any differential (linear) tendency for Kuwaiti mortality rates to rise or fall as age increases. The method guarantees that the sum over all groups of deaths expected given the graduated rates is the sum of actual deaths, as required for the chi-square goodness-of-fit test performed later.



## 4.4.3 ... The Results:

The results for the SSS data are as follows:

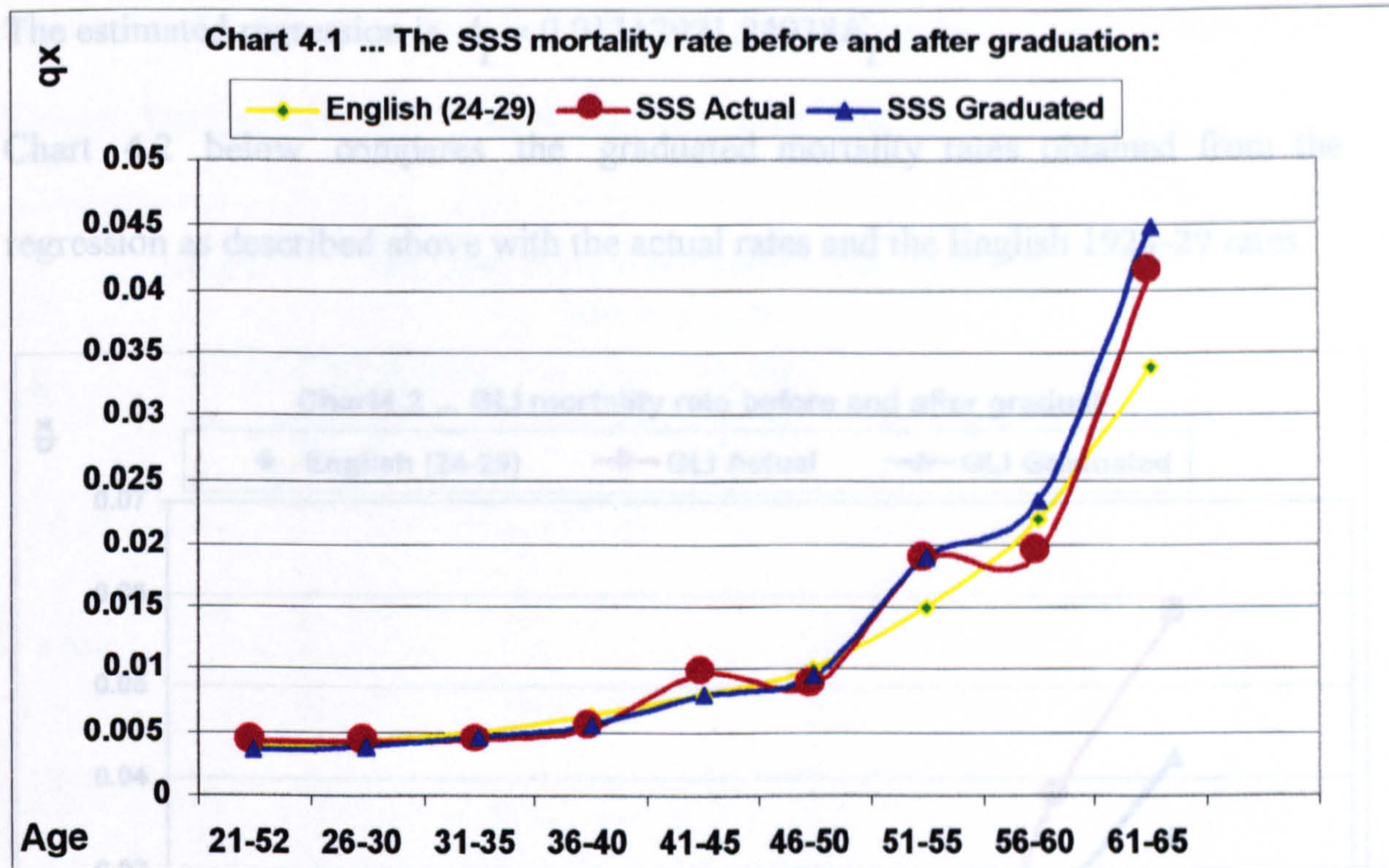
Table 4.2 ... SSS data for regression and results

$i$	Age	$N_i$	$A_i$	$q_i^E$	$E_i$	$q_i^A$	$q_i^G$	$G_i$
1	21-52	11998	49	0.0038	45.5924	0.0041	0.0036	44.23682
2	26-30	14664	63	0.0041	60.1224	0.0042	0.0038	56.01688
3	31-35	11809	52	0.0050	59.0450	0.0044	0.0046	55.14339
4	36-40	12794	68	0.0063	80.6022	0.0053	0.0056	72.62069
5	41-45	4883	47	0.0080	39.0640	0.0096	0.0079	38.94398
6	46-50	5290	46	0.0100	52.9000	0.0087	0.0094	50.16139
7	51-55	1011	19	0.0151	15.2661	0.0188	0.0189	19.65005
8	56-60	1187	23	0.0219	25.9953	0.0194	0.0234	28.34865
9	61-65	387	16	0.0338	13.0806	0.0413	0.0449	17.87817
<b>Total</b>			<b>383</b>		<b>391.6680</b>			<b>383</b>

The estimated regression is  $A_i = 7.273195 + 0.810741E_i$

Chart 4.1 below compares the graduated mortality rates obtained from the regression as described above with the actual rates and the English 1924-29 rates.





The results for the GLI data are as follows:

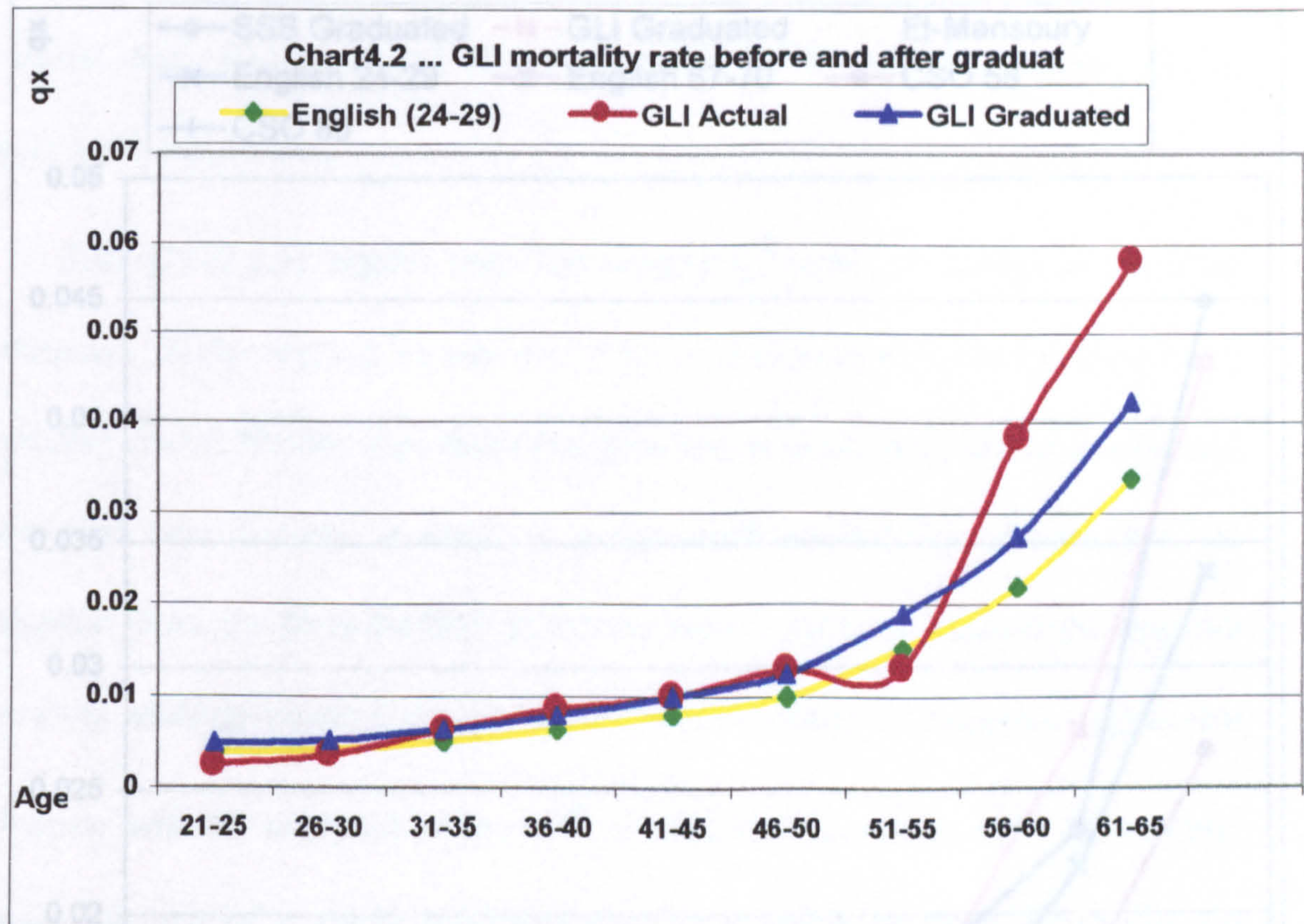
Table 4.3 ... GLI data for regression and results

i	Age	$N_i$	$A_i$	$q_i^E$	$E_i$	$q_i^A$	$q_i^G$
1	21-25	417	1	0.0038	1.5846	0.0024	0.0048
2	26-30	866	3	0.0041	3.5506	0.0035	0.0051
3	31-35	1112	7	0.0050	5.5600	0.0063	0.0063
4	36-40	1274	11	0.0063	8.0262	0.0086	0.0079
5	41-45	1198	12	0.0080	9.5840	0.0100	0.0100
6	46-50	777	10	0.0100	7.7700	0.0129	0.0125
7	51-55	463	6	0.0151	6.9913	0.0130	0.0189
8	56-60	183	7	0.0219	4.0077	0.0383	0.0274
9	61-65	120	7	0.0338	4.0560	0.0583	0.0423
<b>Total</b>			64		51.1304		



The estimated regression is  $A_i = 0.01312921.24938E_i$

Chart 4.2 below compares the graduated mortality rates obtained from the regression as described above with the actual rates and the English 1924-29 rates.

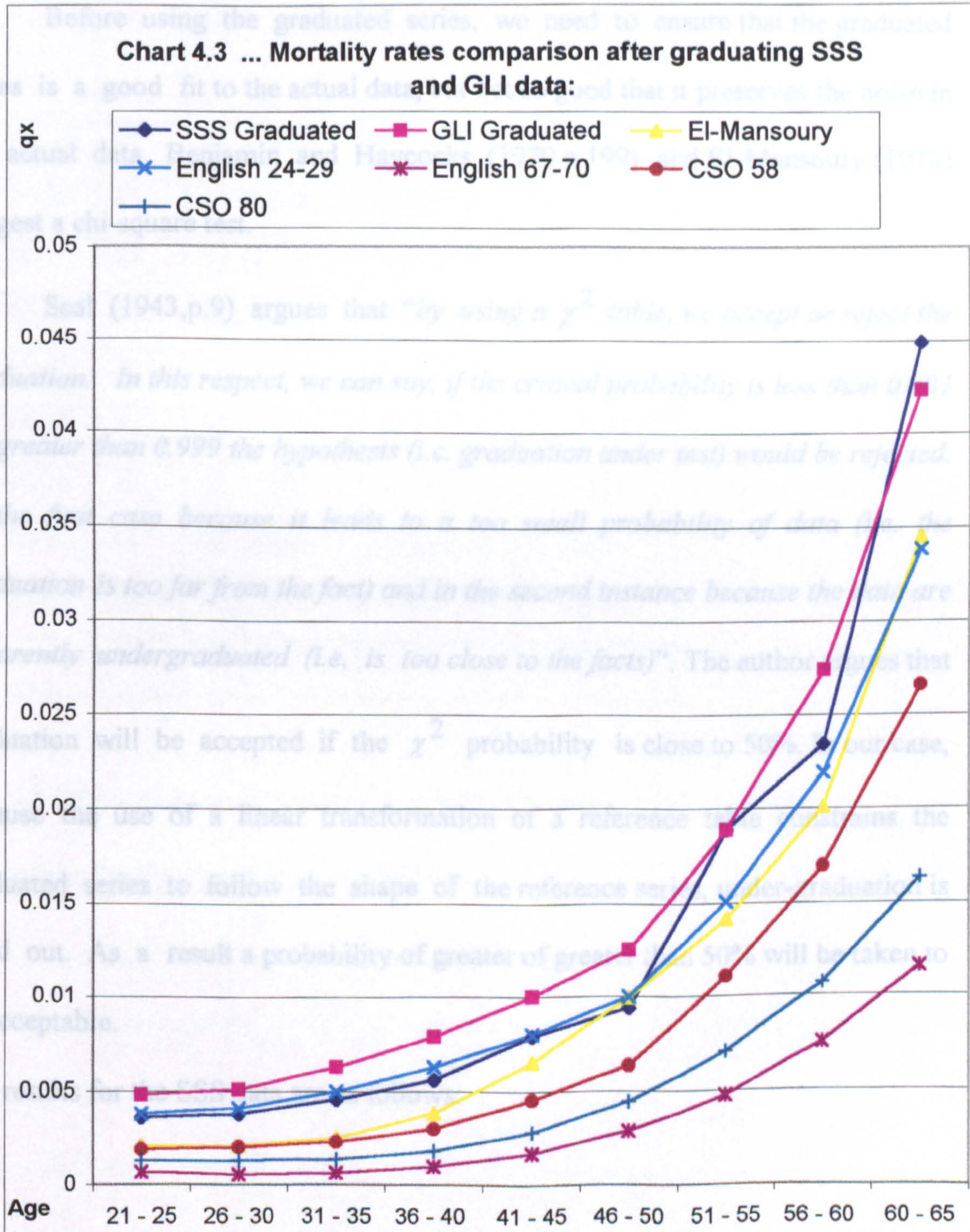


Further, Chart 4.3 compares the graduated SSS and GLI rates obtained above with:

- The English life table 1924-29-the reference table used for the graduation.
- The English life table 1967-70 actually used by insurers in Kuwait.
- The American CSO58 and CSO80 tables.
- EI-Mansoury's table.



This shows that the English 1924-29 rates are closer to the graduated Kuwait series than either the American rates or the later English rates actually used by insurers in Kuwait. The English 1967-70 rates are much lower than Kuwaiti rates.





#### 4.4.4 ... Testing the results:

Before using the graduated series, we need to ensure that the graduated series is a good fit to the actual data, but not so good that it preserves the noise in the actual data. Benjamin and Haycocks (1970.p.199) and El-Mansoury (1978) suggest a chi-square test.

Seal (1943,p.9) argues that *“by using a  $\chi^2$  table, we accept or reject the graduation. In this respect, we can say, if the critical probability is less than 0.001 or greater than 0.999 the hypothesis (i.e. graduation under test) would be rejected. In the first case because it leads to a too small probability of data (i.e. the graduation is too far from the fact) and in the second instance because the data are apparently undergraduated (i.e. is too close to the facts)”*. The author argues that graduation will be accepted if the  $\chi^2$  probability is close to 50%. In our case, because the use of a linear transformation of a reference table constrains the graduated series to follow the shape of the reference series, under-graduation is ruled out. As a result a probability of greater of greater than 50% will be taken to be acceptable.

The results for the SSS data are as follows:



Table 4.4... Chi-squared test on SSS data:

$i$	Age	$A_i$	$G_i$	$A_i - G_i$	$\frac{(A_i - G_i)^2}{G_i}$
1	21-25	49	44.23682	4.763184	0.51287
2	26-30	63	56.01688	6.983120	0.87052
3	31-35	52	55.14339	-3.143390	0.17918
4	36-40	68	72.62069	-4.62069	0.29400
5	41-45	47	38.94398	8.056025	1.66648
6	46-50	46	50.16139	-4.161390	0.34523
7	51-55	19	19.65005	-0.650050	0.02150
8	56-60	23	28.34865	-5.348650	1.00915
9	61-65	16	17.87817	-1.878170	0.19731
total		383	383		5.09626

For  $\chi^2$  with 8 degrees of freedom,  $P = 0.75$ . The graduation is accepted.

The results for the GLI data are as follows:



Table 4.5... Chi-squared test on GLI data:

$i$	Age	$A_i$	$G_i$	$A_i - G_i$	$\frac{(A_i - G_i)^2}{G_i}$
1-3	21-35	11	13.40194	-2.40194	0.82896
4	36-40	11	10.04096	0.959038	0.09160
5	41-45	12	11.98725	0.012755	0.00001
6	46-50	10	9.720871	0.279129	0.00802
7	51-55	6	8.747979	-2.74798	0.86322
8	56-60	7	5.02033	1.97967	0.78064
9	61-65	7	5.080675	1.919325	0.72506
Total		64	64		3.297510.

The first three age groups have been aggregated so that the actual number of deaths is greater than 5, in accordance with the usual requirement for validity of the test.

For  $\chi^2$  with 6 degrees of freedom,  $P = 0.77$ . The graduation is accepted.

#### 4.5 ... Life Table Model:

A model is developed here to prove that the English life table 1924-29 is the efficient<sup>6</sup> life table for this market using the data available from KIC' GLI sector. It examines the efficiency of using American life tables, English, or other estimated Kuwaiti mortality rates in pricing GLI policies in Kuwait.

<sup>6</sup>We mean by efficiency that using this table would result a close correspondence between actual and expected deaths, and allow the insurer to get normal profits from changing premiums according to standard formulas.



The model is also based on methods of calculating the GLI premiums and on the concept of an “actuarially fair premium”.

$$P = \sum_{x=0}^{\infty} x \cdot f(x) \quad (4.7)$$

Where;

$x$  = The amount of coverage,

$f(x)$  = The probability of loss,

$P$  = the fair premium.

In terms of life insurance,  $x$  represents the face amount of a policy, and

$f(x)$  represents known mortality rates ( $q_x$ ).

We now develop a model to find the optimal life table for the Kuwait GLI market.

#### 4.5.1 ... Assumptions:

The assumptions are:

- 1) Insurers collect premiums at the beginning of each year.
- 2) The discount rate used in the calculations is 6 % per annum<sup>7</sup>.
- 3) The period of study is from 1<sup>st</sup> January 1992 to 1<sup>st</sup> January 1996.
- 4) It is assumed that there is no misinformation or misclassification. We therefore presume that using an inefficient life table is the only cause of insurers' loss.



The model aims to find a life table that will achieve the least difference between actual and expected death incidents in KIC' GLI sector. At the same time, it is a requirement that actual deaths should not exceed the expected. The optimal life table that will be suggested should help insurers to achieve a normal profit. A table that breaks even actual and expected death incidents may not be the optimal one.

First, we explain the notation used:

$EC$  (CSO58 or CSO 80 or E 67-70 or E 24-29 or ELM 85-90, or SSS 91-95) = the expected claims for a life age  $x$  using a certain life table, where:

CSO 58 = The American 1958 CSO life table.

CSO 80 = The American 1980 CSO life table.

E 67-70 = The English male life table for 1967-70.

ELM 85 - 90 = El-Mansoury et al, (1991) estimated mortality rates for individual insurees in Kuwait during the years 1985 to 1990.

SSS 91-95 = estimated male mortality rates from the Social Security Association for the years 1991 to 1995.

E 24-29 = The English life table for 1924-1929.

$PVEC_x$  = The present value of expected future claims during the observed four years discounted to the beginning of the study.

$PVAC_x$  = The present value of actual claims during the period of the study for someone aged  $x$ .

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<sup>7</sup>The discount rates chosen according to the suggestion of life insurance underwriters in KIC and GIC.



If actual claims equal expected claims, *by definition* an “actuarial fair premium”, as estimated from the life-table on which the expectations are based, will allow the insurer to “break even”.

The following equations are used to apply the model based on equation (4.7) with an efficient life table:

$$\sum_{x=0}^{\infty} PVEC_x = \sum_{x=0}^{\infty} PVAC_x \quad (4.8)$$

and

$$\sum_{x=20}^{60} PVAC_x = \sum_{x=20}^{60} EC_x \times a_n = \sum_{x=20}^{60} q_x^E \times SumAssured \times a_n \quad (4.9)$$

where, 
$$a_n = \frac{1-v^n}{i} \quad (4.10)$$

and 
$$v = \frac{1}{1+i} \quad (4.11)$$

$PVEC$  = The present value of expected claims.

$AC$  = Actual Claims.

$EC$  = Expected Claims.

And  $i = 0.06$  per annum<sup>8</sup>.

Underwriters use equation 4.9 to calculate the actuarial fair premium that is (for each age group) the net single premium where no loss or profit is expected.

<sup>8</sup> 6 % per annum is assumed to be the average rate for the period between 1992 and 1996. The source is the Annual Statistical Abstracts for the year 1996.



Underwriters must find the life table that satisfies equation 4.8. Here we examine several life tables and apply equation 4.8 to KIC' GLI data to find such a life table.

#### 4.5.2 ... Applying the Model:

In applying equations 4.8 and 4.9 to KIC's GLI data, there was a need to adjust equation 4.9. From the KIC's observed GLI policies we had the data, which included 6412 lives that were insured during the four years of investigation. Sixty-four of them died during this period (from 1<sup>st</sup> January 1992 to 1<sup>st</sup> January 1996). Therefore, the unpaid premiums by the 64 insureds who left the observed group policies at different times should be included in equation 4.9.

Accordingly, the following equation is applied rather than equation 4.9:

$$\sum_{x=20}^{60} PVEC_x = \left( \sum_{x=20}^{60} EC_x \times \sum_{n=0}^4 a_n \right) - \left( \sum_{x=20}^{60} EC_x \times a_s \right) \quad (4.12)$$

Where,  $s$  = years not belonging to the group after death, and  $n = 4$  years, which represents the period of investigation. Premiums are paid at the beginning of each year.

The sum of actual claims paid by KIC for the observed group policies during the period of investigation was:

$$\sum AC = KD879,000 \quad \dots$$

Also, applying equation 4.10 where  $n = 4$  years and  $i = 6\%$  per annum, the following results are obtained:



$$v^n = \left( \frac{1}{1+i} \right)^n = \left( \frac{1}{1.06} \right)^4 = (0.7921).$$

$$a_n = \frac{1-v^n}{i} = \frac{1-0.7921}{0.06} = 3.465.$$

The sum of present values of expected claims to be paid to the observed GLI insureds in KIC<sup>9</sup> is calculated by applying equation 4.12:

$$\sum PVEC_x = (686,000) - (7,500) = \text{KD } 678,500.$$

It appears that  $\sum PVP_x < {}^{10}\sum AC$ , indicating that actual claims exceed expected claims. This is an example of how the use of an inefficient life table in these circumstances will result in a loss.

4.5.3

#### 4.5.4 ... Applying Other Life Tables and Results:

In this subsection, we apply the methodology from 4.5.3 using various life tables to find the most efficient ones. Using KIC's GLI sample data on the American life tables CSO 58 and CSO 80, ELM 85-90, the English life tables 24-29 and 67-70, and the estimated SSS 91-95 mortality rates developed and graduated in chapter 4 gives the results shown in table 4.4.

<sup>9</sup> So,  $q_x$  is determined from the English male life table 67-70.

<sup>10</sup> Discounting the  $AC$  to the beginning of the period of the study (1/1/1992, and using  $v^n$  at 6 % discount rate) will not change the above results as the discounted claims would be equal to KD 784,433.00.



Table 4.6 ... Results of applying model 4.5:

Life Table	PVEC <sub>x</sub>	PVEC <sub>x</sub> Unpaid <sup>11</sup>	Net <sup>12</sup> PVEC <sub>x</sub>	Acx - EC	Total Premium <sup>13</sup>	Accumul- ated Profit % of collected premium	Profit per annum % of collected premium
English 67-70	686.4	7.2	679.2	- 200.1	720.7	- 21.99 %	- 5 %
CSO 80	881.7	8.3	873.4	- 5.8	925.8	5.02 %	1.3 %
CSO 58	1,182.5	13.2	1,169.3	290.1	1,241.7	29.18 %	6.6 %
English 24-29	1,357.1	12.4	1,344.7	465.5	1,424.9	38.29 %	8.7 %
ELM 85- 90	1,830.2	16.5	1,813.7	934.4	1,921.7	54.24 %	11.5 %
SSS 91-95	2,886.6	26.4	2,860.2	1,980.9	3,030.9	70.98 %	14.1 %

Note: ACx = KD 879,282.00.

- All results are in KD (1,000), and the calculations have been made with the SPSS Package.
- The average profits represent the accumulated profits during the period of four years.
- The accumulated profits are calculated over four years.
- The accumulated profit of 38.29 % per 4 years equals about 8.7 % per annum.

In table 4.4, it is clear that using the CSO 80 life table gives only a very small difference between expected and actual claims. Using the American life tables CSO 80 or 58 would result in a negative difference with a rate of loss of (9%-1.3 %) and (9%-6.6 %) per annum respectively. Nevertheless, chart 4.2 on page 77 shows that "Kuwait" mortality rate of the SSS and GLI sample data are

<sup>11</sup> Some claims which is unpaid for reasons as legal problems or contacting failure.

<sup>12</sup>  $Net \sum PVEC_x = \sum PVEC_x - \sum PVEC_x \text{ Unpaid}$

<sup>13</sup> Total Group Premium =  $\sum_{K=20}^{60} q_K \left[ \frac{C_K}{\sum_{i=1} S_{K,i}} \right]$  Where K is the age of each insuree,

S is the amount of life cover and "i" is the age group that the insuree belongs as defined earlier (i = 1 to 9).



much higher than the American life table CSO 58 and 80. Therefore, it seems likely that none of the American life tables would achieve profits.

Table 4.4 shows that the use of English life table 24-29, CSO 58, ELM 85-90, and SSS 91-95 would all result in a surplus, while the English table 67-70 would show a deficit. In finally determining which life table to use, insurers must consider their profits. There is already an explicit verbal agreement between the companies to apply a 5 % loading when pricing GLI policies. In an interview with the Head of the life insurance department in KIC (Dr. Fayeeg Hana) has stated that he expects a profit around 9 % per annum from GLI policies. In this market, the optimal life table would be the one that achieves such a profit. This is deemed a satisfactory profit margin that will not disrupt the market.

The above discussion shows that the English life table 1924-29 would be the most efficient if used for the Kuwaiti GLI market. The insurer using this table is expected to make a profit of 9 % per annum approximately.

#### 4.6 ... Conclusions:

The chapter shows that insurers in Kuwait should take some action to improve the GLI market. It was found that the English life table 1967-70 is inefficient for this market and does not conform<sup>14</sup> to Kuwait GLI mortality rates. It was shown that the English 1924-1929 table provides a better fit to the circumstances of Kuwait.

It was shown that applying one of the graduated Kuwaiti life tables would result in the highest profits to insurers comparing with other foreign life tables.

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<sup>14</sup> See chart 4.2 in page 75.



However, none of those tables were suggested for the following reasons: First, it would be unduly risk to use an untried life table. Second, the two Kuwait-based tables, when applied to the KIC data, appeared to be supposing excessive mortality, and consequently charging excessively high premiums. As evidenced by the fact that profit earned would be well above the normal rate aimed at in the formulas; if genuine competitors were allowed to enter the market, an insurer using one of these tables would be undercut and may be facing regulations problems for making excessive profits.

Kuwait mortality rates were estimated and graduated. It was found that the English life table 1924-29 would be the most efficient life table in the sense that it conforms closely to Kuwait GLI mortality rates.



## Chapter 5

### *GLI Market Prospects*

#### **5.1 ... Introduction:**

In this chapter, we consider some other aspects of the GLI market. The process of underwriting GLI policies needs to be updated. Collecting more insures' information using new technology can also reduce insurers' losses in this market. Applying methods such as multi - period pricing and commissions based on profits could make the market more efficient. In the following we show how insurers can benefit from this study to improve the Kuwaiti GLI market.

#### **5.2 ... Underwriting Methods:**

The previous sections showed the importance of applying the suitable life table to achieve profits. Nevertheless, there are other factors that might affect insurers' profits in the GLI markets. This section focuses on underwriting literature reviewed in chapter 2, and based on that the following underwriting methods are suggested. Here, we aim at showing the importance of underwriting in the progress of the GLI market.



### 5.2.1 ... Full Information Requirement:

Cummins et al, (1983, p. 97) argue that “*underwritten sufficient mortality information possibly could be obtained to prevent adverse selection*”. However, mortality information does not come from life tables only (which only concern age and gender factors), but other information is necessary to estimate future expected losses.

KIC collects group insurees’ information that includes age and salary. But, more information is needed to best estimate future insurees’ claims. In particular, the companies need to build an information database for GLI insurees with more detailed information.

One could collect the following information on insurees: name; job title; nationality and a basic medical report (which is contained in each worker’s file in Kuwait by law).

The intention would be:

- 1) To prevent moral hazard caused by lack of personal information. For example, an employee aged 30 quits his/her job and the employer (holding the group policy) hires another worker also aged 30<sup>1</sup>. As the insurer does not have insurees’ names, and as the database includes only the insurees’ age, the employer need not report the above incident and so avoids the possibility of an increased premium.

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<sup>1</sup> Assume both employees are on the same point of salary scale.



The new employee's risk may be higher than the previous one. This possibility could be regarded as one of moral hazard through submission of wrong information by the policyholder (employer), as the action will increase the probability of loss for the insurer.

- 2) Employers may report a large number of employees with high salaries as low risk insurees to obtain lower GLI premiums. However, requiring information on each employee's job title with the respective name and salary should reduce the amount of misleading information.
- 3) Nationality and basic medical reports of the insuree can be used to classify the insuree's risk class. Insurees' mortality rates can be determined based on previous mortality rates observed for Kuwaitis and Non-Kuwaitis. Also, scaling insuree's risk class based on his/her health status can be used to estimate future claims. This should prevent losses caused by inefficient risk classification.

Furthermore, Suhyer (1990, p. 35) suggests that information must be supplied by each life insuree. However, she (ibid. p. 36) shows the positive and negative effects of applying this method.

She argues that underwriters, because of long experience, realize the importance of collecting information on insurees to classify their risk class. But a long and detailed questionnaire can have a negative effect on marketing life-insurance products. A short and straightforward questionnaire is recommended. She has given examples of this method applied to ILI underwriting. For GLI underwriting, we suggest a shorter questionnaire than that used for ILI's, in order to yield a high response rate.



The following is an outline of the information, which could be collected on the Kuwaiti GLI market (in KIC as an example):

**Table 5.1 ... Suggested database for KIC group life insurees:**

Insuree Name	Date of Birth	Age at Issue	Monthly Salary	Health Report <sup>2</sup>	Job Type <sup>3</sup>	Nationality <sup>4</sup>	Working Hours
Mr. M ... etc.	10/07/63	To the nearest birthday	KD 750	Scale of 1 to 5	Scale of 1 to 5	Scale of 1 to 2	4-8 hours <sup>5</sup>

The database that is suggested in table 5.2 could be used to classify the insuree's risk class based on mortality rates, health status, job type, nationality, number of working hours and income.

We suggest a scale 5-risk category to be developed in the above database to classify the group insurees from very low risk (scale 1) to very high risk (scale 5). The 5-class scale suggested is expected to be reasonable to achieve the aimed results. By experience insurers may choose the appropriate scale. Examining the efficiency of this model can take place after applying the database for several years.

<sup>2</sup> Where, 1 = Very healthy, 2 = Healthy, 3 = Average health, 4 = Unhealthy, and 5 = Very Unhealthy. This can be filled based on the employee's basic health report. By law, any employee in Kuwait should go through a basic health examination and a classification system could be used.

<sup>3</sup> Where, 1 = Very safe job, 2 = safe job, 3 = Average safe job, 4 = Risky job, and 5 = Very risky job.

<sup>4</sup> Where, 1 = Kuwaiti, and 2 = non-Kuwaiti.

<sup>5</sup> A part time job usually requires 4 hours on average. Also, by law a full time job should not exceed 8 hours.



### 5.2.2 ... Cost Study of Full Information:

Insurers need to compare the cost of applying the above database as a method of dealing with lack of information and the losses they face because of not applying such a method. The following example shows the cost of applying or not applying the above-suggested database to the KIC GLI sector.

First, the cost of constructing the suggested database shown in table 5.2 is estimated as:

- 1) Suppose KIC plan to buy a network server for the life insurance department having the following characteristics:

Pentium 300 MHz (512K RAM) server, hard disk capacity of 20 GB, cache memory of 128 MB, CD ROM driver with speed of 24 x, and a backup driver with capacity of 9.1 GB for each backup disk. The price of this machine would be about KD 2020<sup>6</sup>.

Also, they plan to buy ten PC's Pentium 200 MMX (32K RAM) to be connected to the server for ten users in the life insurance department. According to my field visit, this should be the number of PC's required. All of these ten PC's would cost about KD 6000<sup>7</sup>. This will include ten HP 690 C printers and cost of installation.

Further, they plan to buy one network laser HP printer that costs about KD 580. Also, they set aside KD 2000 for hardware; as backup disks, printer

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<sup>6</sup> Price estimated on 19<sup>th</sup> December 1997 from DELL computers. See <http://www.Dell.com/>.



ribbon, modem, printing papers, PC's disks, and network installation. Based on the above, it is found that KIC is expected to spend about KD 8,600<sup>8</sup> to apply this plan.

- 2) Besides, KIC is expected to spend KD 300 to train each employee that will use the database (assume they spend KD 3000 to train ten employee). This amount will be paid at once at the beginning of applying the database project.
- 3) KIC should hire about ten data-entry workers to be trained for that specific database and one computer engineer. Those staff should work only to enter and extract the required information for each policy and claim. This should reduce the waiting time for finding files and all paper work process needed for the insurance operation. In the mean time, the risk of losing insurees' files and information will be reduced. The cost of this plan is calculated as follows: first we assume that each of the ten data entry workers will be paid KD 250 per month and the engineer will be paid KD 500 per month (total salaries = KD 3000 per month). Then the present value of these payments over the next ten years (at  $i = 6\%$  per annum) equals<sup>9</sup>:

$$\left( \text{TotalSalaries} \times 12 \times a_{10} \right) = (3000 \times 12 \times 7.3601) = \text{KD } 22,080.$$

- 4) Also, KIC will need to buy a yearly service contract for the network as well as an insurance cover for the hardware, assuming they will spend on that KD 2000 per annum.

<sup>7</sup> See for example Al-Sada magazine issue No. 161, 20<sup>th</sup> December 1997, Kuwait.

<sup>8</sup> The prices were current at December 1997 using an Internet home page, see for example <http://www.Dell.com/> and <http://www.hp.com/>.

<sup>9</sup>  $a_{10} = 7.3601$ , see interest Table at 6 % per annum in Kellison ( 1991, p. 387 ).



5) Finally, KIC is expected to spend KD 3000 to arrange the database software required for this plan.

Assuming that KIC is testing the profit of applying this plan for the following ten years, the present value of the cost of the plan, using a 6 % discount rate per annum, is:

$$8,600 + 3000 + (2000 * 7.3601) + 3000 + 22,080 = \text{KD } 51,400.$$

Further, and based on chapter 4 results, we assume that the insurer used the English life table 1924-29 rather than the 1967-70. Also the results suggested that the insurer will do about 9 % of profit. However, we argue that improving information could increase profits. Insurers, therefore, may modify policy offers, underwriting and pricing through research using the suggested database. Therefore, the insurer would apply the suggested computerized plan if the present value of future (the next ten years) profits (9 % per annum) is less than expected by KD 51,400 or more.

Let "T" be the target minimum loss (the amount less than the expected profit based on 9 % per annum) per annum. The insurer may need to apply the suggested computerized plan if the present value of "T" for the next ten years using a discount rate of 6 % per annum is equal to or greater than KD 51,400.

So, we solve for T in

$$(T \times 7.3601) \geq 51,400$$

Thus, T should be  $\leq$  KD 6,984.

The above investment appraisal suggests that KIC should construct the database of insuree's information in the GLI sector if they screen an annual shortage of aimed profits by KD 6,984.



### 5.2.3 ... Multi - Period Pricing:

Babbel and Ohtsuka (1989) and Cooper and Hayes (1987) suggest a multi-period pricing method to avoid continuous losses due to problems such as adverse selection in whole and term life insurance markets. Similarly, Townsend (1982) suggests the same method in the presence of asymmetric information<sup>10</sup>. Accordingly, we also suggest a multi - period pricing technique should be applied in the GLI market. This will result in a yearly price change based on a comparison between actual and expected claims.

Suppose employers may submit inaccurate employee' information that causes a large number of high-risk insurees to be reported as low risk insurees. Under a multi-period pricing strategy, employers are expected to submit full and accurate information on employees to avoid future price increases. The price will be adjusted annually based on the annual claim report for each group.

Thereupon, premiums will be regularly adjusted, reducing the possibility of moral hazard, so improving profitability.

### 5.2.4 ... Commissions Based on Profits:

A further possibility is that the loss facing the Kuwaiti GLI market is due to intermediaries' transaction costs. Intermediaries' commissions are based on the amount of cover sold and are usually paid at the time of policy issue.

Consequently, we suggest that insurers should offer intermediaries' commissions for selling GLI policies based on the profits gained by these sales at

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<sup>10</sup> See Babbel and Ohtsuka (1989, p. 461).



the end of each year (most GLI policies in the market are one year term life policy as indicated in chapter 3). This method should decrease losses, as the intermediaries will seek full information to increase their commissions. Here the intermediaries will work hard to have less claims in the policies they sell. To do so, they will search for full information and make sure that high-risk insurees are classified and charged the right premium.

These recommendations are based on the theory of incentive compatible contracts. To avoid the principal-agent problems, Gravelle and Rees (1992, p. 684) define the incentive compatible contract as the optimal insurance contract that increases the insuree's expected utility while insurers do not face losses selling it. They argue that this will need to be a break-even contract where the participation constraint must bind. The participation constraint pushes intermediaries to assist insurers maximize profits.

### 5.3 ... Conclusions:

The chapter has suggested constructing a database to collect information on insurees. However, the database will only be required if profits target is not achieved by using the English life table 1924-29.

Also, applying a multi-period pricing method based on previous claims was proposed to reduce losses. Finally, it may be in the companies' interest to offer agents commissions based on the profits achieved on their policies sold in the previous year (GLI policies are yearly term). This would encourage agents themselves to collect full information, and so reduce losses.



**Chapter 6*****Prospects For Workers'  
Future Income Security*****6.1 ... Introduction:**

The aim of this chapter is to propose a group investment plan for workers in Kuwait who are under-insured. The aim is to address the issue of future incomes for Non-Kuwaitis, and to suggest an additional alternative future income source for Kuwaiti workers. The plan would be introduced by modifying existing GLI policies, which cover insurees' lives. The suggested policy is to include whole life (during working time) and pure endowment (to pay a lump sum at retirement).

However, adding the low cost saving offer (as it is a group policy) to the policy (pure endowment) may not be obligatory. But this would extend the GLI market, increase workers future income, and strengthen the country's economy by providing improved incentives to save for both Kuwaitis and Non – Kuwaitis.

The chapter will compare the proposed plan with the existing Social Security System. The aim is to show that private insurers may be able to compete with social insurance, but both the government and the private sector are not taking advantage from that. Finally, we are not suggesting a plan to replace the existing Social Security System, the plan is to provide a low cost alternative saving for workers' retirement (pure endowment) and securing present income (life cover).



## 6.2 ... Group Investment and GLI:

We will first consider the implications for Non-Kuwaitis to join the suggested plan. Most Non-Kuwaitis suffer economic insecurity due to their inability to join any social insurance program. If they were able to join a group investment plan they would achieve more future income security.

Further, offering life cover and investment cover under one group policy (which might be a group whole life and investment policy) should encourage employers and employees to join. Employers will be covered as they cover their insurees' lives. Employees will be able to save part of their income to secure part or all of their retirement needs through a low cost group insurance plan.

In addition insurers will achieve full information. In this case, insurees would be cautious about providing inaccurate information as they invest in this policy. For example, an unhealthy insuree would ask for a lower premium (for the investment part of the policy) as he/she may die without releasing the lump sum. However, the same insuree might say he/she is healthy in order to be classed as a low risk insuree if he/she was looking for life cover only (the policy has no investment plan).

Finally, offering group investment policies to a larger proportion of society should increase insurers' profits, economic security for workers, and the incomes of retirees.

Kuwaitis might be attracted by a low cost investment plan that secures their retirement. Usually, Kuwaitis retire at an early age (varies between 45 and 60) and then start their own business. A group investment plan that offers a lump sum at the age of retirement could be in great demand.



### 6.3 ... Plan Benefits and Demand:

Kuwaitis are already offered a generous social security system. To determine whether they would be interested in a savings plan, I visited the Social Security Association of Kuwait in May 1998. There, the Head of the Actuarial Department supported my assumption that the SSS faces future problems. This is discussed in the following sections.

The following reasons support the idea of adding a group investment element within GLI policies in Kuwait:

- 1) Once the insurees have the opportunity for future benefits, moral hazard should decrease, as insurees will not take actions, which will reduce their chance of receiving the rewards from the policy.
- 2) Death risks cover offsets investment liability. Life cover is based on mortality rates (probability of dying  $q_x$ ), whereas investments are based on life expectancy (probability of surviving  $p_x$ ). Therefore, if the insurers use an inappropriate life table where expected mortality rates were less than the actual, losses from dead insurees will be indemnified from over charging for the investment element and vice versa ( $q_x = 1 - p_x$ )<sup>1</sup>.

Note that the above is based on the assumption that employers insure employees using term life insurance and plan their future lump sum under one group policy.



**6.3.1 ... The SSS and the Investment Plan:**

Table 6.1 and chart 6.1 show that both SSS benefits and contributions during the period 1991 to 1995 increased and the difference between them increased<sup>2</sup>. The SSS is likely to face future financial difficulties if this gap continues to rise. There is no reason to believe that it will not rise. Furthermore, the SSS is facing the problem of early retirement as discussed in chapter 3.

**Table 6.1 ... SSS Benefits, Contributions (1991 to 1995).**

Year	SSS Pensions Paid KD Mil.	SSS Total Benefits Paid KD Mil.	SSC By All Contributors KD Mil.	Other Source of SSS' Income <sup>3</sup>
1991	225	226	103	100
1992	265	267	123	117
1993	349	351	141	136
1994	390	394	152	149
1995	407	411	161	158
Average	327	329	136	132

Sources: SSS Annual Statistical Abstract (1995, Tables 14 and 15 Pp. 50 and 51).  
Annual Statistical Abstract (1996, table 206, page 241), Kuwait.

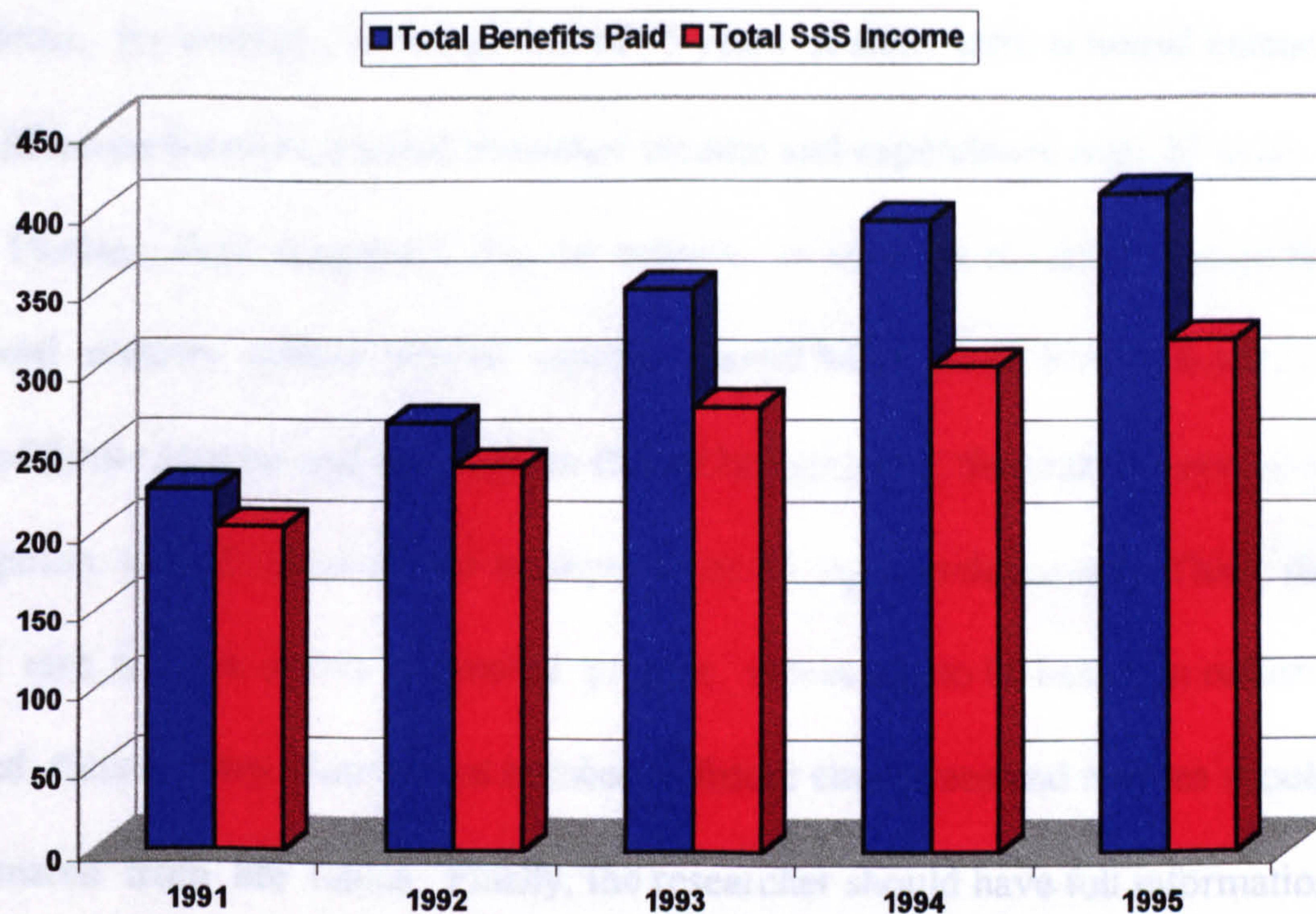
<sup>1</sup> As defined earlier in this thesis,  $q_x$  = the probability of death before attaining age  $x + 1$  for a life aged  $x$ . Also,  $P_x$  = the probability of surviving to age  $x + 1$  for a life aged  $x$ .

<sup>2</sup> See Appendix 6.1.

<sup>3</sup> The government contributes to the SSS for administrative costs and to cover part of the deficit.



Chart 6.1 ... SSS Contributions and Benefits in KD Millions (1991 to 1995)



Source: SSS Annual Statistical Abstract (1995, Tables 14 and 15 Pp. 50 and 51).

Table 6.1 and chart 6.1 show that the SSS is facing a financial problem. It is clear that the systems' income is less than the benefits paid. Nevertheless, the government share to cover the administrative costs and deficit is almost 50 % of the required income (see last column in table 6.1).

If the gap between the SSS's income and its benefits continues to increase, Kuwaiti workers' future income (SSS benefits) is less secure. This will provide an incentive for Kuwaiti workers to join the proposed investment plan.

Furthermore, the above is a basic view of an actuarial unbalance. Beekman and Andrews (1987, P. 120) define the actuarial balance as *"the difference between the projected average income rate and the projected average cost rate, expressed*



*as a percentage of taxable payroll*". The authors argue that a long-term actuarial balance is the average difference between a social insurance income and expenditure, for example, over a period of 75 years. A short-term actuarial balance is the difference between a social insurance income and expenditure over 25 years.

Further, they suggested that to achieve an accurate actuarial balance for any social security system several aspects should be involved. First, the present value of future income and expenditure should be estimated. Second, the period of investigation should be clear (for example 25 or 75 years as discussed). Third, the interest rate for the above estimated present values has to be based on realistic expected future rates. Fourth, the number of future employees and retirees should be estimated from life tables. Finally, the researcher should have full information about the social security system with respect to the benefits, contribution, and investment expectations.

### **6.3.2 ... Kuwait Social Security System' Actuarial Deficit:**

The International Labour Office (ILO) (Geneva, 1994, P. 19) reported on the Kuwaiti Social Security System:

*"Over the 20-year projection period, the total basic benefit payments increase by approximately three times. The ratio of basic benefits to insured earnings also increases; however, the ratio of benefits to insured earnings decreases because no new benefits increases are assumed. During the next 20 years, benefits under the supplementary insurance-scheme are in a too early stage to assess their significance".*



These results by the ILO support our view that the Kuwait SSS may face possible financial future problems. The International Labour Office suggested that the Kuwaiti government (treasury) should cover an actuarial deficit in the future.

Because of the Gulf war in 1990, the report covered the years from 1986 to 1994. The report shows the fourth and fifth actuarial valuations for the Public Institution for Social Security of Kuwait. The study predicted the future income and outcome of the Kuwaiti SSS for the next 80 years. Expected actuarial deficits were discussed.

The following section presents these arguments in figures from the ILO report and the SSA annual statistical abstract.

### **6.3.3 ... The Social Security System Projection:**

We focus on the figures showing the predicted actuarial deficit. Table 6.2 shows the actuarial balance sheet for the Social Security Association at 30<sup>th</sup> June 1992. The table shows an actuarial deficit of KD 2,416,809,000<sup>4</sup> in the basic insurance<sup>5</sup> scheme. This deficit represents only the current actuarial deficit that faces the Kuwaiti Social Security System. Table 6.3 shows the estimated actuarial deficit over the next 80 years.

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<sup>4</sup> About 7.25 billion US dollar.

<sup>5</sup> The basic insurance is defined as the insurance that covers employees with wages equal to or less than KD 1,250 per month.



Table 6.2 ... Consolidated civilian scheme reflecting 1992 amendments:  
Current participants; 1992-standard retirement rate; actuarial  
balance sheet at 30<sup>th</sup> June 1992 (expressed in KD 1,000):

<i>Assets</i>		<i>Liabilities</i>	
Reserve fund <sup>1</sup>		PV. of future payments to existing pensioners and survivors <sup>5</sup>	
Basic insurance	1,746,423	Basic insurance	1,634,135
Supplementary insurance <sup>2</sup>	0	Supplementary insurance	0
PV. of installments payable by the treasury	365,285	Benefit increases	1,152,030
PV. Of installments payable by the treasury with respect to benefit increases <sup>3</sup>	1,070,917	PV. Of future pensions and benefits with respect to active insured persons	
PV. Of future contributions with respect to active insured persons <sup>4</sup>		Basic insurance	4,998,703
Basic insurance	2,185,434	Supplementary insurance	157,637
Supplementary insurance	186,228		
Actuarial (deficit) surplus			
<i>Basic insurance</i>	<i>(2,416,809)</i>		
Supplementary insurance	28,591		

Source: The International Labour Office (1994, p. 5), *Report to the Public Institution for Social Security, Kuwait on the Fourth and Fifth actuarial valuations*, Geneva.

Notes:

- 1) Includes amounts owed by pensioners as a result of commutation of pensions; and amounts owed by the treasury as a result of assuming the obligation for repayment of the commuted part of pensions under Decree No. 11/1991.
- 2) The supplementary insurance scheme does not become effective until 1<sup>st</sup> January 1995; hence there are no assets as of the valuation date. This scheme covers insurees with monthly wages higher than KD 1,250 up to KD 2,250. As "LMS" used in the pension calculations discussed earlier should not exceed KD 1,250, the SSA offered those with higher wages than this limit an additional benefits as a lump sum based on their salaries.
- 3) Includes fixed-period installments and Dinar-by-Dinar reimbursements by the Public treasury.
- 4) Includes employee and employer contributions; and government contributions in the case of basic insurance.
- 5) Including survivors of existing pensioners.



**Table 6.3 ... Consolidated civilian scheme reflecting 1992 amendments:  
Current participants; Expected future participants for the next  
80 years; 1992-standard retirement rate; actuarial balance  
sheet at 30<sup>th</sup> June 1992 (expressed in KD 1,000):**

<i>Assets</i>		<i>Liabilities</i>	
PV. Of future contributions with respect to active insured persons <sup>4</sup>		PV. Of future pensions and benefits with respect to active insured persons	
		Basic insurance	8,681,483
Basic insurance	7,935,996	Supplementary insurance	3,123,994
Supplementary insurance	2,822,138		
Actuarial (deficit) surplus			
Basic insurance	(745,487)		
Supplementary insurance	(301,856)		

Source: The International Labour Office (1994, p. 11 and 16), *Report to the Public Institution for Social Security, Kuwait on the Fourth and Fifth actuarial valuations*, Geneva.



Tables 6.2 and 6.3 show that the Kuwaiti Social Security Systems' present value of future deficit is KD Mil. 3,436 (about eleven billion US dollars) for the next 80 years for both basic and supplementary insurance. The present value of the deficit represents 53.92 % of Kuwait GDP<sup>6</sup> in 1992. The ILO suggested that the Social Security Association should plan to increase the retirement age and investment income. It also suggested the need to examine private pension plans. Unless new measures are put in place to encourage saving, the SSS may be in danger of breaking down in the future.

#### **6.3.4 ... Future Expectations:**

It is expected that most Non-Kuwaiti workers will seek group investment cover to secure their future income. But since most of them plan to go back to their home countries at retirement or before that, a lump sum investment plan would be the most efficient plan to offer them.

Nevertheless, Kuwaitis under the SSS may receive loans at retirement, which are based on the member's salary and age. However, the investment plan would provide a lump sum that a retired Kuwaiti could use to start his own business for example.

The SSS could increase insurees' contribution to cover the actuarial deficit. For example, the average annual contribution by insurees and the government share during 1991 to 1995 is KD Mil. 268 per annum (see table 6.1). Assuming

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<sup>6</sup> See Annual Statistical Abstract (1993, table 195, p. 229); Kuwait GDP for 1992 equals to 6,373,375,372.



that the average expected deficit during the next 80 years is distributed evenly, the actuarial deficit per annum may be

$$\text{KD Mil. } 3,436 / 80 = \text{KD Mil. } 43.$$

The SSS could increase contributions by  $\text{KD Mil. } 43 / \text{KD Mil. } 268 = 16\%$  per annum. This means that SSS contributions by employees and employers should be 31% rather than 15% of an employee's annual salary<sup>7</sup>.

#### 6.4 ... Assumptions and Methodology of the Model:

In the following we compare the SSS contributions and the proposed group investment scheme. It is assumed that members in both schemes join at the age of 30<sup>8</sup> and retire at 60. Also, it is assumed that group investment insurers accumulate premiums at the real rate of interest of 5% per annum (which equals the average difference between interest rates and inflation rates in the years 1991 to 1995). After thirty years it is assumed that insurers will have a reserve value in the insurees account equal to the preserved investment plan's lump sum.

We calculate the present value of the SSS pension assuming it lasts for 20<sup>9</sup> years starting at 60 and compare this with the lump sum under our proposed plan. The comparison assumes that the premiums paid for the investment plan are equal to SSS contributions (15% of the insuree's salary).

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<sup>7</sup> Also the SSS may decrease the pensions, or increase age of retirement to avoid the actuarial deficit.

<sup>8</sup> Most Kuwaitis start work at age of 25 to 27, but to apply the comparison with GLI and according to data availability we assume they start at the age of 30.

<sup>9</sup> Kuwaitis life expectancy varies from 73 for men to 78 for women. However, we assume that they live up to age 80. We assume that life expectancy will increase in the future. The following calculation estimates present value of payment for the coming 30 years. Therefore, by that time Kuwaiti life expectancy may achieve age 80 on average.



The group investment scheme is paid as a lump sum at the age of 60. We further assume that retirement age is fixed at the age of 60 for all insurees in both schemes. Also, the discount rate of the insuree's future income is fixed at 5 % per annum. The inflation rate<sup>10</sup> is assumed to be on average 3 % per annum for the following thirty years.

Let the monthly salary be KD 500 for ages 30-39; KD 750 for ages 40-49, and KD 1000 for ages 50-60.

According to the SSS discussion in chapter 3, the retirement pension on the above assumptions would equal to:

$$\text{Last monthly salary (LMS)} * [65 \% + (2\% * 5 \text{ years})] =$$

$$\text{LMS} * 75 \% = 1000 * 75 \% = \text{KD } 750.$$

Furthermore, the following symbols and values are used:

$i$  = Interest rate = 8 % per annum;

$d$  = Discount rate = 5 % per annum;

$W$  = Average monthly salary of an insuree;

= Retirement age = 60;

$x$  = age of insuree;

$n$  = period of time in years;

$$v^x = (1/1+i)^x;$$

$a$  = the present value of one unit discounted over one year.

$P$  = monthly premium to join the private group investment scheme;

<sup>10</sup> Source: Financial Times, 12<sup>th</sup> December 1996, p. 31.



$LS$  = The amount of lump sum at age of 60 under the proposed investment scheme;

$$\ddot{S}_n = \ddot{S}_{n+1} - 1 = \quad (6.1)$$

The future value of 1 unit collected at the beginning of the year and accumulated annually for  $n$  years, where;

$$S_n = \frac{(1+i)^n - 1}{i} = \quad (6.2)$$

The future value of 1 unit collected at the end of the year and accumulated annually for  $n$  years; then

$$\ddot{a}_n^{(m)} = \frac{i}{d^{(m)}} \times a_n \quad (6.3)$$

which equal the present value of an annuity paid every  $m$  period for  $n$  years with discount rate  $d$  and where  $i$  is the relative rate to the  $d^{11}$ ; followed by

$$d^{(m)} = m \times \left( 1 - v^{\frac{1}{m}} \right) \quad (6.4)$$

$B$  = yearly premium for the group scheme, where;

$B_j$  = the future premiums for a member of the group scheme at the end of period  $j$ .

$j = 1$  for ages 30-39, 2 for ages 40-49, and 3 for ages 50-60.

The sum 
$$\sum_{j=1}^3 B_j \quad \dots \quad (6.5)$$

<sup>11</sup> See Kellison (1991, p. 19 and 104).



equals the future accumulated value of the group scheme premiums, which should equal the lump sum planned for the group members.

The aim is to show that the future value of premiums under the investment plan may exceed (or at least competes with) the present value of expected SSS 'pensions.

We compare the future value of investment plan premiums over a thirty-year period with the present value of a retirement pension assuming average life expectancy is 80<sup>12</sup> years.

We assume that insurees in both schemes receive the same salary and pay the same contribution between the ages of 30 and 60.

#### 6.4.1 ... Results and Comparisons:

The present value of the SSS pension of 750 KD for 20 years =

$$\text{Annual pension} \left[ \ddot{a}_n^{(m)} \right] = 750 \times 12 \times \left[ \frac{i}{d^{(m)}} \times a_n \right] =$$

$$750 \times 12 \times \frac{0.05}{0.0487} \times (12.462)^{11} = \text{KD}115,175$$

This is an estimate of the present value of a KD 750 monthly pension that may lasts for 20 years.

We now calculate the lump sum that group scheme members will receive if they contribute a similar amount (15 % of the monthly salary). This is done by calculating the value of the invested premiums for the first ten years. We then

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<sup>12</sup> To apply the comparison, we assume that a retiree retires at 60 and live for 20 on average.



accumulate these for another twenty years (up to age 60). Using equations 6.1, 6.2, 6.5 and multiplying by  $(1+i)^n$  to accumulate for  $n$  years, we proceed as follows: The first term in (6.5) is

$$B_1 = 500 \times 12 \times P \times \ddot{S}_{10}^{(12)} \times (1+i)^{21} \quad (6.6)$$

Where  $p$  is the worker's contribution as a percentage of the salary and  $\ddot{S}_{10}^{(12)}$  is the future value of a monthly payment for a period of time  $n^{13}$  (10 years).

Thus  $B_1$  is the value at age 60, based on an accumulated group premium paid while the worker is aged between 30 and 39, during which the worker is paid KD 500.  $B_2$  is calculated for the period during which the worker is aged between 40 and 49 and is assumed to earn KD 750 per month. Thus

$$B_2 = 750 \times 12 \times P \times \ddot{S}_{10}^{(12)} \times (1+i)^{11} \quad (6.7)$$

Thus  $B_2$  is the value at age 60 of the accumulated premium paid in this range, while  $B_3$  is the equivalent sum based on the age range 50 to 59 based on a salary of KD 1000 per month.

Thus

$$B_3 = 1000 \times 12 \times P \times \ddot{S}_{10}^{(12)} \times (1+i)^1 \quad (6.8)$$

Note that  $P$  represents the percentage of the monthly salary paid towards the group investment plan. We assume that  $p = 15\%$  for comparability with the SSS scheme.

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<sup>13</sup> We are dividing the employee's working lifetime from age 30 to 60 into three equal intervals.



We assume that workers receive  $B_1 + B_2 + B_3$  as a lump-sum at age 60 when they retire. Note that  $s_{10}^{(12)}$  is determined by applying equations 6.1, 6.2, and by using the interest table at  $i = 8\%$  in Kellison (1991, p. 386). Thus

$$s_{10}^{(12)} = \frac{(1.08)^{10} - 1}{0.076715^{(12)}} = 15.1069. \text{ Therefore, we note that}$$

$$B_1 = 500 \times 12 \times 0.15 \times 15.1069 \times (1.08)^{21} = \text{KD}68,441$$

$$B_2 = 750 \times 12 \times 0.15 \times 15.1069 \times (1.08)^{11} = \text{KD}47,552$$

$$B_3 = 1000 \times 12 \times 0.15 \times 15.1069 \times (1.08)^1 = \text{KD}29,368$$

and  $\sum_{j=1}^3 B_j = \text{KD} 145,361.$

Contributing in a private group investment plan with a similar premium to the SSS contribution<sup>14</sup> should therefore result in a lump-sum of KD 145,400 at age 60. Earlier we showed that the present value of a SSS pension at age 60 might be equal to KD 115,200. This result suggests that the proposed group investment plan may give a better return than the SSS, even though the SSS is a good system compared with other countries.

#### 6.4.2 ... The Equivalent Premium:

This section aims to find the equivalent premium for the proposed group investment plan. The equivalent premium should result in a lump sum at retirement, which should be equal to the present value of the SSS's average expected pension. The objective is to show employers, employees, and the government the potential

<sup>14</sup> Holding all factors as age, period of contributing and age of retirement constant.



costs and benefits of the proposed investment plan compared with the SSS contribution.

Based on the above discussion, we solve backwards for  $p$  (the premium of the proposed investment plan estimated as a percentage of insurees' monthly salary) using equations 6.5, 6.6, 6.7 and 6.8 and the results of the previous section:

Let;  $\sum_{j=1}^3 B_j =$  the present value of a SSS pension of 750 (starts

at age 60) per month who expected to survive to age 80. So, based on the results

of section 6.4.1;  $\sum_{j=1}^3 B_j = KD115,175$  where;

$$B_1 = 500 \times 12 \times P \times 15.1069 \times (1.08)^{21}$$

$$B_2 = 750 \times 12 \times P \times 15.1069 \times (1.08)^{11}$$

$$B_3 = 1000 \times 12 \times P \times 15.1069 \times (1.08)^1$$

Now, as  $\sum_{j=1}^3 B_j = B_1 + B_2 + B_3$ , and solving for  $P$  we found that

$$P = 0.118875 = 11.9 \% \text{ per annum.}$$

Suppose that an employee joins the proposed group investment plan at age 30 under the following circumstances:

- 1) The employee's salaries are 500, 750 and 1000 during the periods 1, 2, and 3 respectively. Where period 1 is the ages 30-39, period 2 is the ages 40-49, and period 3 is the ages 50-59.
- 2) Retirement age is 60.
- 3) The SSS contribution equals 15 % of the monthly salary.



4) Interest rate is 8 % per annum.

5) The employee receives the lump-sum at the beginning of age 60.

This means that this employee is paying 15 % of his/her monthly salary for thirty years to receive the SSS pension with a present value of KD 115,175.

However, the same person may receive a lump-sum equal to KD 115,175 at retirement by paying 11.9 % of his/her monthly salary for thirty years.

The above result suggests that the proposed group investment plan might offer better value than the SSS and consequently could be a preferred alternative for both Kuwaiti and Non-Kuwaiti workers. Note that Kuwaitis are not allowed to leave the SSS, though they would be allowed to join the proposed investment plan to increase their future income.

### 6.5 ... Suggestions:

In UK, the Government suggested that a compulsory employee pension plan should be set up to avoid future financial problems for the Government. The Social Insurance Department (1998) which concluded that in respect of pension provision based this on a study:

*“Occupational schemes have boosted some pensioners’ incomes. However, the state earnings related pension scheme (SERPS) is currently better than many people think, but it will decline. Also, a further rise in pensioner inequality seems very likely. On the other hand, means-tested benefit levels will inevitably continue to rise...Personal pensions provides is not new, and it is already compulsory...”*



*Also the Government suggested that those who can save more should be encouraged to do so. One reason is that self-employment can increase people's risk of being poor in old age. Therefore, everyone must be able to plan with confidence for retirement...And a better informed and coordinated policy making is needed."*

These conclusions show that social insurance may face financial problems when paying the required pension for a retiree in the future. Therefore, the conclusions suggested that employees should be encouraged to save for their future. Also, asking for a compulsory saving plan for workers is not new.

The report suggested that increased savings were required. Based on these conclusions, Mr. F. Field<sup>15</sup> (1997) suggested in the Parliament that some actions that should be taken to avoid future economic crises. He argues that *"however, with an aging population over time, more will need to be saved for pensions, but the share borne by tax payers can not go up, otherwise the costs of the system will be unsustainable. We want everyone to benefit from a second pension on top of the state pension. This is what our proposals for Stakeholder Pensions are all about. It is quite clear that unless there is more saving towards retirement, we will continue to see into the next century far too many of our pensioners retiring on incomes which do not properly reflect the rising prosperity of the nation"*.

This implies that as social security benefits in the UK may decline in the future, private investment plans should be introduced for employees as a second source of pensions.

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<sup>15</sup> Frank Field MP. is the Minister of State for Social Security and Welfare Reform in the UK since 1996.



The same argument applies to Kuwait, and therefore we have suggested a group investment plan. The Government and the Parliament should plan to legislate for this proposed investment plan in which there would be a minimum proportion of salary saved, similar to the UK. The Government could encourage and support this plan financially and encourage employees and employers to join. If the Government and the Parliament supported this plan, we could expect an increase in retirees' income, and avoidance of financial difficulty for the Government, which would have serious repercussions on Kuwait's prosperity.

Therefore, and based on the results of section 6.4.2 which estimated the cost of the proposed plan could be about 12 % of employees' salary, we suggest that the government, employers and employees each contribute 4 % of salary.

This could be offered to both Kuwaiti and Non-Kuwaiti workers. Knowledge that the SSS faces financial problems might encourage Kuwaitis to join the scheme. Also, Non-Kuwaiti workers (who are not covered in the Kuwaiti SSS and might not be covered in their country) could invest for their retirement, assuming that this plan offers a better investment opportunity than is available in their home country.

## **6.6 ... Conclusions:**

A group investment scheme is a viable alternative to SSS for both Kuwaiti and Non-Kuwaiti workers. Kuwaitis will increase their retirement income through a (low-cost) group investment plan as well as insuring against possible decreases in SSS benefits. Non-Kuwaitis will cover their retirement risks, also at low cost.



Further, if employers share with the employees in the scheme (as expected in most group investment plans such as in the USA and UK), the cost of the employee's premium will be even less than their share of the SSS. Finally, though the Kuwaiti Government supports the SSS, the government owns about 30.6 % of the four Kuwaiti insurance companies in the market. Therefore, the government will have another interest in the proposed plan and might contribute to it to achieve wider economic security (as most Non-Kuwaitis workers will be covered). Finally, the plan should encourage Non-Kuwaitis to stay in Kuwait, which may also assist economic development.



## **Chapter 7**

### ***Conclusions and Suggestions***

#### **7.1 ... Conclusions:**

The thesis has considered the group life insurance market as applied in Kuwait. It showed that the GLI market has increased rapidly since the changes in the Labour laws took place in 1965. Also, it showed how GLI was having (and still has) the largest share of the life insurance market. The problems of the GLI market were discussed.

Further, it was suggested that using an inefficient life table for pricing GLI might cause losses in the life insurance market. This is partly because of the large size of the GLI market with respect to the whole life insurance market.

Chapter 2 reviewed the literature on GLI definitions. The characteristics of GLI was discussed and compared with ILI. The advantages of GLI were described also with respect to ILI. It appeared that GLI policies do not require medical examination, and provide low cost life insurance compared with ILI.



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GLI pricing is based only on life tables (insuree's age) and job title. ILI pricing uses information such as insuree's health, type of work, life table and the amount of life cover (sum assured). Consequently, the thesis focused on the life tables used in the Kuwait GLI market. The literature also argues that choosing an efficient life table is the main factor in efficient pricing of GLI policies.

In addition, adverse selection, moral hazard, underwriting and information in the context of the GLI markets were discussed. It was found that most insurance literature on adverse selection and moral hazard was on ILI and the health insurance market but did not concern the GLI market. A new view of those problems relating to the GLI market was introduced. It was found that though both adverse selection and moral hazard may occur in this market, it is difficult to find evidence.

Chapter 3 reviewed the Kuwaiti insurance market, the GLI market, and the SSS. After introducing some key features of the Kuwaiti economy, the life insurance market was described. GLI figures revealed that it covered 75 % of the entire life insurance market. Furthermore, mortality rates and the factors affecting it were discussed.

The discussion considered how population, the economy, education level, health care, housing, and climate affect mortality rates. Some factors may have an effect in increasing mortality rates while others decrease it. Therefore, it seemed appropriate to test Kuwait mortality rates. The present characteristics of the Kuwait Social Security System are that:



- 1) Only Kuwaiti workers can join the plan.
- 2) The majority of the labour force (who is Non-Kuwaiti) faces the risks of premature death and old age with no insurance cover.
- 3) Estimates of the size of claims (pensions and benefits) on the SSS raises the possibility of real financial problems for the SSA in the future.

In addition, based on the literature review and the Kuwaiti GLI markets, several hypotheses were considered. Chapter 4 aimed to estimate mortality rates in Kuwait using SSS and GLI data from Kuwait. First, the chapter described the data required to estimate a Kuwaiti life table. The period of the study covered the years 1992 to 1995.

Crude mortality rates were determined from the SSS and GLI sample data, and then graduated. The method used was graduation with reference to a standard life table (the English life table 1924-29). To test for efficiency of graduation method, a chi-square test was applied. It was found that the graduation was successful.

Further, a model was developed to show that the use of an English life table 1924-29 might improve the insurer's profitability. The table was applied to the GLI sample data and shown to be most efficient.

In chapter 5, the underwriting methods in this market were described. It was suggested that insurers could collect insurees' information using a computerized database and so reduce part of their losses. Finally, to ensure disclosure of information, it was suggested that agents' commissions be based on yearly profits.



## 7.2 ... Proposals:

A group investment plan within GLI policies was suggested in chapter 6. One objective of the plan is to secure Non-Kuwaitis' future because at present they cannot join the Kuwaiti SSS. Nevertheless, Kuwaitis may enjoy an additional alternative income along with the SSS. The proposal was to provide insurees with a lump sum at age 60 (retirement).

The chapter first calculates the present value of the SSS pension assuming insurees retire at age 60 and die at 80. Also, it was assumed that SSS member's start working at age 30. The SSS contribution equals 15 % of the member's monthly salary.

Further, it was assumed that the member's monthly salary was KD 500 from age 30 to 39, KD 750 from age 40 to 49, and KD 1000 from age 50 to 60 (at retirement). Based on SSS characteristics discussed in chapter 3, the member's pension should be equal to KD 750 per month.

The proposed group plan provides a lump-sum at retirement greater than the SSS pension's present value. Even with the same monthly contribution such a plan could be in demand by both Kuwaiti and Non-Kuwaiti workers. However, the proposed plan was not suggested to substitute the SSS, but to be an optional alternative for insurees. Nevertheless, it was also suggested that the proposed investment group plan might be applied to oblige workers to save part of their monthly income as in the UK.



Finally, the chapter estimated a contribution of 11.9 % of a member's monthly salary could provide a lump-sum similar in value to the SSS pension's present value (that assumed to last between ages 60 and 80) holding other factors constant.

### 7.3 ... Summary:

This study covers many new issues for Kuwait GLI market and workers' income security. The work showed the importance of choosing the efficient life table for pricing GLI policies. It was found that Kuwait mortality rates are closer to the English life table 1924-29 where insurers use the English life table 1967-70.

Underwriting methods affect insurers' profits. The study found that underwriting in Kuwait needs updating to deal with the possible current lack of insureds' information. New methods of underwriting were suggested and figures of possible profit demonstrated, assuming insurers apply those methods.

Finally, a group investment plan was suggested for the GLI market. The plan should increase workers' future income (at retirement). Also, the plan was found that the proposed plan is financially accepted if compared with the SSS. It was shown that a private group investment under GLI market might be cheaper than the SSS. Nevertheless, the plan will provide income security for a large portion of society (Non-Kuwaitis) who is not presently covered by SSS.



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## Appendixes

## Appendix 2.1 ... The English Life Table (1924-1929).

Age x	Lx	Dx	qx	Age x	Lx	Dx	qx
0	100,000	8,996	0.08996	50	69,916	824	0.01179
1	91,004	2,120	0.02330	51	69,092	884	0.01279
2	88,875	933	0.01050	52	68,208	949	0.01391
3	87,942	572	0.00650	53	67,259	1,016	0.01511
4	97,370	415	0.00426	54	66,243	1,082	0.01633
5	86,955	363	0.00417	55	65,161	1,144	0.01756
6	86,592	292	0.00337	56	64,017	1,203	0.01879
7	86,300	238	0.00276	57	62,814	1,264	0.02012
8	86,062	198	0.00230	58	61,550	1,333	0.02166
9	85,864	171	0.00199	59	60,217	1,413	0.02347
10	85,693	155	0.00181	60	58,804	1,506	0.02561
11	85,538	148	0.00173	61	57,298	1,607	0.02805
12	85,390	149	0.00174	62	55,691	1,711	0.03072
13	85,241	157	0.00184	63	53,980	1,814	0.03361
14	85,084	169	0.00199	64	52,166	1,911	0.03663
15	84,915	185	0.00218	65	50,255	1,998	0.03976
16	84,730	208	0.00245	66	48,257	2,074	0.04298
17	84,522	235	0.00278	67	46,183	2,146	0.04647
18	84,287	260	0.00308	68	44,037	2,218	0.05037
19	84,027	279	0.00332	69	41,819	2,298	0.05495
20	83,748	292	0.00349	70	39,526	2,370	0.05996
21	83,456	303	0.00363	71	37,156	2,444	0.06578
22	83,153	311	0.00374	72	34,712	2,504	0.07214
23	82,842	317	0.00383	73	32,208	2,544	0.07899
24	82,523	320	0.00388	74	29,661	2,557	0.08621
25	82,202	327	0.00398	75	27,107	2,542	0.09378
26	81,875	328	0.00401	76	24,565	2,504	0.10193
27	81,547	329	0.00403	77	22,061	2,439	0.11056
28	81,218	331	0.00408	78	19,622	2,350	0.11976
29	80,887	338	0.00418	79	17,272	2,237	0.12952
30	80,549	350	0.00435	80	15,035	2,105	0.14001
31	80,199	365	0.00455	81	12,930	1,957	0.15135
32	79,834	382	0.00478	82	10,973	1,792	0.16331
33	79,432	400	0.00504	83	9,181	1,613	0.17569
34	79,052	418	0.00529	84	7,568	1,424	0.18816
35	78,634	435	0.00553	85	6,144	1,227	0.19971
36	78,199	450	0.00575	86	4,917	1,042	0.21192
37	77,749	466	0.00599	87	3,875	871	0.22477
38	77,283	485	0.00628	88	3,004	716	0.23835
39	76,798	504	0.00656	89	2,288	578	0.25262
40	76,294	525	0.00688	90	1,710	457	0.26725
41	75,769	547	0.00722	91	1,253	354	0.28252
42	75,222	570	0.00758	92	898	269	0.29955
43	74,652	595	0.00797	93	629	199	0.31638
44	74,057	621	0.00839	94	430	143	0.33256
45	73,436	647	0.00881	95	286	101	0.35315
46	72,789	671	0.00922	96	185	66	0.35676
47	72,118	698	0.00968	97	116	45	0.38793
48	71,420	731	0.01024	98	70	29	0.41429
49	70,689	773	0.01094	99	41	41	1.00000

Source: Institute of Actuaries, Library, London, and UK.



*Appendixes*

Appendix 4.1 ... The American Male Life Table (CSO 1958)

**Appendix 2.2 ... The English Male Life Table (1967-1970).**

Age x	Lx	Dx	qx	Age x	Lx	Dx	qx
0	34,481,408	19,999	0.00058	41	33,466,599	37,952	0.00113
1	34,456,927	18,606	0.00054	42	33,407,624	42,264	0.00127
2	34,433,841	17,216	0.00050	43	33,340,915	47,008	0.00141
3	34,412,836	15,829	0.00046	44	33,265,431	52,189	0.00157
4	34,393,221	14,445	0.00042	45	33,180,042	57,828	0.00174
5	34,375,681	13,406	0.00039	46	33,083,523	63,934	0.00193
6	34,359,181	12,369	0.00036	47	32,974,549	70,516	0.00214
7	34,344,063	11,676	0.00034	48	32,851,686	77,583	0.00236
8	34,329,638	10,895	0.00032	49	32,713,329	85,141	0.00260
9	34,315,907	10,294	0.00030	50	32,558,008	93,195	0.00286
10	34,303,210	10,290	0.00030	51	32,383,756	101,742	0.00314
11	34,290,518	10,287	0.00030	52	32,188,740	110,781	0.00344
12	34,277,830	10,283	0.00030	53	31,970,942	120,302	0.00376
13	34,264,461	10,964	0.00032	54	31,728,226	130,293	0.00411
14	34,250,070	13,015	0.00038	55	31,485,342	140,732	0.00447
15	34,232,259	16,773	0.00049	56	31,158,931	151,593	0.00487
16	34,209,439	22,236	0.00065	57	30,827,543	162,840	0.00528
17	34,179,680	28,662	0.00084	58	30,461,645	174,429	0.00573
18	34,143,368	26,468	0.00078	59	30,058,648	186,304	0.00620
19	34,109,166	24,434	0.00072	60	29,615,936	198,398	0.00670
20	34,076,957	22,568	0.00066	61	29,130,898	210,633	0.00723
21	34,046,610	20,876	0.00061	62	28,600,975	222,915	0.00779
22	34,017,983	19,364	0.00057	63	28,023,708	235,137	0.00839
23	33,990,921	18,042	0.00053	64	27,396,808	247,176	0.00902
24	33,965,254	16,916	0.00050	65	26,718,225	258,894	0.00969
25	33,940,795	15,995	0.00047	66	25,986,236	270,138	0.01040
26	33,917,341	15,289	0.00045	67	25,199,536	280,738	0.01114
27	33,894,668	14,807	0.00044	68	24,357,348	290,512	0.01193
28	33,872,531	14,559	0.00043	69	23,459,538	299,265	0.01276
29	33,650,662	14,555	0.00043	70	22,506,732	306,792	0.01363
30	33,828,764	14,805	0.00044	71	21,500,445	312,885	0.01455
31	33,806,514	15,323	0.00045	72	20,443,198	317,335	0.01552
32	33,783,557	16,118	0.00048	73	19,338,635	319,939	0.01654
33	33,759,503	17,204	0.00051	74	18,191,617	320,507	0.01762
34	33,733,924	18,593	0.00055	75	17,008,294	318,875	0.01875
35	33,706,352	20,298	0.00060	76	15,796,140	314,907	0.01994
36	33,676,272	22,334	0.00066	77	14,563,940	308,512	0.02118
37	33,643,122	24,713	0.00073	78	13,321,717	299,652	0.02249
38	33,606,286	27,450	0.00082	79	12,080,592	288,351	0.02387
39	33,565,089	30,559	0.00091	80	10,852,568	274,703	0.02531
40	33,518,794	34,055	0.00102				

Source: Neill (1977, page 418).



*Appendixes*

**Appendix 4.1 ... The American Male Life Table (CSO 1958).**

Age x	Lx	Dx	qx	Age x	Lx	Dx	qx
0	10,000,000	70,800	0.00708	50	8,762,306	72,902	0.00832
1	9,929,200	17,475	0.00176	51	8,689,404	79,160	0.00911
2	9,911,725	15,066	0.00152	52	8,610,244	85,758	0.00996
3	9,896,659	14,449	0.00146	53	8,524,486	92,832	0.01089
4	9,882,210	13,835	0.00140	54	8,431,654	100,337	0.01190
5	9,868,375	13,322	0.00135	55	8,331,317	108,307	0.01300
6	9,855,053	12,812	0.00130	56	8,223,010	116,849	0.01421
7	9,842,241	12,401	0.00126	57	8,106,161	125,970	0.01554
8	9,829,840	12,091	0.00123	58	7,980,191	135,663	0.01700
9	9,817,749	11,879	0.00121	59	7,844,528	145,830	0.01859
10	9,805,870	11,865	0.00121	60	7,698,698	156,592	0.02034
11	9,794,005	12,047	0.00123	61	7,542,106	167,736	0.02224
12	9,781,958	12,325	0.00126	62	7,374,370	179,271	0.02431
13	9,769,633	12,896	0.00132	63	7,195,099	191,174	0.02657
14	9,756,737	13,562	0.00139	64	7,003,925	203,394	0.02904
15	9,743,175	14,225	0.00146	65	6,800,531	215,917	0.03175
16	9,728,950	14,983	0.00154	66	6,584,614	228,749	0.03474
17	9,713,967	15,737	0.00162	67	6,355,865	241,777	0.03804
18	9,698,230	16,390	0.00169	68	6,114,088	254,835	0.04168
19	9,681,840	16,846	0.00174	69	5,859,253	267,241	0.04561
20	9,664,994	17,300	0.00179	70	5,592,012	278,426	0.04979
21	9,647,694	17,655	0.00183	71	5,313,586	287,731	0.05415
22	9,630,039	17,912	0.00186	72	5,025,855	294,766	0.05865
23	9,612,127	18,167	0.00189	73	4,731,089	299,289	0.06326
24	9,593,960	18,324	0.00191	74	4,431,800	301,894	0.06812
25	9,575,636	18,481	0.00193	75	4,129,906	303,011	0.07337
26	9,557,155	18,732	0.00196	76	3,826,895	303,014	0.07918
27	9,538,423	18,981	0.00199	77	3,523,881	301,997	0.08570
28	9,519,442	19,324	0.00203	78	3,221,884	299,829	0.09306
29	9,500,118	19,760	0.00208	79	2,922,055	295,683	0.10119
30	9,480,358	20,193	0.00213	80	2,626,372	288,848	0.10998
31	9,460,165	20,718	0.00219	81	2,337,524	278,983	0.11935
32	9,439,447	21,239	0.00225	82	2,058,541	265,902	0.12917
33	9,418,208	21,850	0.00232	83	1,792,639	249,858	0.13938
34	9,396,358	22,551	0.00240	84	1,542,781	231,433	0.15001
35	9,373,807	23,528	0.00251	85	1,311,348	211,311	0.16114
36	9,350,279	24,685	0.00264	86	1,100,037	190,108	0.17282
37	9,325,594	26,112	0.00280	87	909,929	168,455	0.18513
38	9,299,482	27,991	0.00301	88	741,474	146,997	0.19825
39	9,271,491	30,132	0.00325	89	594,477	126,303	0.21246
40	9,241,359	32,622	0.00353	90	468,174	106,809	0.22814
41	9,208,737	35,362	0.00384	91	361,365	88,813	0.24577
42	9,173,375	38,253	0.00417	92	272,552	72,480	0.26593
43	9,135,122	41,382	0.00453	93	200,072	57,881	0.28930
44	9,093,740	44,741	0.00492	94	142,191	45,026	0.31666
45	9,048,999	48,412	0.00535	95	97,165	34,128	0.35124
46	9,000,587	52,473	0.00583	96	63,037	25,250	0.40056
47	8,948,114	56,910	0.00636	97	37,787	18,456	0.48842
48	8,891,204	61,794	0.00695	98	19,331	12,916	0.66815
49	8,829,410	67,104	0.00760	99	6,415	6,415	1.00000

Source: Institute of Actuaries, Library, London, and UK.



Appendix 4.2 ... The American Male Life Table (CSO 1980).

Age x	Lx	Dx	qx	Age x	Lx	Dx	qx
0	10,000,000	41,800	0.00418	50	8,966,618	60,166	0.00671
1	9,958,200	10,655	0.00107	51	8,906,452	65,017	0.00730
2	9,947,545	9,848	0.00099	52	8,841,435	70,378	0.00796
3	9,937,697	9,739	0.00098	53	8,771,057	76,396	0.00871
4	9,927,958	9,432	0.00095	54	8,694,661	83,121	0.00956
5	9,918,526	8,927	0.00090	55	8,611,540	90,163	0.01047
6	9,909,599	8,522	0.00086	56	8,521,377	97,655	0.01146
7	9,901,077	7,921	0.00080	57	8,423,722	105,212	0.01249
8	9,893,156	7,519	0.00076	58	8,318,510	113,049	0.01359
9	9,885,637	7,315	0.00074	59	8,205,461	121,195	0.01477
10	9,878,322	7,211	0.00073	60	8,084,266	129,995	0.01608
11	9,871,111	7,601	0.00077	61	7,954,271	139,518	0.01754
12	9,863,510	8,348	0.00085	62	7,814,753	149,965	0.01919
13	9,853,126	9,757	0.00099	63	7,664,788	161,420	0.02106
14	9,845,369	11,322	0.00115	64	7,503,368	173,628	0.02314
15	9,834,047	13,079	0.00133	65	7,329,740	186,322	0.02542
16	9,820,968	14,830	0.00151	66	7,143,418	198,944	0.02785
17	9,806,138	16,376	0.00167	67	6,944,474	211,390	0.03044
18	9,789,762	17,426	0.00178	68	6,773,084	223,471	0.03299
19	9,772,336	18,177	0.00186	69	6,509,613	235,453	0.03617
20	9,754,159	18,533	0.00190	70	6,274,160	247,892	0.03951
21	9,735,626	18,595	0.00191	71	6,026,268	260,937	0.04330
22	9,717,031	18,365	0.00189	72	5,765,331	274,718	0.04765
23	9,698,666	18,040	0.00186	73	5,490,613	289,026	0.05264
24	9,680,626	17,619	0.00182	74	5,201,587	302,680	0.05819
25	9,663,007	17,104	0.00177	75	4,898,907	314,461	0.06419
26	9,645,903	16,687	0.00173	76	4,584,446	323,341	0.07053
27	9,629,216	16,466	0.00171	77	4,261,105	328,616	0.07712
28	9,612,750	16,342	0.00170	78	3,932,489	329,936	0.08390
29	9,596,408	16,410	0.00171	79	3,602,553	328,012	0.09105
30	9,579,998	16,573	0.00173	80	3,274,541	323,656	0.09884
31	9,563,425	17,023	0.00178	81	2,950,885	317,161	0.10748
32	9,646,402	17,470	0.00181	82	2,633,724	308,804	0.11725
33	9,328,932	18,200	0.00195	83	2,324,920	298,194	0.12826
34	9,510,732	19,021	0.00200	84	2,026,726	284,248	0.14025
35	9,491,711	20,028	0.00211	85	1,742,478	266,512	0.15295
36	9,471,683	21,217	0.00224	86	1,475,966	245,143	0.16609
37	9,450,466	22,681	0.00240	87	1,230,823	220,994	0.17955
38	9,427,785	24,324	0.00258	88	1,009,829	195,170	0.19327
39	9,403,461	26,236	0.00279	89	814,659	168,871	0.20729
40	9,377,225	28,319	0.00302	90	645,788	143,216	0.22177
41	9,348,906	30,758	0.00329	91	502,572	119,100	0.23698
42	9,318,148	33,173	0.00356	92	383,472	97,191	0.25345
43	9,284,975	35,933	0.00387	93	286,281	77,900	0.27211
44	9,249,042	38,753	0.00419	94	208,381	61,660	0.29590
45	9,210,289	49,107	0.00533	95	146,721	48,412	0.32996
46	9,168,382	45,108	0.00492	96	98,309	37,805	0.38455
47	9,123,274	48,536	0.00532	97	60,504	29,054	0.48020
48	9,074,738	52,089	0.00574	98	31,450	20,693	0.65797
49	9,022,649	56,031	0.00621	99	10,757	10,757	1.00000

Source: Black and Skipper (1994), Table 18 - 1, pages 518 and 519.



## Appendixes

### Appendix 4.3 ... A sample of Kuwait Insurance Company Database of a Group Insuree in the GLI Sector.

Kuwait Insurance Company S.A.L.

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Occupation Class 20

RAJIBHIL UNREGISTERED COMPANY

Y.O.B	AGE	RATE	1	2	3	4	5	6	7	LIVES	TOTAL SALARY	SUM ASSURED	RATE
1956	37	0.900	311.771	291.750	282.000	254.813	244.904	243.088	237.625	37	6232.873	271903.620	237.091
			230.125	230.125	229.500	221.343	217.875	208.750	199.313				
			190.313	189.000	178.813	166.333	157.042	149.003	148.647				
			143.000	143.542	133.000	128.000	128.000	128.000	128.136				
			96.500	75.313	85.917	85.917	79.500	79.500	77.000				
			77.000	77.000									
1957	38	1.250	356.647	311.750	282.000	243.003	245.003	243.750	234.417	49	7750.899	250397.544	270.316
			230.125	213.875	213.875	213.875	208.938	208.703	208.708				
			190.125	190.500	190.003	183.108	185.000	170.750	170.750				
			170.750	162.253	151.625	149.003	143.000	143.000	143.000				
			143.000	143.542	143.000	139.917	130.000	128.000	128.000				
			125.375	99.646	95.313	91.542	85.917	85.917	85.917				
			85.917	85.000	82.708	82.708	79.500	77.000	77.000				
1958	39	1.140	281.700	272.250	243.003	238.250	234.417	230.125	230.125	54	8234.445	295777.220	337.120
			222.000	222.000	213.875	213.875	213.875	213.875	213.875				
			228.938	199.283	199.003	193.000	188.000	182.583	180.003				
			159.917	151.000	149.003	143.000	144.772	144.003	138.333				
			138.333	135.042	133.000	133.000	128.000	125.375	120.500				
			118.917	117.042	111.875	96.500	96.500	96.500	96.500				
			84.417	65.917	82.708	82.708	79.500	79.500	79.500				
			79.500	77.000	77.000	77.000	77.000						
1959	40	1.200	301.500	272.250	261.647	243.003	243.003	243.003	234.417	62	9759.772	311331.792	449.730
			230.125	230.125	225.844	222.000	217.875	213.875	208.750				
			190.125	197.625	199.583	195.343	193.989	193.000	190.313				
			180.000	182.583	173.500	173.000	172.813	168.000	168.000				
			148.333	135.042	134.542	131.000	131.000	149.003	145.000				
			138.333	130.000	134.708	128.000	119.313	113.917	118.917				
			114.000	112.417	109.750	109.167	109.000	98.333	98.333				
			96.500	96.500	96.500	96.500	96.313	79.500	79.500				
79.500	77.000	77.000	77.000	77.000	77.000								
1954	41	1.430	316.647	291.750	272.000	230.125	230.125	230.125	229.500	41	1406.897	230772.292	318.000
			222.000	222.000	222.000	213.250	208.750	195.383					

Notes: Occupation Class 20 = Low Risk Insuree, and 10 = High Risk Insuree.

Sum Assured = 36 \* Monthly Salary.

The Data represents the following:

- 1) Age: In years to the nearest birthday. And Year of Birth (Y.O.B.).
- 2) Rate: Premium rate per 1000 KD of sum assured.
- 3) Monthly Salary: The monthly salary for each insured in KD.
- 4) Lives: Number of lives under a similar age.
- 5) Total Salary: The total monthly salary per insuree of the same age.
- 6) Sum Assured: The total sum assured for insuree of the same age.
- 7) RATE: The monthly net single premium for insuree of the same age.
- 8) Company: The name of the company holding the group policy.

Source: Kuwait Insurance Company (1996), Life Insurance Department.



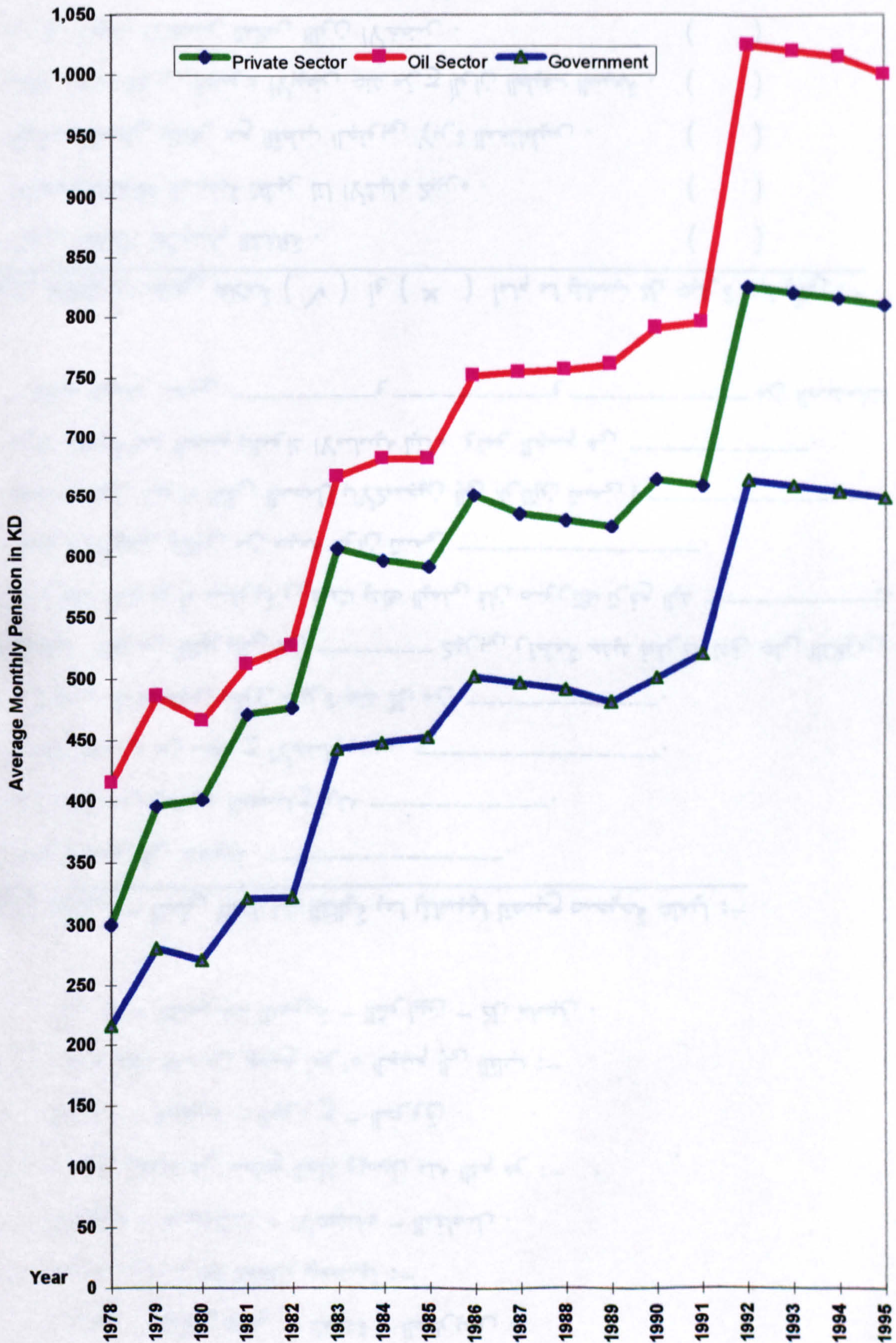
Appendix 4.4 ... Net single premium per annum in KD for each KD 1000 of term life insurance coverage under a group policy.

<i>Age</i>	<i>Low Risk Price</i>	<i>High Risk Price</i>
20	6.0	6.6
21	6.0	6.6
22	6.1	6.71
23	6.1	6.71
24	6.2	6.82
25	6.3	6.93
26	6.4	7.04
27	6.4	7.04
28	6.5	7.15
29	6.6	7.26
30	6.6	7.26
31	6.7	7.37
32	6.8	7.48
33	6.9	7.59
34	7.2	7.92
35	7.7	8.47
36	8.4	9.24
37	9.2	10.12
38	10.2	11.22
39	11.4	12.54
40	12.8	14.08
41	14.3	15.73
42	16.2	17.82
43	18.3	20.13
44	20.7	22.77
45	23.3	25.63
46	26.3	28.93
47	29.7	32.67
48	33.5	36.85
49	37.7	41.47
50	42.4	46.64
51	47.7	52.47
52	53.5	58.85
53	59.9	65.89
54	67.1	73.81
55	75.0	82.50
56	83.7	92.07
57	93.3	102.63
58	104.0	114.40
59	115.7	127.27
60	128.6	141.46
61	142.7	156.97
62	158.3	174.13
63	175.3	192.83
64	194.1	213.51
65	214.6	236.06

Source: Kuwait Insurance Company, 1992 to 1996 prices.



Appendix 6.1 ... The Growth of Average Pensions By the SSA During the Period 1978 to 1995 in Kuwait.



Source: The SSA Annual Statistics Book (1995, page 67), Kuwait.



