Modelling the Actuarial Projection and Valuation of the Egyptian Social Security Pension System

By

Mohamed Ahmed Maait

Thesis submitted for the degree of

DOCTOR OF PHILOSOPHY

THE CITY UNIVERSITY

LONDON

FACULTY OF ACTUARIAL SCIENCE AND STATISTICS

Cass Business School

March 2003

Chapter 6
Labour Force Participation and Unemployment Projections, 1997-2025

6.1. Introduction

One of the core requirements of the actuarial projection of national social insurance schemes is to forecast future employment, unemployment and covered worker rates by estimating the supply of and demand for labour force. Theses are fundamental variables utilised in the projections. Demographic and social characteristics of the population determine the supply of workers, while national economic conditions, mainly, determine the demand side. Clearly, unemployment is the result of an imbalance between the supply and demand of the labour force.

Accelerated population growth is one of the major causes of increasing unemployment in many developing countries, particularly when the economy is not capable of providing job opportunities for new entrants to the labour market. It may also be a result of recession, when the level of gross national product (GNP) declines or is not growing fast enough. The problem is more severe when the slow growth of labour demand is combined with a rapidly growing labour supply.

Lower labour force participation rates (LFPRs) for young age groups could burden social security systems by decreasing the number of contributors, which may be linked to the problem of unemployment. Also the declining participation of older age groups may be reflected in the number of social insurance benefit recipients (either because of an increase in unemployment insurance or in early retirement rates).

As in other developing countries, Egypt's measured LFPRs are traditionally low with a growing chronic imbalance between the supply of and demand for labour. The problem is mainly attributed to rapid population growth, which adds to the supply of labour at a much faster rate than could be effectively absorbed in employment[1]. This chapter aims to investigate the structure, characteristics and trends of the labour force, employment and unemployment in Egypt over 1976-97. It aims also to quantify these factors for use in the actuarial projection of the ESSPS.

---

[1] Many studies about the labour force in Egypt have been carried out and these include, Wahba, 1983; Nagi, 1988; ElAshry, 1991; Soliman, 1995; Kenawi, 1996; ILO, 2000; Scholz W. et. el., 2000.

6.2. Labour Supply

Labour supply is determined by the size and structure of the population, and more precisely by the maximum number of potentially active persons. The labour force in a country, by definition, comprises all persons who are either employed or actively seeking employment, but the bulk concentrates in the age groups 25-54[2]. The sources of labour force changes are the population component[3], the age-structure component and the age-specific participation rate component[4]. Changes in the age–structure of the labour force reflect variations in the age of entry into the labour force and in the age at retirement, or involuntary withdrawal into inactive status. Changes in the age-structure of the population in Egypt have had a very small effect on the total labour force of both sexes (Soliman, 1995).

6.2.1. Labour Force Structure

Over 1900-60, the total labour force more than doubled with an annual growth of 1.5%. Over 1960-96, the annual growth rate increased to 3.0%, because of growth rates of new entrants to the labour market over the 1970s and the 1980s[5]. These high growth rates of labour force expansion were mainly attributed to population growth, which overshadowed the negative effects of participation in economic activities during 1970-95 (Soliman, 1995). ILO (1997) projects that the growth rate of labour supply will decrease by 0.05% per annum from the 3% rate in 1997, and ultimately reach 2% by 2025, which seems consistent with the changes in the population structure.

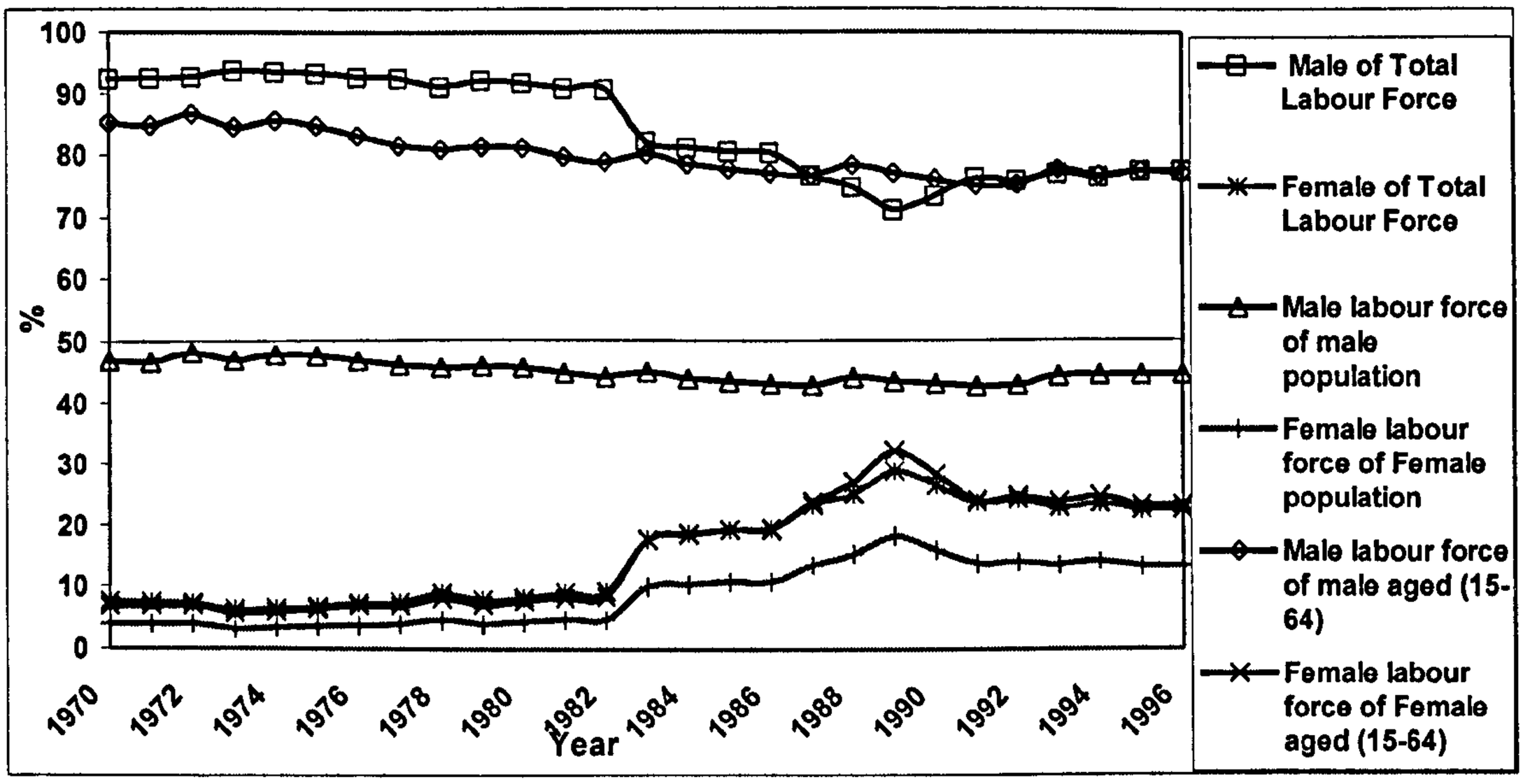
The total crude activity rate (CAR)[6] has grown by 0.5% per annum over 1970-96, with a minimum of 25.8% in 1982, a maximum of 32% in 1989, and 29% in 1996[7]. The male CAR over 1970-96 decreased from 46% in 1970 to 44% in the 1990s, at an annual rate of 0.2%. The female CAR improved dramatically from 3.9% in the 1970s to 13.5% in the 1990s at an annual growth of 4.9%. However, it is still very low compared with some other countries, because a large proportion of females is excluded from the labour force to be homemakers. The changes in the total labour

---

[2] The potentially active population comprises all persons, male and female, between the ages 12 to 15 and 65 to 70 or even outside this range.
[3] This is determined by the demographic factors such as fertility, mortality, migration and urbanisation.
[4] This indicates the rate of participation in the economic activities.
[5] The labour force increased from 8.2 million in 1970 to 17.7 million in 1996.
[6] This is the ratio of the labour force to the total population.
[7] This implies a heavy demographic dependency burden.

force and the male labour force at the national level are similar due to the predominance of males in the labour force[8] as shown in Figure 6.1 and **Table 5.1 of Appendix 5.**

Figure 6.1. % Males and Females Labour Force over 1970-96



The overall level of LFPR at the national level was relatively stable over 1970-96 (47% in the 1970s and 52% in the 1990s). The male proportion of the total labour force has declined from 93% in the 1970s to 78% in the 1990s and the male LFPR has also declined[9] from 85.3% to 77.6% at an annual rate of 0.36% over the same period. The main reason for this decrease was, among many other reasons, the emigration of men to work in the oil rich Arab Gulf countries[10] for a much better salaries, leaving more job opportunities for females.

The female proportion of total labour force increased from 7.6% in the 1970s to 21.7% in 1997, at an annual growth rate of 3.6%[11]. The female LFPR increased from 6.8% in 1970 to 23% in 1997 at an annual growth rate of 4.3%[12] with the highest growth recorded in the 1980s. This rate started to slow again in the 1990s, and the

---

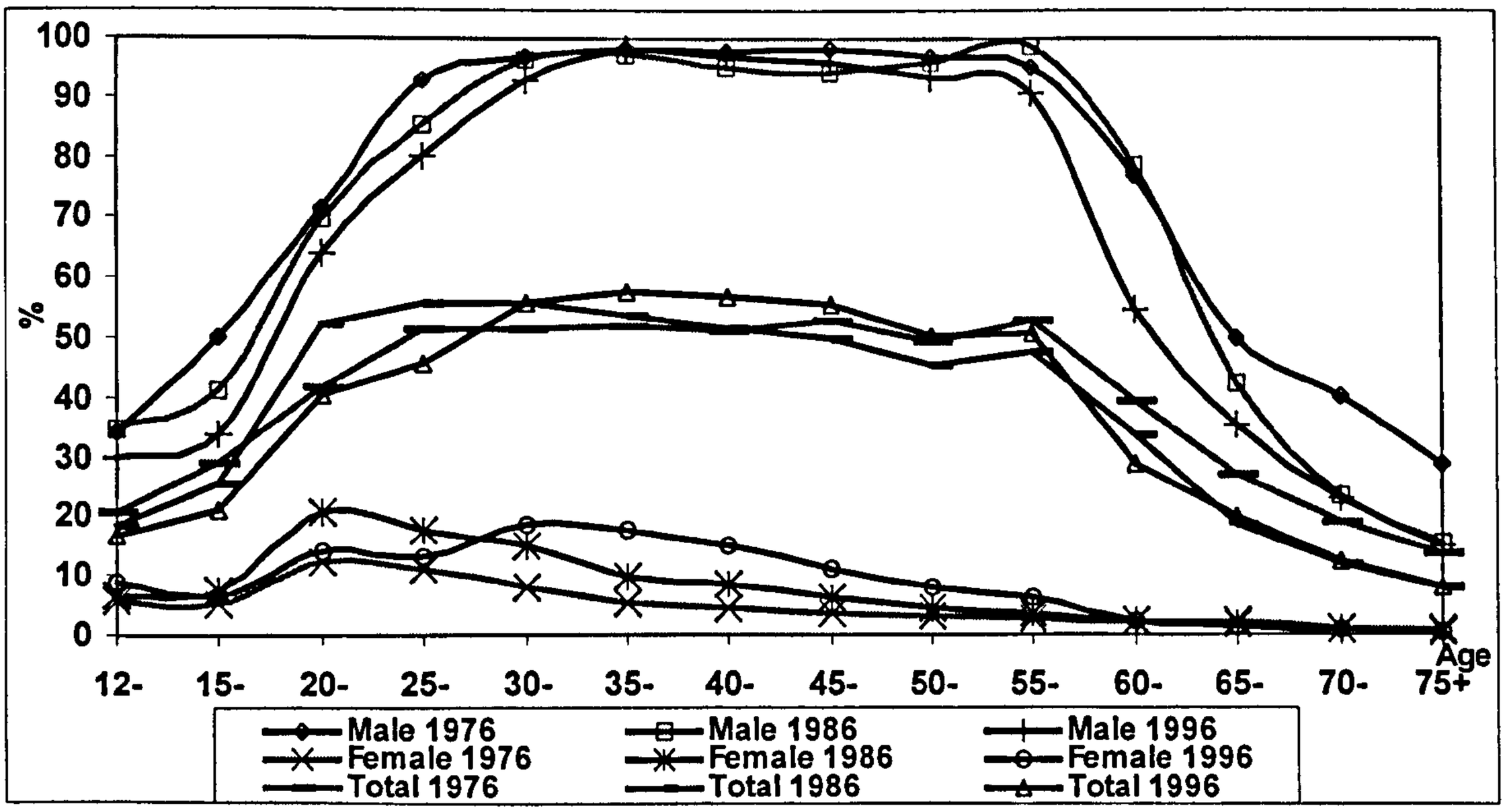
[8] This is the case in most developing countries.
[9] The male labour force has increased from 7.6 million in 1970 to 13.8 million in 1997 at an annual growth rate of 2.2%.
[10] Egyptians working abroad constitute a large component of the labour force. Unofficial estimates put their number close to three million.
[11] The female labour force increased from 0.62 million in 1970 to 3.76 million in 1997 (an annual growth of 6.4%) which implies 6 times more than that in 1970 compared with less than double for males over the same period.
[12] The ILO (1996) indicates that the female participation rate has increased by 0.5% per year, whereas the male participation has declined by 0.43% per year over 1975-96.

annual rate was 2% over 1986-96. Although the female participation is still low, it is growing and there is a gradual shift in the general participation profile in favour of females, a trend which is expected to continue in the future.

6.2. 2. Age-Specific Activity Rates, 1976-96

The LFPRs in Egypt are, in general, similar to the universal patterns as shown in Figure 6.2[13] and **Table 5.1 of Appendix 5**. They start at low levels in the age group under 20 and increase rapidly until ages 20-24 when all students finish their education and training. They peak at the age group 30-34 and remain stable at a high level until age 55[14]. At age 50 they start to decline gradually and rapidly after age 55 due to the increasing chances of death and voluntary or enforced retirement.

Figure 6.2: LFPRs of Males and Females over 1976-96.



Over 1970-96, falling activity rates had a negative effect on the total and male labour force, and it was only the activity rates of females which were increasing[15]. The relative share of participation in the younger (15-29) and in the older (55+) age groups also decreased. Over 1976-96, male LFPRs were decreasing significantly at these ages and remained almost stable in the intermediate age groups. Female participation

---

[13] Those who actually participate or want to participate are usually measured in (regular) labour market surveys to calculate the so-called labour market participation rates.

[14] The age groups between 30 and 55 are most liable to determine the size of the total number of persons with credits in pension systems, rather than the size of the employed population close to the retirement age bracket alone (Scholz W. et. el., 2000).

[15] The increase in female participation did not offset the decrease in male participation because of its small base.

was increasing in all age groups except 15-29 and 60+[16] where they were decreasing, which is a phenomenon for both sexes[17]. The maximum female participation was in the age group 30-34 (7.8% in 1976 and 18.3% in 1996). Female participation trends experienced over 1976-96[18] are expected to be reflected in the structure of future labour force. A complex set of economic, social, cultural, and possibly demographic factors influence the decision to participate in the labour force. The influence of these factors is different for various age groups and sexes, which creates variation in the LFPRs and the direction of their changes over time.

6.2.3. Factors Affecting Labour Force Participation

The most important factors affecting activity rates, in general, are female participation rates, the proportion of young adults in higher education, rates of long term sickness, rates of early and late retirement (Khorasanee, 2000). There are also some other factors which affect the growth of labour supply and activity rates, such as the state of the economy, the availability and level of retirement benefits, the general trend in attitudes towards work, leisure, and retirement.

The educational status of the population[19] is one of the most important social characteristics affecting levels and patterns of participation in the labour force particularly in the age groups 15-29. Although Egypt has implemented various educational programs, the current one does not match the needs of the labour market. The education system is characterised as "detached from the needs of the local labour market and training programs are ineffective and lack planning and private sector participation" (Kenawi, 1996).

Another factor is labour force emigration, which is attracting young people, especially males, and this changes the age pattern of the labour force. The expansion of education is decreasing child labour and lower participation of the older age groups[20] is mainly attributed to retirement as a result of social security expansion, increasing

---

[16] It is expected to decline further in the future reflecting the underlying trend of the retirement pattern.
[17] In recent decades, female LFPRs have been increasing in most countries, whereas the rates of older male workers have dropped (Scholz W. et. el., 2000).
[18] Increases in the LFPRs of the relatively young cohorts of women in 1976 and 1986 are likely to result in increased participation during the reminder of their working lifetimes.
[19]Egypt committed itself to a continuing strategy of extending free education from primary school until university, which has allowed young people to delay entry into the labour market.
[20] The decline of LFPR of elder males and females is a crucial factor, as it will increase the number of social insurance benefit recipients.

pensions and also health problems that lead to incapacity to work. Increasing early retirement was facilitated by the government's encouragement to ease pressure on the labour market and increased personal savings.

6.2.3.1. Factors Affecting Female and Male Participation Rates

Demographic and socio-economic developments, such as marital status, the presence of children in the family, the presence of a disabling condition and changes in society with regard to the rights and responsibilities of women have different effects on male and female participation rates. The considerable differences between male and female participation in Egypt is caused by factors such as cultural and religious barriers, traditions and social customs that consider woman as economically dependent[21]. Hence women are not often required to be economically active.

The decline in male activity over 1976-96 has been affected, mainly, by the decline in young male participation due to enrolment in education and male labour force emigration. Emigration of males to seek work abroad during 1976-96 put less pressure on demand for jobs at home which contributed to the increase in female participation. The increase in female participation is due to a decrease in female homemakers[22], an expansion in female education, a decrease in the percentage of women marrying at very early ages, a decrease in fertility rates, and the opening up of more employment opportunities to replace male emigration.

Female educational standards are improving and expanding faster than that of males, as the relative share of most education categories is higher for females than males (Soliman, 1995). This is a significant factor in increasing female participation at intermediate ages and decreasing their participation in the early age groups. But the overall low levels of female participation at the primary age groups 25-59 results from the high proportion of married females caring for children at these ages. Another reason for low female participation in economic activities is the possibility of under-reporting of participation among females, and the exclusion of unpaid family workers in rural areas.

---

[21] The private sector has recently shied away from employing women, partly because of the need to finance maternity leave and partly because of their preference for male employees in general, and this trend is expected to continue in the future (Kenawi, 1996).

[22] Severe economic problems have been forcing women to work to support themselves and their families, which have also increased the average age at which women marry.

6.2.4. Projection of LFPRs over 1997-2025

The future total labour force depends mainly on the future population, as the size of the future economically active population is the sum over all age groups as follows:

$$TLF(t) = \sum_{s} \sum_{x=15}^{65} (POP(x, t, s) * LFPR(x, t, s) \qquad (6.1)$$

LFPR(x, t, s) are exogenous factors which determine the development of labour force, and are assumed to take account of the recent trends in participation, adjusted to reflect the expected future socio-economic changes in participation.

A technically simple way to project the future development of labour supply is by leaving LFPRs constant during the projection period; any projected changes in the overall participation rate then only result from changes in the population structure[23] (Scholz W. et. el., 2000). This approach considers what would happen in the future under status quo conditions without including any future modification due to behavioural or policy changes[24]. This approach is appropriate if there is no sufficient information available to indicate that the rates may need to be modified according to factors such as past trends, expected changes in the overall socio-economic environment or legislation.

Another technique for estimating future LFPRs is suggested by the ILO (1997), which involves simulating different countries' experiences. This approach is easy and considers the experience of other countries as a standard pattern, particularly the developed countries, but it is viable only if the countries have comparable socio-economic environments which can indicate a similar pattern of future national LFPRs.

In 1997, ILO simulated the labour force participation of Egypt with those of some of the OECD countries[25] over the period 1979-95. The simulated expected future annual changes in participation rates appeared to be close to the historical trends of Egypt, as

---

[23] It should be noted that this approach – despite its advantages – has been fundamentally criticised; one result of this criticism was the development of microsimulation models (Scholz W. et. el., 2000).
[24] This approach was applied to the Egyptian data in 1995 through two variants: Variant I assumes that the age-specific participation rates remain constant throughout the projection period. Variant II assumes that female participation will increase by 1% point per year, except for the "prime active age groups" 35-49, where the participation rates increase by 2.5% points annually. Male participation rates remain unchanged. The increased participation of females leads potentially to an additional 3.8 million workers within two-and-a-half decades, which if not absorbed by the labour market will lead to additional open or hidden unemployment (Scholz W. et. el., 2000).
[25] France, Italy, the Netherlands, Spain and Portugal

an annual increase of 0.55% for females[26] and an annual decrease of 0.35% for males were suggested. However, although female LFPR is expected to continue to increase into the future, the most likely scenario is that this increase will be at lower rates than those experienced over 1976-96 as a result of the mentioned socio-economic factors. Factors affecting female participation rates in the OECD countries will not necessarily have the same effect in Egypt and may work in different directions. Also, analysis of the factors affecting female participation in Egypt suggests that it may not continue to increase to high levels, as happened in the OECD countries.

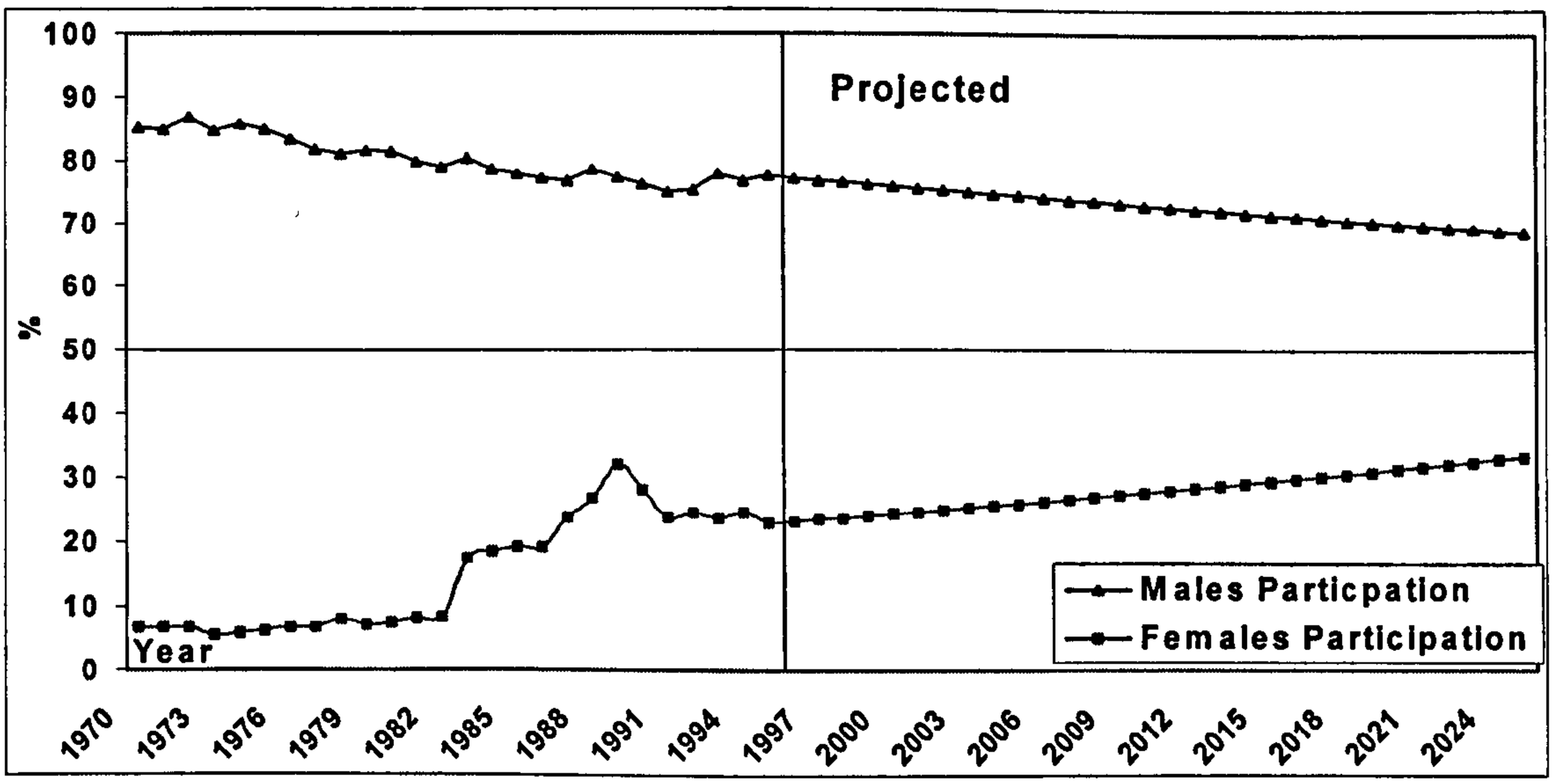
Another technique is to assume that the trend of the LFPR at each age and sex observed over a specific period in the past[27] will continue over the projection period with or without any adjustments. These trends are then applied to the LFPR's of the base year and extended throughout the projection period. However, upper limits on the overall levels of participation for each sex may be required.

In this thesis, two variants are applied in projecting the future labour force participation in Egypt. Variant I assumes that the age-specific activity rates in the base year 1996 remain constant throughout the projection period and this will represent the principle projection (*status quo* assumption). Variant II adopts the last technique by assuming an annual increase in the total female LFPR of 0.30-0.41%[28] over 1997-2025. For the total male LFPR, an annual decrease of 0.31-0.28%[29] over 1997-2025 is assumed as shown in Figure 6.3. The geometric mean growth rate of the LFPRs observed over 1976-96 of each age and sex is applied to the LFPRs of the base year of 1996 and extended throughout the projection period. Proportional adjustments to LFPRs are made to restrict the changes in total female and male participation rates respectively to the assumed total rates.

---

[26] This rate of increase seems high compared with what is expected to occur in Egypt.
[27] Calculating the geometric mean of the growth rate over this period can do this.
[28] This is equivalent to an assumption of an annual growth of 1.25% in the female labour force (extended exponentially) which was the geometric mean of growth observed over 1976-96.
[29] This is equivalent to an assumption of an annual decline in male labour force of 0.4% (extended exponentially).

Figure 6.3. Estimation of Future Males and Females total LFPRs over 1997-2025.



These projections imply that the total female LFPR will reach 27% in 2005[30] and 33.4% in 2025, compared with the ILO's estimate of 39%. They also indicate that total male LFPR will reach 74.4% in 2005[31] and 69% in 2025. These assumptions seem reasonable, prudent and also consistent with the analysis of past experience. These estimates reveal the effect of changes in both population and LFPRs and the interaction between them. Female labour force increases will be higher than they would be if only changes in fertility and marital status were considered. Male labour force increases will be caused only by population growth following the pattern of change over 1976-96. Results of the projected total and age-specific LFPRs for males and females are presented in **Table 5.2 of Appendix 5**[32] and a summary is shown in Table 6.1. Table 6.1 shows that future fertility together with ASARs according to variant II will have some effects on the future of total number of labour force.

Table 6.1. Projected labour force over 1997-2025 according to two variants (in thousands).

Year	Demographic Scenarios	1997	2000	2005	2010	2015	2020	2025
Variant I	Scenario I	18322	20008	22807	25668	28454	31240	34058
	Scenario II	18322	20009	22815	25687	28549	31570	34810
	Scenario III	18322	20014	22837	25740	28692	31947	35596
Variant II	Scenario I	18189	19853	22634	25508	28354	31256	34264
	Scenario II	18189	19854	22641	25527	28448	31585	35016
	Scenario III	18189	19859	22663	25580	28590	31960	35803

Source: Derived by Author

[30] The actual value of this proportion remained at 22% over 1997-98.
[31] The actual value of this proportion remained at 78% over 1997-98.
[32] The results show that underestimating future participation rates, for example that of females, could lead to a substantial underestimation of the future size of the work force.

6.3. Labour Demand (Employment)

Labour demand is subject to changes in employment policies. Overall employment growth depends on output growth and labour productivity[33] of different economic sectors [34]. Higher growth in GDP implies more job opportunities, which could eventually have positive effect on the employment situation. Real output growth can be decomposed into the increase in employment and the increase in output per worker.

Over 1970-97, total employment[35] in Egypt was growing by 2.4% per annum compared to a growth in labour supply of 3.0% per annum over the same period. Employment is mainly in industry (22%), agriculture (35%) and services (more than 35%) which reflects a minor emphasis on the industrial sector. Labour demand in the Gulf countries and in the agriculture sector are expected to decline sharply over the coming years as the potential of both categories to absorb labour diminishes. The service sector is projected to grow at a lower rate. Over 1986-96, the private sector absorbed one out of every two new-comers to the labour force. It is expected that private sector job generators will be services, trade and industry.

A significant sector of employment in Egypt is the informal sector. It comprises a substantial part of total employment and needs special attention from the ESSPS. It includes non-registered small establishments as well as non-registered employment outside establishments. It has become the leading sector of labour absorption in Egypt by employing excess labour supply, especially in non-agricultural areas. It represents a buffer that allows the Egyptian economy to adjust to negative external shocks. The total number of workers employed in the informal sector was estimated to be 3.7m in 1996, which represents more than one-sixth of total employment. The number of those employed outside establishments is reported to be some 1.9m, thus constituting 60% of total private sector employees in the age groups 15-64 in 1996.

Labour productivity growth was strong during the second half of the 1970s, particularly in agriculture, but has been stagnant and even declined in the 1980s and

---

[33] It is the (annual) output per employed person, expressed in "real" currency units.
[34] The employed should be broken down by the same categories as the number of contributors. This establishes meaningful theoretical and statistical links between those who contribute to the country's social insurance pension and those who are employed, which are not necessarily identical groups.
[35] It increased from 8.1 million in 1970 to 17.0 million in 1997.

1990s, particularly in agriculture and industry. Annual productivity growth over the first half of 1990s was 1.8% in agriculture, 1.2% in services and 0.6% in industry and continues to lag in many sectors of the economy (ILO, 1997).

The current labour laws in Egypt are a significant factor in low productivity levels because of management's limited ability to impose effective sanctions for poor performance. Law 137 of 1981 makes no provision for layoffs or redundancy and it is therefore extremely difficult for employers to lay off their workers. This may discourage job creation in the private sector and hamper its development. One of the constraints on improving productivity is government interference in employment practices instead of concentrating on producing better-educated and trained workers to raise their productivity.

With over 500,000 new entrants into the labour market each year, the labour force needed to expand by about 50% over the second half of the 1990s to absorb new entrants and reduce unemployment (Kenawi, 1996). During the 1990s, nearly 5 million new jobs were needed to meet the demands of new entrants to the job market and more than 2 million additional jobs were needed to eliminate the existing level of unemployment[36] (World Bank, 2000).

Techniques to project future labour demand need assumptions about the annual growth of GDP and labour productivity growth, starting in a base year t_0[37]. In projections, labour productivity is calculated as the previous year's value multiplied by an assumed growth factor. Then, over all years of the projection period, total employment[38] is calculated as a residual by dividing the projected real GDP by labour productivity. Applying this technique, the projected annual growth rate of total employment under moderate annual growth rates of GDP and labour productivity (4.5% and 2.23% respectively) is 2.21%. This figure rises to 2.36% under higher growth rates (5.83% and 3.38% respectively) over 1997-2025 (ILO, 1997).

---

[36] In February 2002, the US government issued a report criticising the Egyptian government for not implementing policies to encourage the private sector to create more jobs to reduce the level of unemployment. It warned that unless Egypt is able to create at least 800,000 jobs in 2002, Egypt may face social disaster (Alsharqalawast, 2002).

[37] Labour productivity for the base year t_0 can be estimated as real GDP divided by total employment.

[38] Future unemployment in this case can be projected as the difference between projected future labour supply and demand.

Mousa, et. al. (1993), in their study of demand forecasting for manpower in Egypt over 1994-2000, used time series analysis by fitting a regression model from which they have obtained projected values for manpower over 1994-2000. They indicted that the projected number of workers in each economic sector compared with actual data show that the projections are satisfactory and consistent.

Labour demand can also be estimated using the input-output coefficient matrix to ensure inter-sector consistency over time and also using interdependence between economic sectors. The development of total employment on the basis of sectoral real value added and sectoral labour productivity can be calculated if the necessary statistical information on hypotheses for the future development of individual sectors of the economy is available.

However, such methods require the projections of various significant factors, such as labour productivity, labour elasticity of demand and future real GDP, which depend on the expected future economic performance of the country. This would make the projection of future labour demand depend on many uncertain factors, requiring huge amount of data from all of the economy's sectors and this is beyond the scope of this thesis. As the ultimate objective is to support the social insurance pension projections by providing the necessary inputs, a different approach for estimating future employment is used in this thesis. The rate of future unemployment is estimated, first using a stochastic time series technique, and then total employment is deduced, as explained in the following sections.

6.4. Unemployment

Unemployment has an important effect on the financial status of the social insurance pension system and, therefore, it is a major economic factor for the state pension system. Unemployment [39] describes the section of the labour force that is capable of and available for employment, but not utilised by the economy. As contributions represent the primary sources of financing social security pensions, so periods of relatively high unemployment correspond directly to fewer contributors. It may also

[39] It is the overall labour market balance from a table consistently showing labour supply and labour demand, both by different categories of persons. This table is important as the labour force numbers establish limits for important categories of the social insurance system, such as the maximum potential number of contributors to the system. Also the number of unemployed, so calculated, would provide for a maximum number of beneficiaries of unemployment benefits.

lead to an increased incidence of early retirement, which contributes significantly to financing difficulties at those times. The unemployment level in a country is strongly affected by the socio-economic and demographic factors. In the following sections, the trends and structure of unemployment in Egypt over 1970-96, and expected future changes in unemployment, are investigated. Also a stochastic time series analysis to project future unemployment is explored and employed.

6.4.1 Unemployment Structure

Egypt, like many other developing countries, has been suffering from soaring unemployment, which seems to be one of the biggest challenges facing Egypt's economy as a whole and the ESSPS in particular in the coming years. This represents a phenomenon that did not exist, at least officially, under the state-owned economy.

In the early 1980s, the ILO issued an optimistic report about future unemployment in Egypt, which did not pay much attention to the expected lack of future job opportunities. It explained the unemployment rate by the lack of mobility within the labour market rather than inadequate job creation to absorb the increasing number of new entrants to the labour market (Hansen et el., 1982). In 1997, the ILO described the unemployment problem in Egypt as linked to the inability of new entrants to find a job rather than existing workers being laid off. This indicates that the problem is a supply driven, as the unemployment of new entrants to the labour market has been the actual problem.

However, it has been argued for many years that the unemployment problem in Egypt is mainly due to the imbalance between the nature of the educational system and the demands of labour market. The highest unemployment levels[40] were among the better educated, those with intermediate and higher levels of education. The percentage of unemployed among the educated labour force exceeded that of the uneducated workers, as better education does not provide a better chance for either employment or a higher income (Soliman, 1995). However, the unemployment problem in Egypt may also be reflected in the disguised underemployment of the less well educated.

In 1990, the government stopped its employment-generating policy[41], which resulted in overstaffing of the civil service and public sector industries, and a strong bias

---

[40] Many studies about the unemployment in Egypt have been carried out and these include, Nassef, 1970; Fergany, 1988; El-Biblawi, 1990; Shaker, 1990; Girgis, 1991; Soliman, 1995; Winograd, 1997.
[41] This policy used to guarantee employment for graduates of higher education institutions.

towards university education. This policy led to an excess supply of people with an academic education. In 1996, the percentages of first time job seekers among the unemployed with intermediate, upper intermediate and university levels of education were 98%, 98%, and 94% respectively, suggesting that once employed, the better educated employee tends to stay employed. The high entrance barrier for highly educated people is reflected in queuing for government jobs and it is estimated that the length of the queue is thirteen years (ILO, 1997). As a result, it is argued that limitation of higher education and expansion of secondary and technical education on the one hand, and the restructuring of specialisations within each educational level on the other hand, could reduce unemployment.

6.4.2. Unemployment over 1945-1997

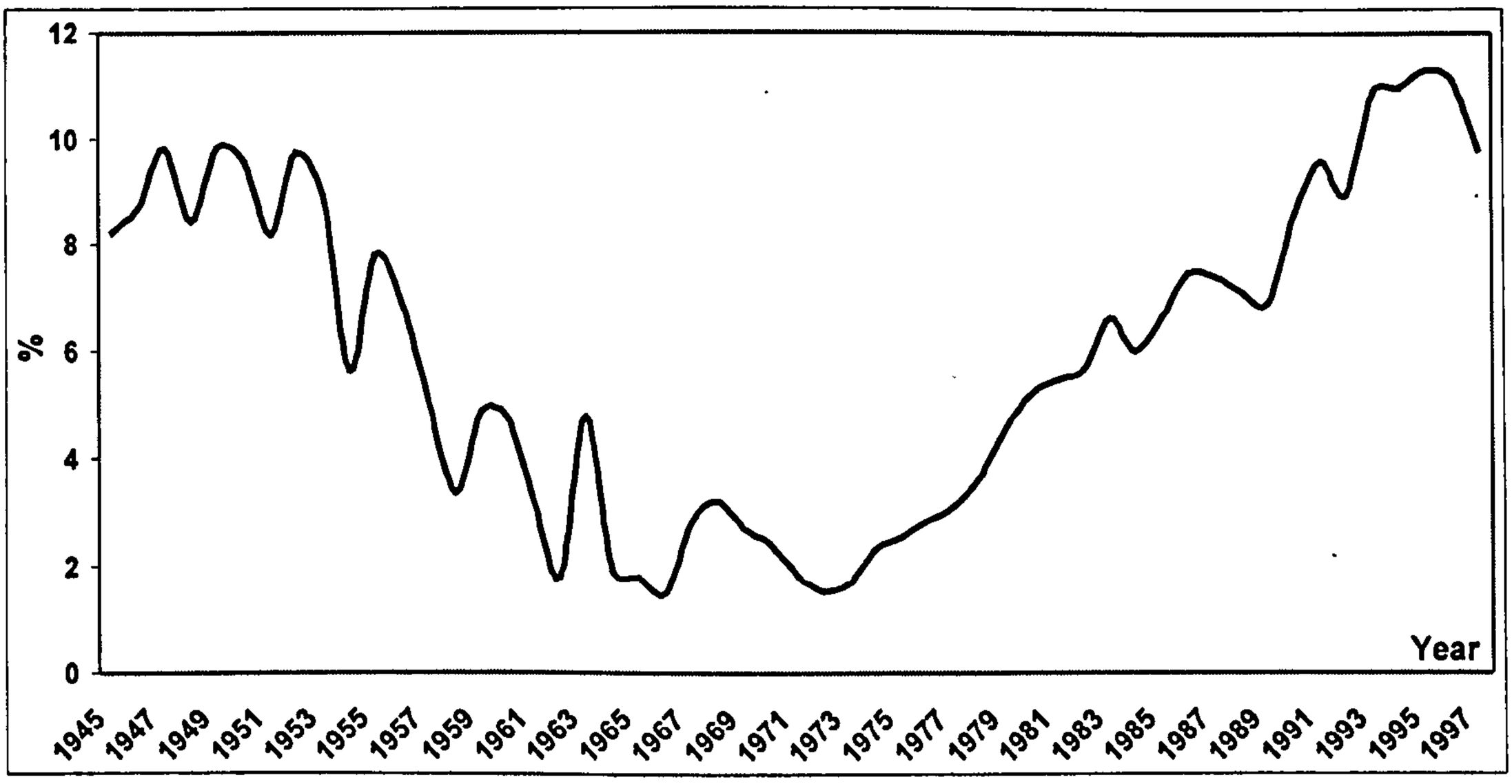
Employment reached its peak in 1975 and since then has been decreasing, as a mirror image, unemployment was quite reasonable during the 1980s, but has increased dramatically over the 1990s. The number of unemployed increased 9 times in 25 years, from 0.2 million in 1970 to 1.73 million in 1996 with an annual growth of 8.7%. The rate[42] increased from 2.2% in 1960, to 7.7% in 1976, to 10.7% in 1986 to 11.3% in 1996[43]. Unofficial estimates of unemployment in 1990s stand within a range of 15-17% (Exelby, 1997).

Since 1945, unemployment rates have fluctuated between 1.5-11.5%, with two main trends as shown in Figure 6.4 and **Table 5.3 of Appendix 5**. The first was a decrease in unemployment rates over 1945-73, a period in which the country fought 4 wars and a significant part of its labour force was joining the military[44]. The second is a dramatic increase in unemployment rates, which started after 1973 war and continues until now. These two trends may also be linked to the history of the Egyptian economy, as unemployment fluctuates widely with the economic performance. There were two peaks associated with the market economy experienced before 1956[45] and after 1990[46]. In general, this indicates that the demand for labour remains below the supply and this pattern is expected to continue.

---

[42] It is measured as the percentage of unemployed among the labour force, which is a weighted average of age-sex specific components.
[43] The government official estimates for 1997 and 1998 are 1.447 and 1.448 million respectively. These figures are strongly argued by many to be an under-estimate for political reasons.
[44] It is not surprising that the lowest level of 1.5% was in 1966 and 1972 before the 1967 and 1973 wars and its highest level of 11.3% in 1996 after 6 years of starting the economic reform programme.
[45] This was the starting of the nationalisation of the Egyptian economy and the public sector era.
[46] This is the year the country started to reform and liberalises its economy.

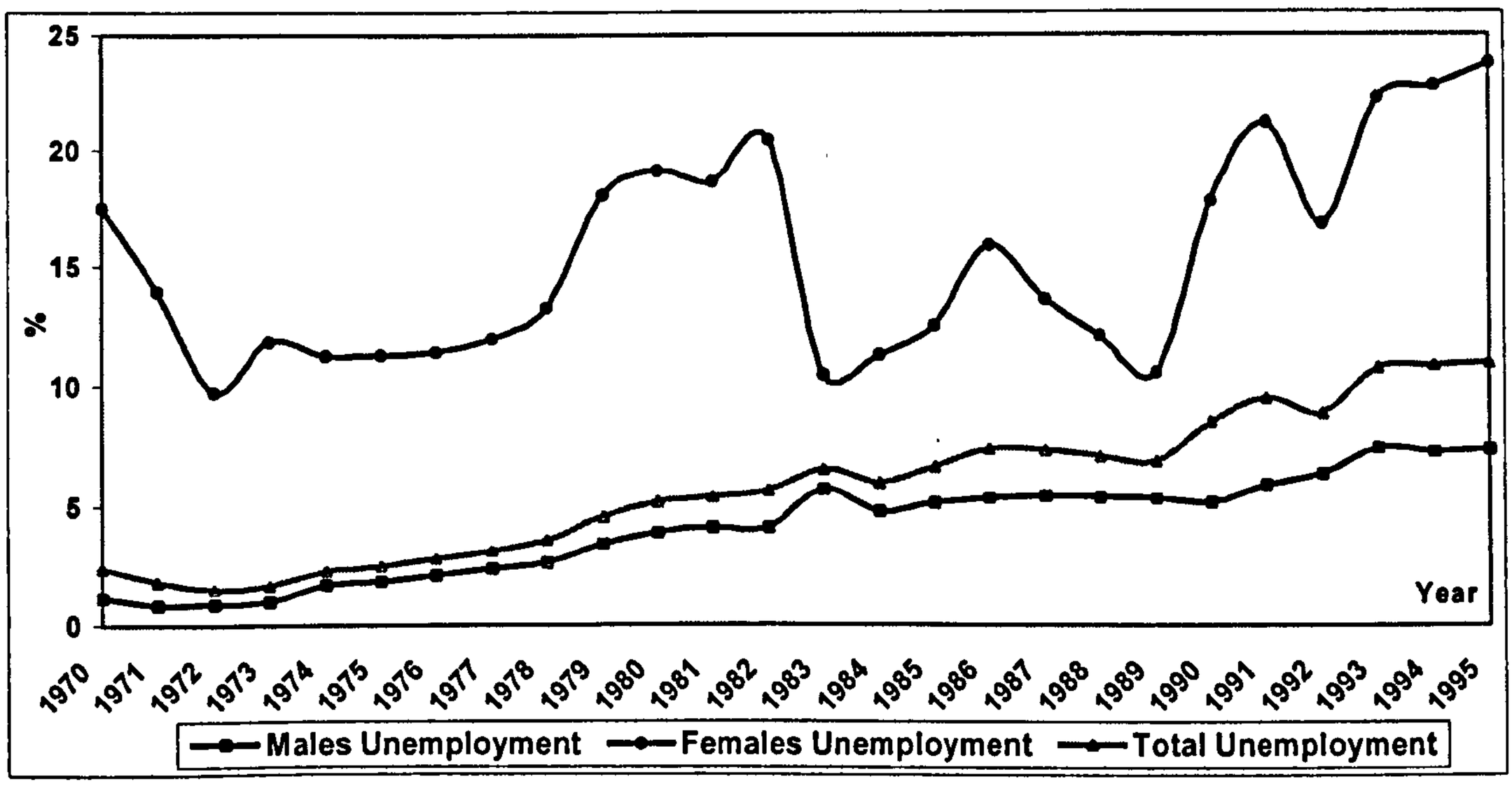
Figure 6.4: Total Unemployment Rates over 1945-1997



6.4.3. Age and Sex Specific Pattern of Unemployment over 1970-96

Total and male unemployment rates have nearly the same observed patterns at the national level, due to the predominance of men in the labour force, as shown in Figure 6.5. In 1976, the highest unemployment rates were at ages under 20, mainly those with low levels of education (Zayyan, 1991). In 1996, only 1.6% of illiterate labour force participants were unemployed and the highest unemployment was for the age group 15-29, mainly young educated persons and new entrants to the labour market.

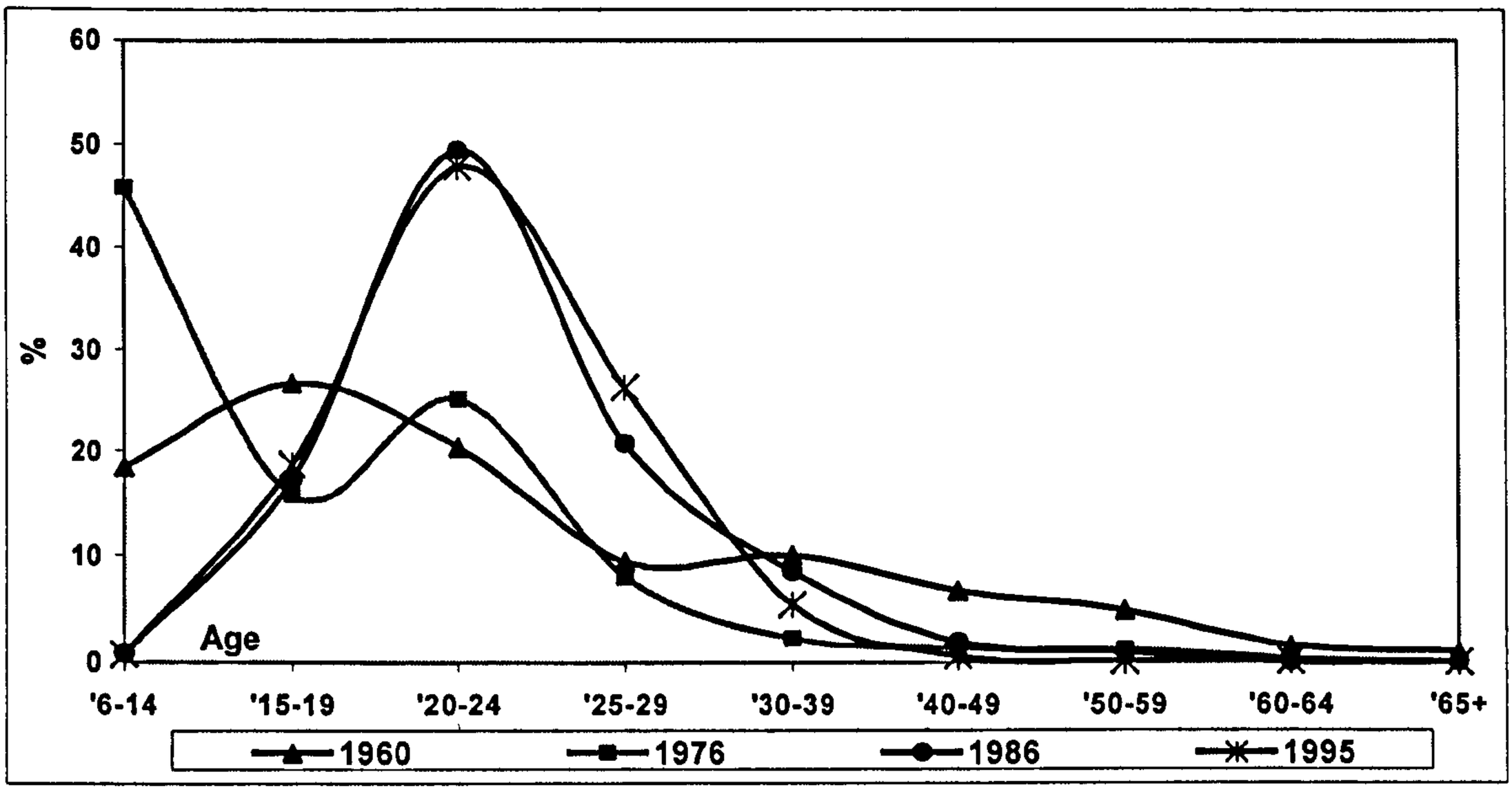
Figure 6.5. Unemployment rates of Total, Males and Females over 1970-96



In 1996, more than 94% of the total unemployed were new entrants to the labour market (94% males and 96% females) and about half of them were in the age group

20-24, which consisted mainly of the better educated new entrants. The age group 20-30 represented 73% of the total unemployment in 1996 (74% males and 72% females), followed by the age group 15-19 with 21% (18.7% males and 23.7% females) with unemployment decreasing rapidly from age 30 as shown in Figures 6.6 & 6.7 and **Table 5.3 of Appendix 5.**

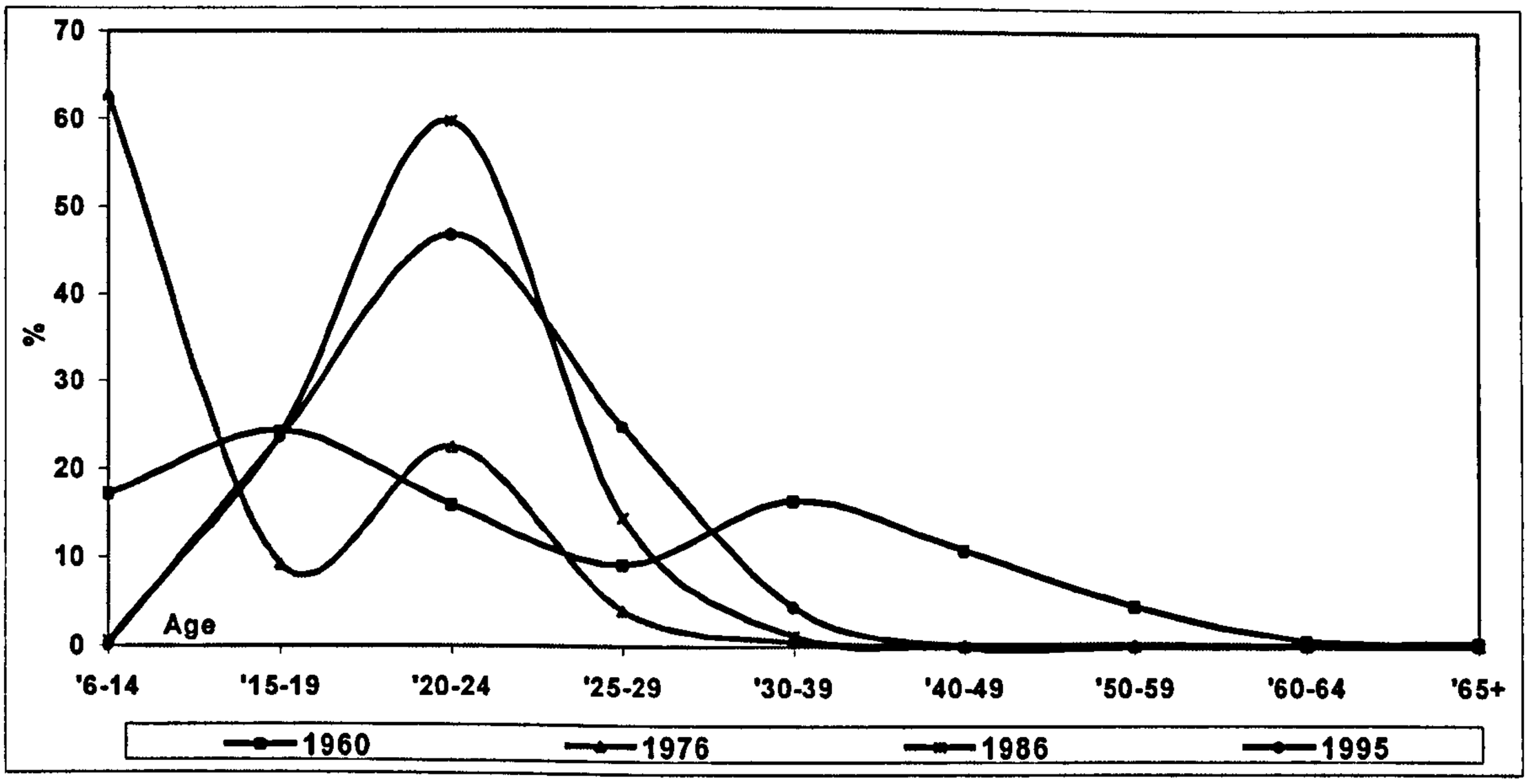
Figure 6.6: Male's Age-Specific Unemployment Rates, 1960-95.



Although male unemployment was lower than female unemployment over 1960-95, it increased more than 15 times over this period. The male unemployment rate increased from 0.85% in 1971 to 7.5% in 1996, which implies an annual growth rate of 9.1%.

The female unemployment rate increased from 13.93% in 1971 to 23.78% in 1995, which implies an annual growth rate of 2.2%. Female unemployment rates were higher than the corresponding rates for males in the age group 15-35, then decline rapidly and are less than those of males at higher ages. In 1996, more than half of unemployed females belonged to the age group 20-24 due to the expansion of female higher education. The high level of variation in female unemployment rates can be attributed, mainly, to two factors. The first is the small number of female workers, who have to compete with males for the limited jobs available in the presence of gender inequity. The second is the increase in female participation because of the improvement in their educational and social status, especially in urban areas.

Figure 6.7. Female's Age-Specific Unemployment Rates 1960-95



The duration of unemployment spells in Egypt is high and reflects the age and education profile. Unemployment duration tends to be long in the 25-39 age group. It is over 65 months on average, whereas it is 18 months for those aged 15-19 and 37 months for those aged 20-24. With respect to education, unemployment duration is close to 30 months for those below intermediate level, around 45 months for those at the intermediate level and above, and 37 months for university graduates (ILO, 1997).

6.4.3. Factors Affecting Future Unemployment in Egypt

The problem of educated new entrants to the labour market constitutes the major part of unemployment. It is also argued that government intervention[47] contributes to the problem significantly and may reduce the number of jobs available to new entrants, which explains the high unemployment rate among first time job seekers. It has been found that private firms prefer to hire contract labour rather than regular employees, to avoid getting stuck with workers they don't need. It is argued that this intervention hurts the Egyptian economy more than benefits it (Winograd, 1997).

It is argued that lower unemployment rates might prevail when restrictions controlling the hiring and firing of employees are removed, as some countries' experiences indicate a relationship between guaranteed job security and unemployment (Kenawi, 1996). Western European countries governed by laws fostering high job security, such

[47] The Government's concern about unemployment resulted in a series of incentives and prohibitions designed to encourage firms to employ more workers than they actually need which may eventually raise the cost of labour.

as France and Spain, have high unemployment rates of 12.3% and 22.7% respectively and countries adopting flexible labour laws such as the USA and UK have lower unemployment rates of 5.6% 7.1% in 1996.

Although the sharp increase in unemployment in the 1990s is due to the transition towards a market economy it is also a mix of many other different effects and factors. The most likely expectations are that the unemployment may be more acute in the future and that rates may increase or remain close to the current levels in the coming years, for reasons such as:

1. The economic reform and privatisation of the public sector, which is manifestly burdened with disguised unemployment[48]. This reflects the impact of the transition towards a market economy during this period, which coincides with the projection period;
2. The extension of unemployment to intermediate ages and older employed people as a result of economic reforms and privatisation;
3. The transfer of many workers between economic sectors, such as from agriculture and services sectors to the industrial, IT and telecommunications sectors;
4. The expected increase in the number of young people aged 15-29 who will enter the labour market;
5. The trend of replacing the Egyptian workers in the oil-rich Gulf countries with other or their nationalities will have significant impact on the size and level of unemployment;
6. The increase in female participation (particularly those educated) on the one hand and the proportionate decrease in female homemakers on the other hand, is a trend which is expected to continue in the future and may increase the rate of unemployment;
7. Advanced technology changes the structure of the economy, eliminating some jobs and creating others that require a high level of technological training. This will make it necessary for the present labour force to retrain for new careers, leading to higher unemployment rates during the transition period;
8. The globalised economy may put further pressure on the labour market which may affect the unemployment level over the coming years[49].

---

[48] It is estimated that one third of the Egyptian workforce is in this sector.
[49] It is also argued that it may create job opportunities from overseas investment.

These factors indicate the seriousness and persistence of future unemployment in Egypt, which will have an important effect on the financial status of the ESSPS, particularly the PPSF. So it is important for the actuarial projection of ESSPS to allow for the prospect of future unemployment in the country. Future unemployment levels are projected in the following section.

6.5. Projecting Future Unemployment over 1997-2025

If labour supply and labour demand have been projected for every year over the projection period, the unemployment rates are estimated by the following formula:

$$UEMR(t) =$$

$$((Labour\ supply - Labour\ demand)/(Labour\ supply)) \times 100 \qquad (6.2)$$

However, the approach adopted in this thesis is to project first the labour force and then project the unemployment rate. The number in employment is then estimated using the following formula:

$$EM(x, t, s) = LF(x, t, s)\,[1 - UEMR(x, t, s)] \qquad (6.3)$$

$$EM(t) = \sum_{s} \sum_{x=15}^{MaxAge} EM(x, t, s) \qquad (6.4)$$

According to this approach, the unemployment rates are exogenous and the total unemployment rates for each year are derived from the projected age-sex specific unemployment rates, weighted by the projected age-sex specific labour force for the specific year. Thus the method requires projected age-sex specific unemployment rates for the economy, which can be projected using many statistical and econometric models, either in isolation or in connection with other related factors. This leaves the way open for applications in which the future structure of unemployment can be taken as a function of other factors such as long-term GDP growth, or as a dependent factor of time.

Usually forecasts of unemployment are based on econometric models, which seek to model the determinants of supply and demand factors in the local labour market together with a set of relevant macroeconomic variables. Most of econometric models of unemployment are short-term forecasts, rarely beyond five years. This is because of data uncertainties. Since forecasts are needed over the period 1997-2025, a time series approach is used in the thesis. These forecasted values can be viewed a trend value in unemployment over the period. Time series analysis is used in this thesis to project the rate of total unemployment, as explained in the following sections.

The assumption made is that the trends in the age-sex-specific unemployment rates observed over 1986-96[50], will prevail over 1997-2025 without any adjustments. These trends start with the unemployment rates of the base year of 1996 and extend throughout the projection period. Proportional adjustments for age-specific unemployment rates are made in order to restrict the total annual rate of unemployment to within the projected rates.

6.5.1. Adopted Model for Projecting Total Unemployment Rates

A forecasting model employing a stochastic approach for projecting total unemployment rates is used. Although stochastic forecasts are naive in the sense that they do not use knowledge possessed by experts in a field, they nonetheless provide a relatively non-controversial starting place for discussion on the appropriate levels of future assumptions. It also provides a disciplined way of assessing confidence in future projections via probability intervals. A probability interval provides a method for assessing the reliability of the results when compared to projections based on low, intermediate, and high assumptions. It also provides benchmarks for comparison with other assumptions.

Statistical time series analysis is believed to have the potential to improve the understanding of the possible range of variation and alternatives that can reasonably be expected for a future variable (Foster, 1994). In 1991, a Technical Panel of actuaries and economists, convened by the Advisory Council on Social Security of the US, recommended the use of time series techniques in performing the evaluation of the economic assumptions used in projections. Accordingly, a stochastic parametric time series model is explored in this section to project the total unemployment rate.

A simple stochastic time series model is used in this chapter to fit the past experience of total unemployment rates[51] and to project future total unemployment rates in Egypt over 1997-2025. It is also to quantify the uncertainty associated with the projected rates by producing estimated probability intervals over the projection period. The focus is on the likelihood that actual future unemployment falls within the range of

---

[50] Using the geometric mean of growth observed over this period.
[51] Data used in the analysis is obtained from the ILO bureau in Cairo.

alternatives projected by the model. The model's projected rates are compared with estimates published by the ILO[52] in order to validate the model's results.

6.5.2 Time Series Analysis

The projection of a variable is developed primarily by the analysis of patterns exists in the historical data. Figure 6.5 indicates that the rate of unemployment over 1945-1997 does not fluctuate around the same average levels. It fluctuates around two different average levels, before and after 1973, with the later average significantly higher than the earlier one as shown in Table 6.1. It also indicates that a high rate of unemployment in one year tends to be followed by additional high rates in the following years, and vice-versa. Table 6.1 presents summary statistics for the total unemployment rate over 1945-97 and for two sub-periods corresponding to the apparent change in the average level of unemployment.

Table 6.2. Summary Statistics of Unemployment Rates over 1945-1997

Period	Mean	SD	Min. Value	Q1	Q2	Q3	Max. Value
1945-97	5.96	3.06	1.50	3.12	5.66	8.57	11.3
1945-72	5.34	3.05	1.50	2.63	4.85	8.29	9.83
1973-97	6.65	2.98	1.67	4.57	6.67	8.95	11.3

Source: Derived by Author

Although the averages before and after 1973 are different, the overall patterns of variation in the three periods are fairly similar, as the standard deviations are roughly the same. But the differences between Q1 (the first quartile) and Q3 (the third quartile) for the three sets show different variation within each set and indicate the shift in the level of unemployment after 1973. This shift increased the average unemployment rate from 5.34% before 1973 to 6.5% after 1973.

It is known that median forecasts from a model will gradually move toward the overall mean of the data. Foster (1994) suggests that the inclusion of level shifts is likely to improve the accuracy of the model's near-term forecasts and probability intervals, but the inclusion or exclusion of a level shift variable has little effect on the median forecasts. Removal of this effect could unduly narrow the range of forecasts for the future, particularly over long time horizons, thereby understating the true degree of uncertainty associated with the forecasts. The same arguments also apply to

[52] In 1997, the ILO published unemployment estimates for Egypt over 1997-2050 according to moderate and high GDP growth assumptions.

the outliers, which largely reflect normal variation which can occur on occasion in the future. Therefore, their exclusion may lead to unduly narrow forecast intervals, producing prediction intervals that no longer reflect the normal peaks and troughs within periods of recession or recovery.

There seems also to be little reason or economic evidence to expect a return to a significantly lower level of unemployment, similar to pre 1980s levels, is imminent. The core objective of this section is to use a simple and direct model, based on the historical data to obtain a reasonable forecast of future unemployment rates. Therefore the analysis of level shifts and outliers in unemployment rates are ignored[53]. The following sections introduce the time series-modelling framework that is used to account for the existing pattern and provides forecasts of future unemployment.

6.5.3. ARIMA Models

The time series methodology based on finite-parameter models for second-order stationary properties, as defined by Box and Jenkins in the 1960s, is used in its simple version in this section. In the time series literature, a set of procedures that reduces a series to a random process, or white noise, is called a filter[54]. The assumption is that the series X_t runs throughout time, but is observed only for $t = 1, ..., n$, and the series will have a mean μ. An autoregressive process that models a variable X at time t is a weighted-average of the corresponding variable in one, two or more prior periods. A process $\{X_t\}$ is said to be an autoregressive process of order p if (Chatfield, 1994):

$$X_t = \alpha_1 X_{t-1} + ... + \alpha_p X_{t-p} + Z_t \qquad (6.5)$$

The factor Z_t represents a random innovation or error affecting the variable each year and its distribution is assumed to have a constant variance through time with mean zero. An autoregressive process of order p ($AR(p)$) together with a moving average

---

[53] This means that the model estimates the average level of unemployment at a constant average of 5.96% throughout the historical period which does not differ much from the average after 1973.

[54] The mathematics underlying the regression procedure is based upon 4 main assumptions: constant error variance (homeosscedasticity, the variance of the residuals is constant for all values of a given explanatory variable which is opposite to heteroscedasticity which leads to the standard error of the regression coefficient being inaccurate), normality of residuals (form a normal distribution), independent residuals (no autocorrelation) and indpendence of explanatory variables (no multicollinearity, no exact relationship among some or all of the explanatory variables).

process of order q *(MA(q))* represents an *ARMA(P, q)* process which is defined by (Chatfield, 1994):

$$X_t = \alpha_t X_{t-1} + \ldots\ldots + \alpha_p X_{t-p} + Z_t + \beta_1 Z_{t-1} + \ldots\ldots + \beta_q Z_{t-q}^{55} \qquad (6.6)$$

where Z_t (the error term) denotes a series of uncorrelated random variables and is assumed to be normally distributed with mean zero and constant variance σ_z^2 and the covariance and correlation are as follows[56]:

$$\gamma_t = cov(X_{t+\tau}, X_\tau) \qquad (6.7)$$

$$\rho_t = \text{corr}(X_{t+\tau}, X_\tau) \qquad (6.8)$$

Under the assumption of second-order stationary these have the same mean and variance and the estimators are:

$$c_t = \frac{1}{n} \sum_{s=max(1,-t)}^{min(n-t,n)} [X_{s+t} - \overline{X}][X_s - \overline{X}] \qquad (6.9)$$

$$r_t = \frac{c_t}{c_0} \qquad (6.10)$$

where c_t and r_t are the autocovariance and autocorrelation functions respectively.

An ARIMA (p, d, q) process (where I stands for integrated) is a process whose dth difference $\nabla^d X$ is an ARMA (p, q) process. ARIMA models take the form:

$$W_t = \alpha_t W_{t-1} + \ldots + \alpha_p W_{t-p} + Z_t + \ldots + \beta_q Z_{t-q} \qquad (6.11)$$

where $W_t = \nabla^d X_t = (1-B)^d X_t$ *and* (6.12)

B called the backward shift operator defined by $B^j X_t = X_{t-j}$ (6.13)

Several time series models were fitted to model the existing pattern of the Egyptian total unemployment data without adjustment for outliers and shifts[57]. A lot of attention was paid to identify plausible *ARMA* models and choose between them on the basis of their goodness of fit. Graphical techniques and diagnostic statistics are used to display patterns that are evident in the data.

---

[55] β_0 for a *MA (q)* process is not needed and will be taken as 1 under the assumption that the process is stationary.

[56] The covariance is estimated from n-t observed pairs (X_{1+t}, X_1),....., (X_n, X_{n-t}).

[57] When looking at which model to be selected there some general principles such as larger coefficient of determination (R^2) and smaller standard error are desirable. Also looking at the parameter's p value, if it is above 5% the parameter is a candid for exclusion.

6.5.4. Identification and Fitting Model of Unemployment

To identify the fitted model, the standard approaches described in Box, Jenkins, and Reinsel (1993) were used. The Partial Autocorrelation Function (*PCF*)[58] of the series was first examined which suggested that *AR(1)* or *AR(3)* models can fit the data well (see the diagnostic statistics[59] in **Appendix 5**). The method of conditional maximum likelihood was also explored[60]. It was assumed that the response vectors are (conditionally) normally distributed[61]. Fitting by maximum likelihood does not include a mean, and a log-likelihood function is taken as a measure of deviance (Venables et. al., 1998).

To help select amongst *ARMA* process or alternative models, Akaike's Information Criteria (*AIC*)[62] was used, which is defined to be (Frees et. al., 1997):

$$AIC_k = (-2ln\ (maxmized\ likelihood) + 2K)/T \qquad (6.14)$$

where k is the number of model parameters and *T* is the number of observations. The *AIC* of different models, which have the same conditional set of starting values for *AR* are compared, and the model with the smallest *AIC* is chosen (Venables et. Al.,1998).

Standard time series model identification procedures led to an *ARIMA(1,0,2)* model (which is a stationary autoregressive moving average) with a starting conditional value equal to 1 as follows[63]:

$$X_t = 0.972(0.035)X_{t-1} + Z_t + 0.363(0.142)Z_{t-1} + 0.106(0.141)Z_{t-2}$$

with $\sigma^2 = 1.267$ and $AIC = 153.56$ and the χ^2 was significant.

This model relates the current unemployment rate X_t to a weighted-average of the rate in the prior year. The t-statistics associated with the key parameters was used and in this model all coefficients are statistically significant except for Z_{t-2}. A comparison of the standardised residual to a corresponding set of values drawn from a true normal

---

[58] The partial autocorrelation between X_s and X_{s+l} is the correlation after regression on X_{s+1}, ...,X_{s+t-1}, and is zero for $t > p$ for AR(p) process.

[59] The S-Plus statistical package was used in producing these results.

[60] The likelihood conditional on a set of starting values for *AR*

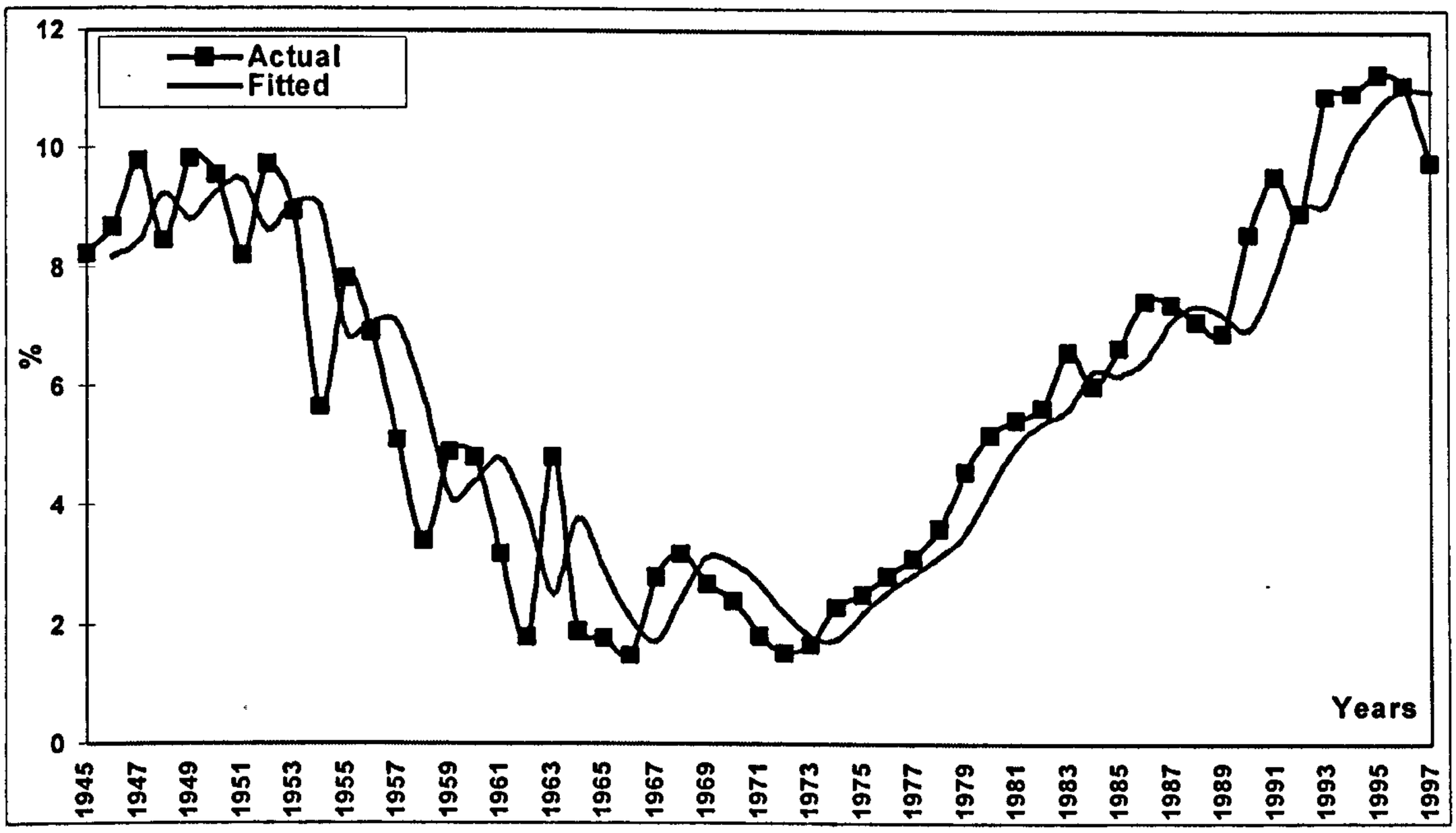
[61] This was consistent with the likelihood considered under S-Plus functions, which assumes the Gaussian distribution

[62] It is the component of the excess over the best fitting model, which penalises the deviance by twice the number of parameters.

[63] Time series models with homoscedastic variances were identified by examining the standardised residual, residual autocorrelations, and partial autocorrelations. To accommodate autocorrelation and heteroscedasticity, regular *AR(p)*, *MA(q)* and autoregressive moving average (*ARMA*) models, as well as the autoregressive conditionally (*ARCH*) were also explored.

distribution revealed that the standardised residual fails the correlation test of normality. Standard error of the fitted values (0.395) is substantially lower than the standard error of the original data (0.426) and the same is also true of the standard deviation (3.06). But the standard errors do not include the effect of estimating the mean and the parameters of the *ARIMA* model. A comparison of the actual unemployment rates and the model's fitted values shown in Figure 6.8.

Figure 6.8. Actual Unemployment Rats vs. the Fitted Values over 1945-97



In general, the model provides a satisfactory fitting and the *ACF* revealed a pattern associated with only two partial autocorrelation coefficient in excess of ± standard deviations (the first and fifth). The diagnostic plots of the results of the tests for the model adequacy, standardised residual of the model, *ACF* of the residual, *PACF* of the residual and the p-value test are shown in **Appendix 5**.

6.5.5 Projection of Future Total Unemployment

Projection methods can be subjective or/and objective but projections need to be at least partly objective. Projection of the unemployment variable in this thesis depends on the model fitted to data, which justifies the choice of the model. Projection is made straightforward by using the fitted function, as the output of the fitted model gives the forecasts. The model produces forecasts that gradually move toward the overall mean of the data as shown in Figure 6.9. Projections of unemployment rates over 1997-2025 generated by the model are shown in Figure 6.10 and **Table 5.4 of Appendix 5.**

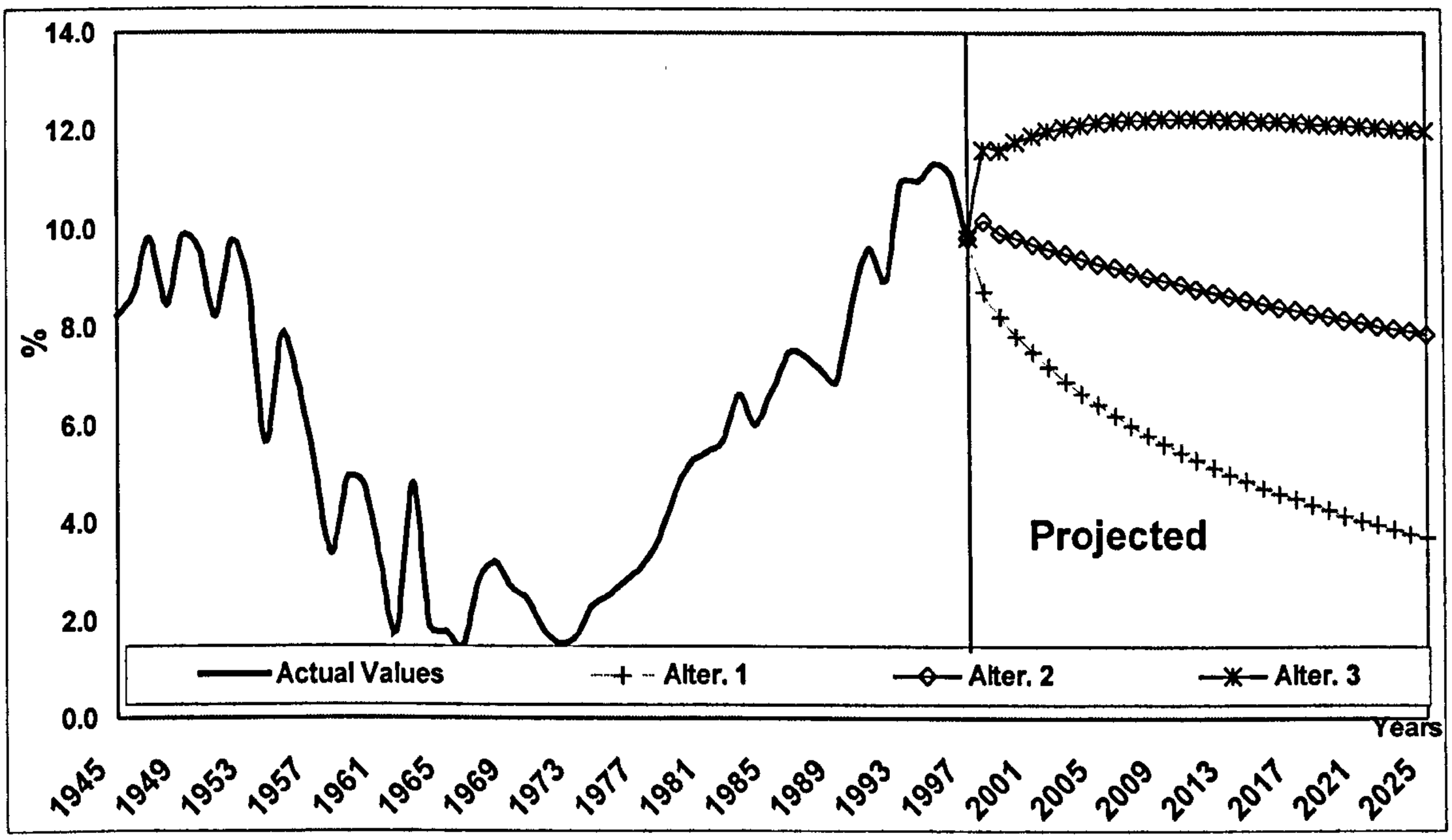
Because of the uncertainty in the method of estimation, especially in the selection of economic parameters, separate sets of assumptions have to be developed in order to present a range of possible outcomes or "scenarios", particularly for long-term projection. Projections under alternative assumptions provide policy-makers with sense of the reliability of the projections and normally there are three possible alternatives:

Alternative I, the most optimistic set in terms of lower unemployment rates and higher future cash-flows,

Alternative II, the intermediate set which represents the most likely future course according to past trends and future expectation,

Alternative III, the pessimistic set in terms of higher unemployment rates and lower future cash-flows.

Figure 6.9. Yearly Unemployment Rates over 1945-1997 and forecast for 1997-2025 with 90% forecast intervals



A 90% prediction confidence interval associated with this forecast was estimated over 1997-2025, which yields a range of reliability for forecast point estimates. The width of the projection interval widens as the forecast horizon lengthens, in keeping the reduced certainty that accompanies longer forecasts. By the end of the 28-year forecast, the width of the 90% interval is close to matching that of the original data. The 90% probability associated with the interval applies to the expected unemployment rate for a given year and does not represent the probability that all the future unemployment rates will fall within the indicated bounds.

The projected total unemployment rate under alternative II decreases gradually from 10.03% in 1998 to 7.92% by the year 2025. The projected values after the early years are intended to represent the expected experience for those years and are not intended to be predictions of year-by-year values, which is consistent with the simplifying assumption that the economy will operate without cycles over the projections years. Actual future values will be likely to exhibit fluctuations or cyclical patterns, as in the past. By the end of the projection period, the alternative II is still higher than the median forecast based on the model, which indicates a satisfactory projection of future unemployment in Egypt.

In order to validate the model further, a comparison between the model's projection intervals and a projection provided by the ILO in 1997 is made out to gauge the difference between these two estimates. Figure 6.10 shows that the projection intervals captured the experience well.

Figure 6.10. Comparison between ILO Unemployment' Estimates and Forecast Intervals based on the Stochastic Model 1997-2025

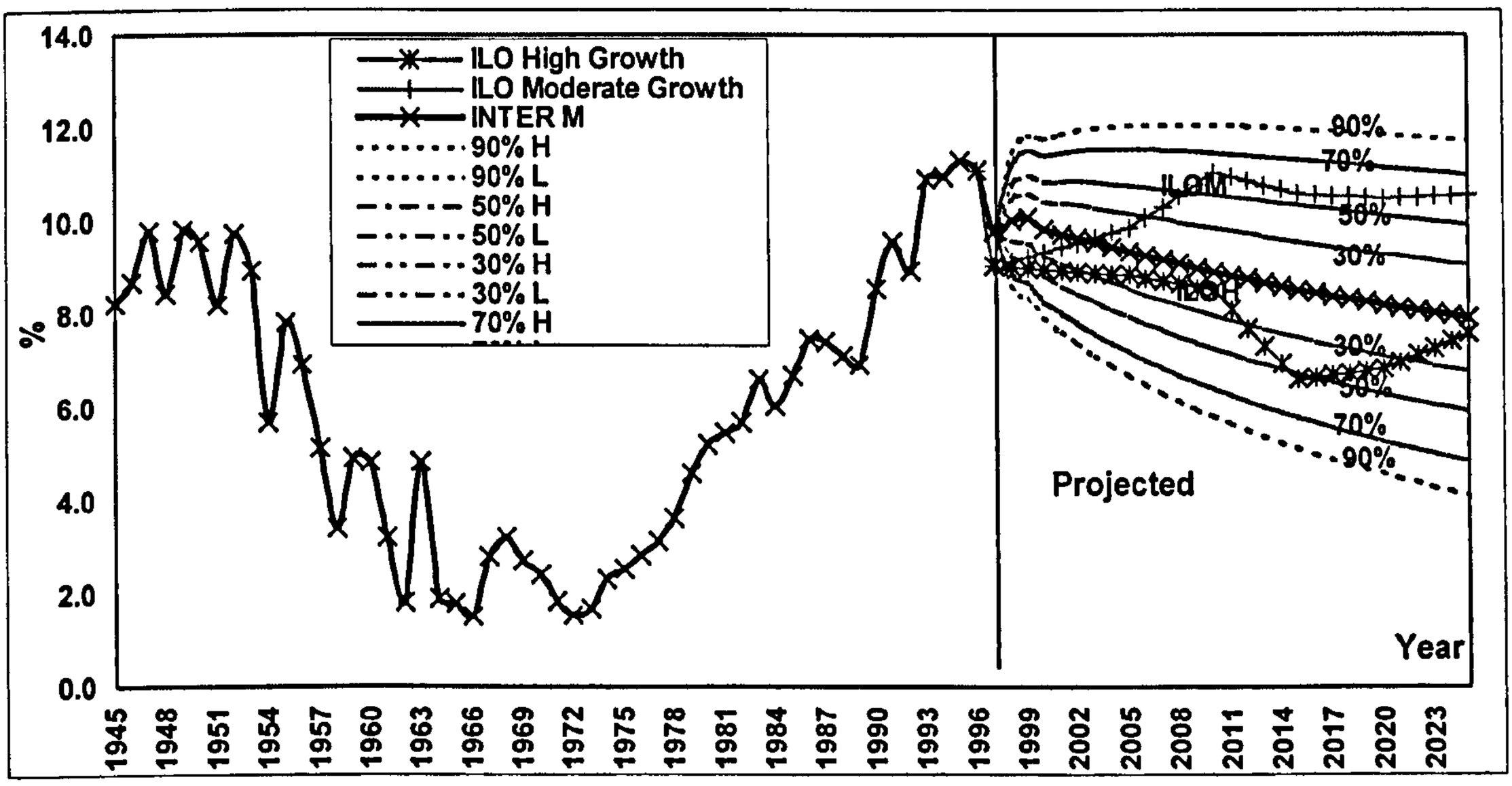


Figure 6.10 compares the ILO projections of future total unemployment rates to that of 30-90% prediction intervals of the model. The ILO estimates are roughly within 50% projection intervals. This means that there is a probability of less than 25% of having unemployment rates less than that assumed under the ILO high GDP growth projection, and there is a probability of less than 20% of having unemployment rates higher than those assumed by the ILO moderate GDP growth projection.

Alternative II is in the middle between the high and moderate growth assumptions of the ILO and the projection intervals are much more centred relative to the high growth alternative. The model results indicate that the location of the ILO alternatives is within the centre of stochastic distribution. However, forecasts of this nature are always subject to the three caveats concerning (1) quantum changes in socio-economic circumstances, (2) appropriateness of model specification, and (3) accuracy of model estimation. Therefore, the three alternatives adopted in estimating futures total rate of unemployment will be as follow:

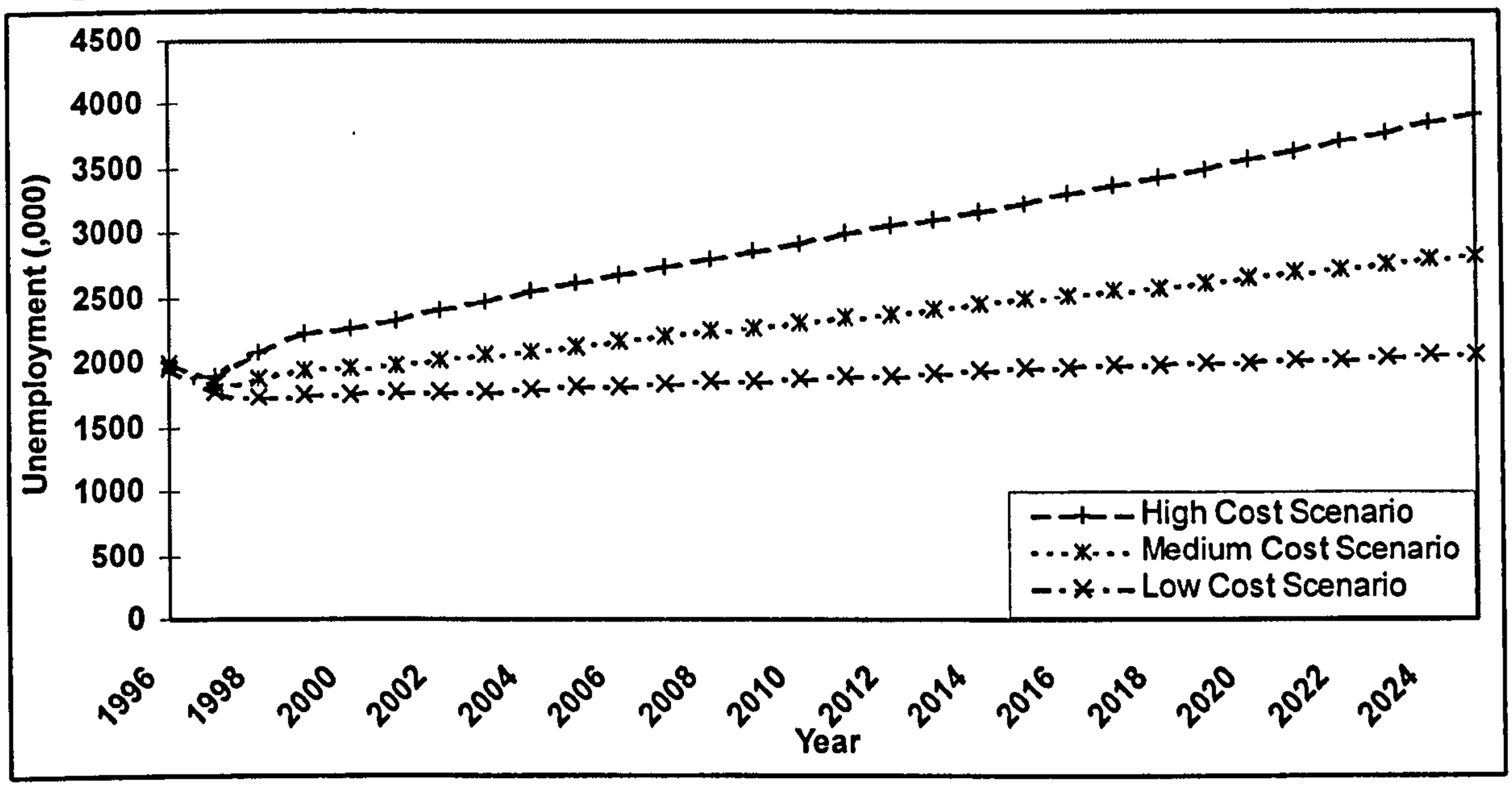
Alternative I: The lower limit of the 50% prediction confidence interval;

Alternative II: The model's projected values;

Alternative III: The upper limit of the 60% prediction confidence interval;

The results of this model are used to estimate the number of employed and unemployed workers over the projection period using formulae 6.3 and 6.4 as explained before (see **Table 5.4 of Appendix 5**).

Figure 6.11. Total unemployment numbers over 1997-2025 according to the three scenarios.



The final results of the demographic economic models for projecting future male, female and total employment and unemployment numbers over the projection period are presented as shown in **Figure 6.11** (total unemployment figures) according to the following three scenarios from the ESSPS and the Treasury point of views (See **Table 5.5 of Appendix 5**):

Scenario I (Low Cost Alternative): Low fertility + High mortality + Variant I labour force + Variant I unemployment;

Scenario II (Medium Cost Alternative): Medium fertility + Medium mortality + Variant I labour force + Variant II unemployment;

Scenario III (High Cost Alternative): High fertility + Low mortality + Variant II labour force + Variant III unemployment.

6.6. Conclusion

Declining male participation, increasing female participation, large gender-imbalance and rapid growth in the working age population can characterise and explain the general trend and structure of the LFPRs in Egypt. There is a gradual shift in the "participation profile" in particular, with growing female participation in the prime ages 25-55, and declining male and female participation in the age groups 15-29 and 55+. The expected increase in female participation and return of labour force emigrants from the Gulf countries may increase the pressure on the labour market, particularly the primary age groups, which may increase the likelihood of higher unemployment. This would have a considerable impact on the composition and size of the country's total labour force. However, females' participation in economic activities compared with males is not expected to improve more quickly over the coming years because of the effect of the socio-cultural attitudes towards female employment and also the economic, social, religious, educational and culture factors.

The Egyptian labour market requires reform in order to achieve growth in employment and a competitive private sector economy. Bureaucratic systems have led to an inflexible labour market, which impedes job creation. Egypt needs an effective employment program to replace life-time guarantees, or if that continues, it must be supplemented by retraining and wage reform. The government must realise that its policies concerning job security intensifies the problem of unemployment. Without skilled technicians and managers in Egypt, new investment will not be profitable, unemployment will stay high and the economy will suffer.

It is clear that unless the Egyptian economy will be able to absorb the expected large numbers of new entrants to the labour market, Egypt will suffer high levels of unemployment. But if Egypt succeeds in entering a path of high economic growth, labour market behaviour can be expected to change accordingly and the level of unemployment might decline, especially within the next two to three decades.

Chapter 7

The Projection and Valuation Results and Analysis

7.1. Introduction

This chapter analyses the results obtained from the cash flow and financial projections of each individual scheme, the two Funds and the ESSPS according to the valuation model set up in Chapter 3 and the demographic and economic assumptions given in Chapters 2, 4, 5 and 6. We can never simulate all possibilities and are limited by preconceptions and the computational process, the results are examined through a sensitivity analysis.

The model adopted in this thesis is a reflection of reality with some simplifications, so the results cannot be very definitive and any conclusion drawn is liable to some sort of subjective interpretation. The cost projections based on the assumptions, although subject to appreciable variability, are a useful indicator of the trend and range of future income and expenditure, and financial sustainability of the system. It is recognised that even though such projections and valuation cannot be considered exact predictions of emerging experience, they provide insights which are useful for making policy decisions.

The analysis is carried out under the three demographic cost alternatives (low, medium and high) and two economic (GDP) growth scenarios (moderate and high)[1]. This was done by projection until 2025 in terms of financial and demographic situation to determine the sustainability of the current system and sensitivity test to compare the results of changing the parameters. However, the presentation here concentrates on the demographic medium cost and moderate economic scenarios, and mentions the results of the other scenarios for the purpose of the sensitivity analysis. Results of the other scenarios are presented in **Appendix 6, Tables 6.2.**

The actuarial costs, of every scheme within the ESIPS, under different assumptions for earned interest rates and salary escalation are measured and compared with the current cost using the aggregate cost method. The required interest rate on the

[1] The first assumes 4% GDP growth rate and 5% salary escalation rate and the second assumes 6% GDP growth rate and 9% salary escalation rate.

invested funds to keep a full funding level in the two Funds is also analysed under different levels of salary escalation. The projection and valuation of the system is carried out according to the status quo, assuming that the system will continue to operate in the future according to the current rules and without any major changes.

7.2. Interpretation of the Results

Projections of income and expenditure have been carried out according to the projection model constructed in Chapter 3 and the demographic and economic assumptions set up throughout this thesis. On the income side, the number of persons who will be covered by each scheme has been estimated by applying the assumed coverage rates from Chapter 2 to the employed population in the three demographic cost alternatives given in Chapter 6. The contribution incomes have been obtained by taking into account the contribution rates applicable for each earnings component, the compliance rates and average insurable earnings (basic and variable). The other relevant assumptions used such as interest rate, were that assumed in Chapters 2 to 6.

On the expenditure side, the amounts of future benefits have been projected by estimating the amounts of newly awarded pensions for every year and adding them to the pensions in payment from preceding year. This is according to the model of projection constructed in Chapter 3. The benefit expenditure has been estimated separately for basic and variable earnings, pensions and increments, each scheme and each Fund, for each year in the projection period. Data from the fiscal base year of 1996/97 (shown in **Table 6.1 of Appendix 6**[2]) have been used for estimation over the projection period.

The results indicate some very significant trends, which need to be considered very carefully. The three main types of income available to the system, namely contributions, state subsidy and interest on investments, are quite different in terms of liquidity. Contributions are collected from the workers' payroll and are therefore equivalent to cash, and the state subsidy comes from general tax revenue, that can be classified as cash income. However, special arrangements are necessary to liquidate the Treasury subsidy in respect of the special increments and the interest credited on the invested assets[3]. Therefore, contributions should be first allocated to meet

---

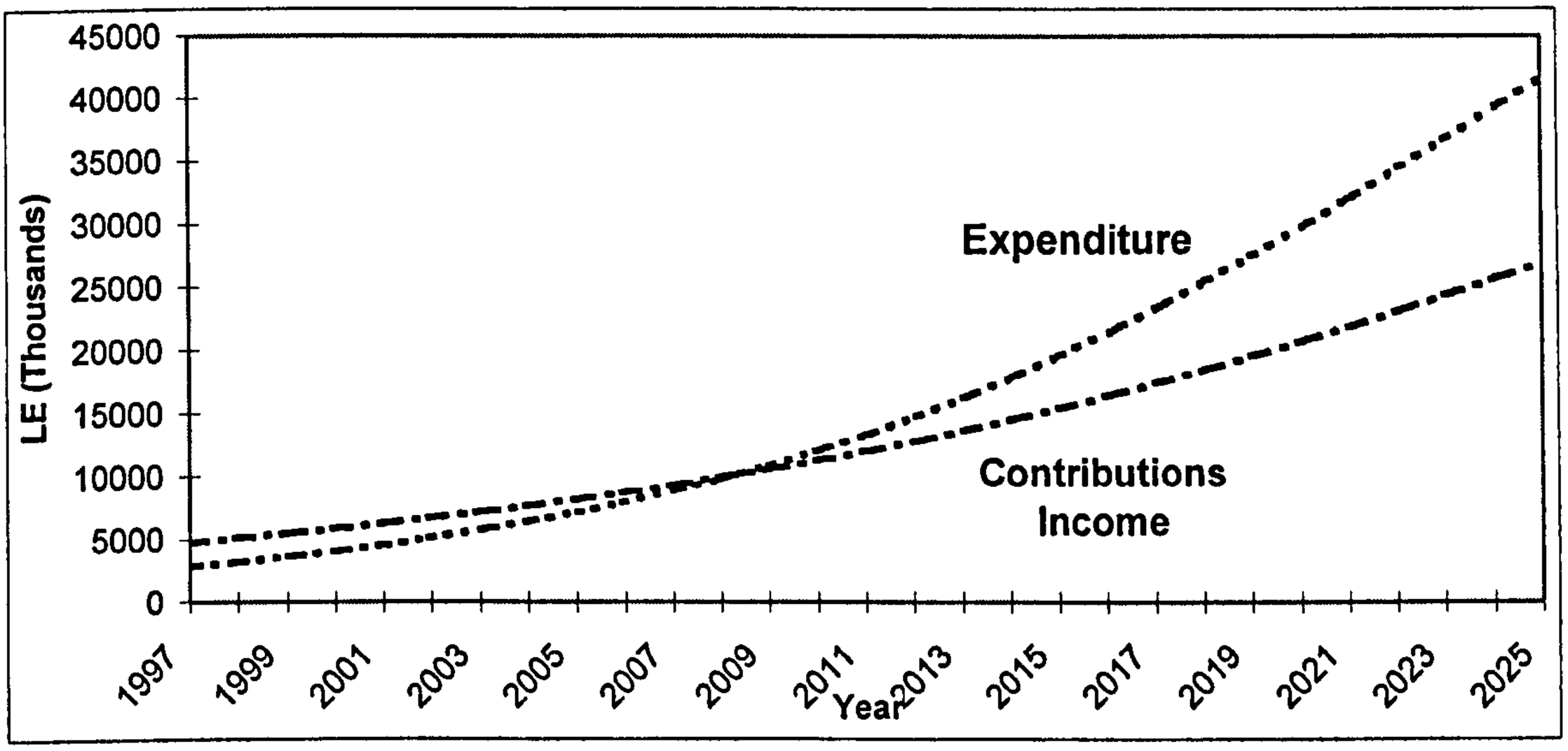
[2] It is found impossible to present all the data used in the projection and valuation in the Appendix. Therefore, some of the data are presented and other will be available to be provided on a CD.
[3] So far the interest on the NIB investments has never been liquidated.

expenditure[4] and if there is not enough cash income (including the Treasury subsidy), then interest income or assets need to be liquidated to meet expenditure. The projection results, presented in the following sections, concentrate on the medium demographic cost and moderate economic growth scenarios, which, from a financial point of view, is considered the conservative scenario. In order to analyse the sensitivity of the results to more favourable and less favourable conditions, projections under two other scenarios, high economic growth and low demographic cost scenarios and high economic growth and high demographic cost scenario, have been carried out.

7.3. The GSF Projection Results

The cash flow projection of the GSF, which covers civil servants, shows that the estimated contribution income will only be enough to cover expenditure up to 2009 according to the status quo projection under the medium demographic cost and the moderate economic growth scenario as shown in Figure 7.1.

Figure 7.1. The GSF contributions income and total expenditure over 1997-2025



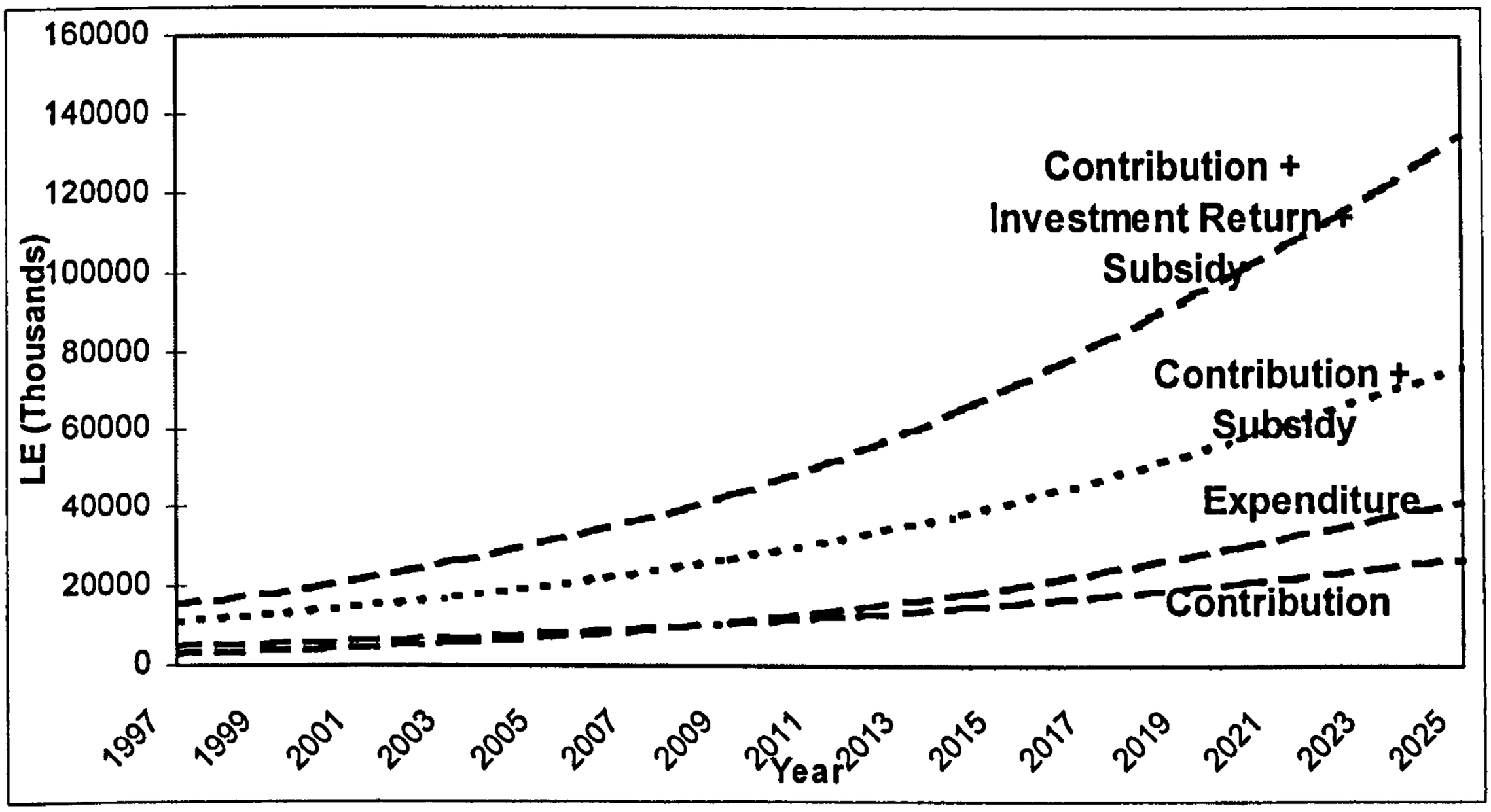
Since the number of civil servants is assumed to be increasing at a decreasing rate as discussed in Chapter 2, the increase in the number of pensioners increases the burden on the insured workers. It is estimated that the negative difference between contribution income and total expenditure will grow steadily, and consequently contributions are estimated to cover only two-thirds of the expenditure by the end of the projection year 2025. The cash-flow analysis suggests that the Fund is estimated

[4] This called primary cash-flow balance (Contribution – Expenditure)

to remain solvent without relying on State subsidy until 2009, but after this year the Fund would require additional cash income to meet its expenditure.

The projected total cash-flow balance shows that if the State subsidy is used in part to pay benefits, the Fund would envisage no liquidity problem until the end of the projection period. Nevertheless, concerns arise as to whether the Treasury would be able to allocate substantial amounts (totalling 50% of the expenditure of the Fund) from general revenues to the GSF. Figure 7.2 shows the evolution of the income components and expenditure over the projection period of 1997-2025 for the GSF under moderate economic growth and medium demographic cost scenarios. **Table 6.2 of Appendix 6**[5] shows the detailed results of estimated incomes and pension expenditures of the GSF.

Figure 7.2. Estimated income and expenditure of the GSF under medium demographic cost and moderate economic growth over 1997-2025



In projecting the assets, it was assumed that the state subsidy is invested in full in accordance with the legislation. Under this assumption, it is expected that the assets would continue to grow from a level equivalent to 16.3 years' expenditure in 1997 to 21.4 years' expenditure in 2025. As a result, the interest income (which represented 85% of the contributions in 1997) is estimated to amount to more than twice the expected contributions in 2025. However, it should be noted that most of these assets

[5] It is found impossible to present all the results of the projection and valuation in the Appendix. Therefore, only the main results are presented in the appendix and the detail results will be available to be provided on a CD.

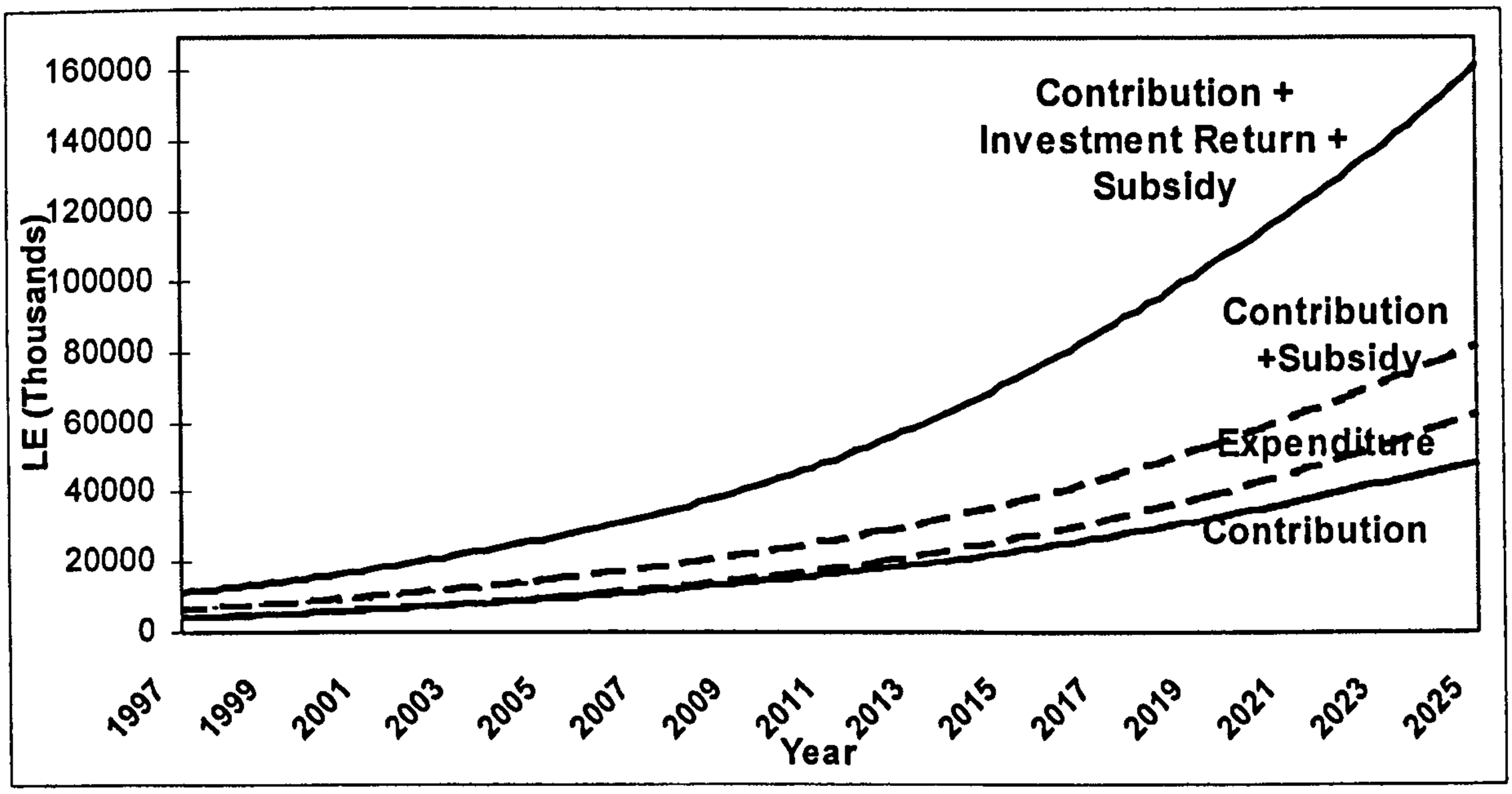
are placed in long-term investments, and therefore have a low level of liquidity. This significant amount of debt might be untenable for the NIB.

Under the optimistic scenario of low demographic cost and high economic growth, it is estimated that the negative difference between contribution income and total expenditure will grow at a slower rate. Consequently contributions are estimated to cover three-quarters of the expenditure by the end of the projection year 2025. The cash-flow analysis suggests that the Fund is estimated to remain solvent without relying on State subsidy until year 2009, but after this year the Fund would require additional cash income to meet its expenditure. The same conclusion was reached in the case of high demographic cost and high economic growth scenarios but contributions are estimated to cover only two-thirds of the expenditure by the end of the projection year 2025 as in the moderate economic growth and medium demographic cost scenarios.

7.4. The PPSF Projection Results

The cash flow projection of the PPSF, which covers all other schemes and categories of the members, shows that the deficit in contribution income and expenditure is expected to persist in the future as shown in Figure 7.3.

Figure 7.3. The income and expenditure from the PPSF employees under the medium demographic cost and moderate economic growth scenario over the projection period 1997- 2025.



However, due to the assumed growth in the overall number of contributors to this Fund[6], the cash-flow deficit is expected to remain stable in the short-term and the contributions would continue to cover 95-98% of the expenditure according to the medium demographic cost and moderate economic growth scenario. This cash-flow deficit has to be financed either by State subsidy, or the liquidation of assets or their accumulated interest.

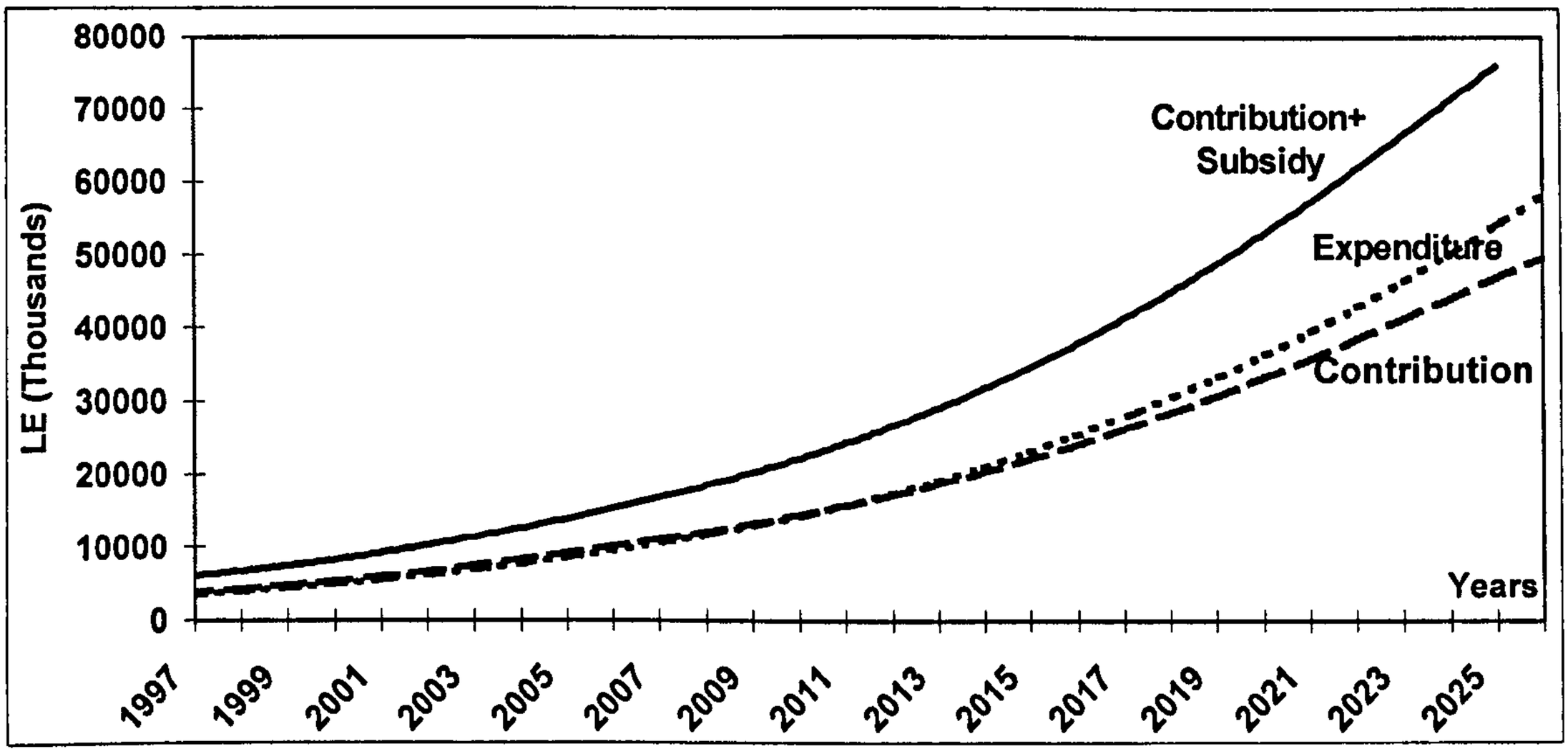
However, by 2010 the coverage of expenditure by contributions would start to deteriorate and is expected to accelerate, and by 2025 contributions would cover only 80% of expenditure according to the status quo projection. This is due to a decrease in the number of contributors and increase in the number of pensioners. According to the high economic growth and low demographic cost scenarios the contributions would cover 98-100% of the expenditure until 2015 and by 2025 contributions would again cover 81% of the expenditure. The same conclusion was also reached under the high economic growth and high demographic cost scenarios. The projection, which assumes full payments of the State subsidy, shows that the assets would continue to grow from a level equivalent to 11.5 years' expenditure in 1997 to around 18.7 years' expenditure in 2025 under the three scenarios. The same remarks apply as for the GSF concerning liquidity and the size of debt to the NIB. Table **6.2 in Appendix 6** shows the detailed results of estimated contributions and pension expenditure.

7.5. Cash Flows of Individual Schemes Within the PPSF

With respect to workers in public and private enterprises only, the primary cash-flow balance is positive until 2011 when it turns negative, and its size is estimated to widen rapidly thereafter according to the moderate economic growth and medium demographic cost scenarios as shown in Figure 7.4. However, according to the high economic growth and low demographic cost scenarios the primary cash-flow balance is positive until 2018, and the deficit in contribution income relative to expenditure is expected to continue at a low rate up to 2025. This is because the business sector is much more affected by the economic conditions which directly affect the level of income and expenditure of this scheme. It is also because of the lower number of unemployed people associated with high economic growth and low population growth. According to the high economic growth and high demographic cost scenarios the balance would be positive until 2013.

[6] In particular, private sector and self employed workers as assumed in Chapter 2.

Figure 7.4. Income and expenditure from the public and private sector employees under the moderate economic growth and medium demographic cost scenario over the projection period 1997-2025



It is expected that the reserves of this scheme would continue to grow from a level equivalent to 11.6 years' expenditure in 1997 to 20 years' expenditure in 2025 according to the moderate economic growth and medium demographic cost scenario. This scheme is in a similar situation to the civil servants' scheme but the expenditure will need to use part of the Treasury subsidy to pay benefits, as the investment return and the assets are unattainable. The results of the status quo projections for public and private sector employees under the three scenarios are presented in **Table 6.2 of Appendix 6.** A comparison between the primary deficits of the two funds and individual schemes is shown in Table 7.1.

Table 7.1. The primary cash-flow balance according to the medium demographic cost and moderate economic growth scenario over 1997-2025 (LE m)

Scheme/Year	1997	2000	2005	2010	2015	2020	2025
GSF	1978	1812	976	-711	-4148	-8991	-14711
PPSF	-69	-266	-394	-1438	-3597	-7274	-13807
PP Employees	454	409	656	207	-962	-3037	-7186
Self-employed	-81	-80	-68	-50	-70	-157	-344
Egyptians Abroad	1	4	15	28	50	85	130
CSIS	-278	-373	-612	-1022	-1694	-2788	-4465

Source: Derived by Author

This Table shows that by year 2015 all the schemes except that for the Egyptians working abroad scheme will have a cash flow deficit and these deficits will persist thereafter. The self-employed scheme is expected to have negative primary cash-flow balance throughout the projection period unlike the Egyptians working abroad

scheme. The scheme is supposed to have a significant share of the number of contributors in the low demographic cost scenario. The Egyptians working abroad scheme shows a positive primary cash-flow for the whole projection period, although due to its very small coverage the amount of excess contributions is marginal. The scheme is supposed to have a decreasing number of contributors and contribution income and has an increase in the number of pensioners. However, this scheme is not significant to the whole system. The casual workers scheme has the largest negative cash-flow balances reflecting the obvious imbalance between the benefit level (LE 63) and the contribution level (LE 1). The deficit in respect of the casual workers scheme in all the scenarios makes the overall primary cash-flow balance negative in the PPSF.

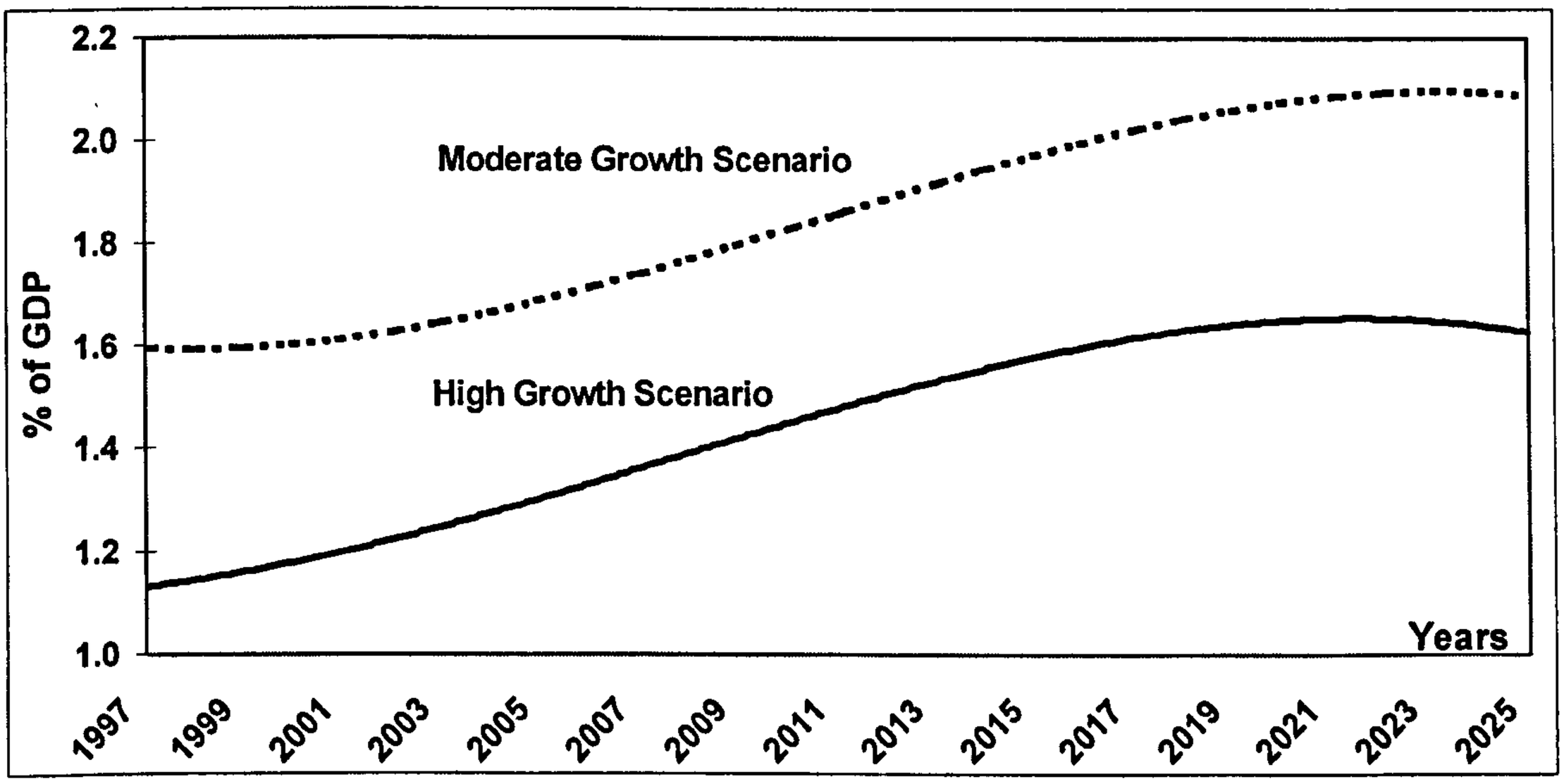
In the PPSF, the cross subsidisation between covered categories of different schemes is not shown explicitly, however the analysis of the Fund as a whole shows that the deficit in respect of self-employed and casual workers schemes is reduced by surplus of the public and private sector workers' scheme in the short term. However, as the financial balance for the public and private sector workers' scheme deteriorates, the overall cash flow will fall negative. If this situation remains unchanged, the negative cash-flow balance is expected to continue. This will require the use of the Treasury subsidy to pay benefits or the realisation of assets or some of the future annual interest due to the system before being added up to the assets in the NIB.

7.6. Consolidated Expenditure of ESSPS

To evaluate and analyse the social insurance expenditure at the national level, the overall projected income and expenditure of the two Funds are consolidated together to provide an assessment of its future "burden" for the national economy. The expenditure analysis of the three scenarios is explored. The less favourable moderate economic growth projection scenario takes the cost of subsiding the social pension system up towards 2.3% of the GDP by the end of the projection period. However, under the high economic growth scenario, this rate goes below 1.5% of the GDP by 2025. Figure 7.5 shows an estimate of the Treasury' subsidy to the ESSPS as a percentage of GDP over 1997-2025 under the medium demographic cost and moderate and high economic growth scenarios. The assets of both Funds are estimated to increase to 83% of GDP by 2025.

The results of these projections for the two Funds give a more favourable overall picture in the high economic growth and low demographic cost. The results give a less favourable picture under the moderate economic growth and high demographic cost scenario, but the differences are not significant as shown in **Tables 6.2 of Appendix 6**. However, as a conclusion, whatever scenario is actually happen in the future the ESSPS would face a liquidity problem from around 2010 unless the Government changes the rules regarding the availability of benefits or increase the level of cash income. But because the ESSPS is a very formal system and there is no private provision, it is most difficulty reducing the system benefits and therefore, encouraging private provision might be an appropriate solution[7] (Dickinson, G., et al., 1997).

Figure 7.5. The Treasury subsidy to the ESSPS as a percentage of the GDP over 1997-2025



The current level of Treasury subsidy is below 1.8% of GDP and it is estimated to increase gradually to about 2.3% by the end of the projection period according to the medium demographic cost and moderate economic growth scenarios. This looks reasonable for a country with a developing economy and wide population coverage within the social insurance system. This compares well with that of some other countries in the region, being about 4.6 % of that in Turkey, 9.0% of that in Israel, for example (World Bank, 1997). If economic growth is 4% per annum on average (the assumed moderate GDP growth scenario) over the projection period, then Egypt would reach a level of per capita GDP equivalent to the current levels in some

[7] Chile closed its Social Security System and replaced it with compulsory 10% savings.

European transition economies[8], such as the Czech Republic and Hungary, without reaching their level of social expenditure: currently between 18% and 25% of GDP (World Bank, 1998).

The projection reveals that Egypt is expected to follow normal trends of development in the increase of its pension expenditure as its population ages. But the moderate ageing of the population in Egypt will enable pension expenditure to stay below 5 % of GDP by the end of the projection period. One of the reasons of lower social security in Egypt is the pre-funded of the system as well as the low level of benefit amounts as a percentage of average national earning. However, if further population ageing in Egypt is extrapolated, a steady increase in pension costs may be anticipated.

7.7. Actuarial Valuation of the ESIPS

The actuarial valuation of every individual scheme was carried out according to the valuation model set up in Chapter 3, the demographic and economic assumptions discussed throughout the thesis and the available data on 30/6/1997. The actuarial valuation method applied was the aggregate cost method, as explained in Chapter 3. The actuarial valuation concentrates on the objectives stated in Chapter 3 regarding answering significant questions relevant to the adopted full funding strategy in connection with the characteristics of the ESIPS. The valuation results are presented in the following sections.

7.7.1 Objective 1: Adequacy of the Current Contribution Rates for New Entrants

1. What is the normal actuarial cost of providing benefits at different entry ages as a % of the payable salary (basic, variable and total) and what is the age at which the actuarial cost is the same as the current level of contribution rates at different assumed interest rates;
2. What is the effect of the current strategy of increasing national salaries[9] at a rate of 10% per annum.

---

[8] On average, social security expenditure in European Union was 28.5% of GDP in 1995. This figure ranged from 20% in Ireland to almost 36% of GDP in Sweden. By the nature of statutory social security system old-age pensions are the largest item of social protection expenditure in the Union.

[9] Although pensions in payment are also increased by the same percentage, they are not included in the benefit formulae as the rules do not allow for any link with price or salary increases and they are financed directly by the Treasury as stated before.

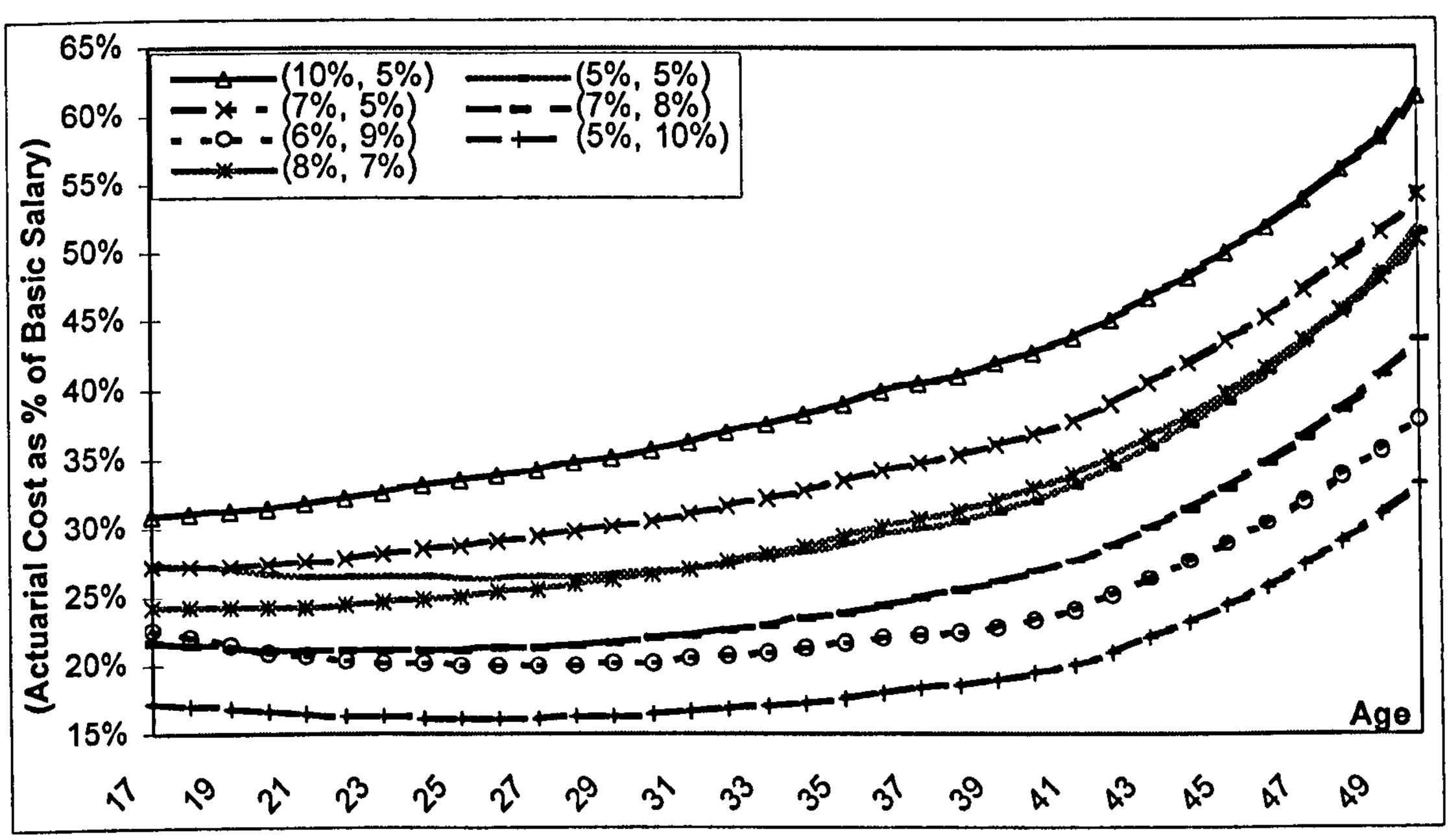
The actuarial cost using the aggregate cost method was calculated for every benefit separately. The actuarial cost was calculated for basic, variable and total salaries and for every scheme separately. The total actuarial cost was calculated as the summation of the individual costs which include the following:

1- old age and early retirement benefits;
2- death benefits (in service, after retirement and after invalidity);
3- death and marriage grants
4- remuneration benefit
5- administration cost
6- margin for adverse results

7.7.2. Basic Salary

As it can be seen in Figure 7.6 for the basic salary in the GSF, the actuarial cost depends on the assumed future interest, salary growth rates and age at entry.

Figure 7.6. Percentage actuarial cost of basic salary for different interest and salary growth rates (γ, δ) and different age at entry for civil servants covered by Law 79/1975[10]



The age at which the actuarial cost is the same as the current level of contribution rate using an assumed interest rate of 7% and salary escalation of 8% is 38. It is found that this age is 35 for the public and private sectors workers covered by Law 79/1975. However, if the interest and salary escalation rates are assumed to be 5% and 10%,

[10] δ is the rate of interest and γ is the rate of salary escalation.

respectively, this age decreases dramatically for the GSF members to 18. On the other side if the interest and salary escalation rates are assumed to be 10% and 5%, respectively, this age increases dramatically for the GSF members to 49. If we assume that the normal entry age is 30 (because of the very high unemployment at young ages), the actuarial costs at entry are 26.6% and 29.3% of basic earnings for civil servants and public and private sector employees, respectively, assuming an interest rate of 7% and a salary growth rate of 8%. If we take a more optimistic position on future interest and salary growth rates of 5% and 7%, respectively, with a normal entry age of 30, the actuarial cost for new entrants should be around the same current contribution rates for both civil servants and public and private sector employees.

For members covered by the self-employed scheme, the actuarial cost is the same as the current contribution level at age 33 assuming 7% and 9% interest and salary growth rates respectively. For the Egyptian working abroad scheme, the age at which the actuarial cost is the same as the current contribution rate is 44 years at 7% interest rate and 9% salary growth rate.

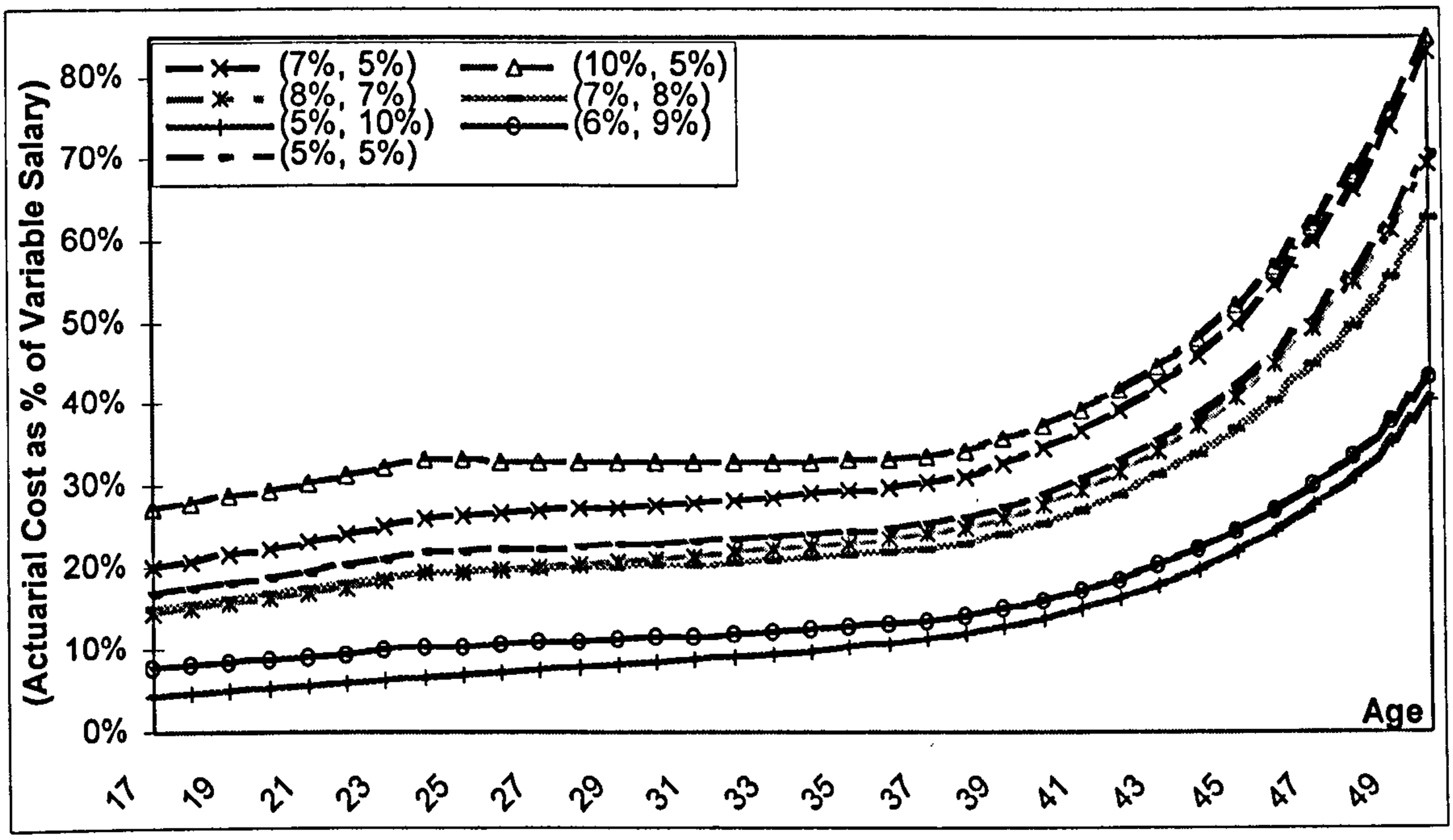
It is clear that both the interest rate and the salary growth rate have different effect on determining the actuarial cost at entry. As it can be seen from Figure 7.6, increasing the interest rate reduces the actuarial cost at entry, however increasing the salary escalation rate increases the actuarial cost at entry and vice versa. It is found that the current contribution rates for the basic salary are, in general, higher than the normal actuarial costs under reasonable assumptions of interest rate and salary escalation. It is also found that survivors' benefits and early retirement benefits represent the most significant factors influencing the actuarial cost for males and females respectively. Details of the actuarial costs for every individual scheme are given in **Table 6.3 of Appendix 6.**

7.7.3. Variable Salary

A similar conclusion to that of the basic salary was reached for the variable salary as shown in Figure 7.7. Benefits from the variable salary based on career salary (and not final salary as in the case of the benefits from basic salary) indexed by 2% for every contributory year. Pensions from the variable salary is set at a minimum of 50%, except in the case of early retirement when it is reduced by 5% per annum for the remaining years to age 60. These factors have some effects on the actuarial cost,

particularly on death and invalidity benefits. This can be noticed from the shape of the actuarial cost curves shown in Figure 7.7.

Figure 7.7. Percentage actuarial cost of variable salary for different interest and salary growth rates (γ, δ) and different age at entry for Law 79/1975



For the GSF, the actuarial cost equals the current contribution rate at age 39, assuming an interest rate of 7% and salary growth rate of 9%. However, assuming 6% interest and 5% salary escalation, respectively, and a normal entry age of 30, the actuarial cost is 21.1%. For the public and private sector workers it is found that the current contribution rates are equivalent to entry at age 36 under the assumption of 6% interest rate and 7% salary growth rate[11]. The other schemes do not have variable pensionable salary.

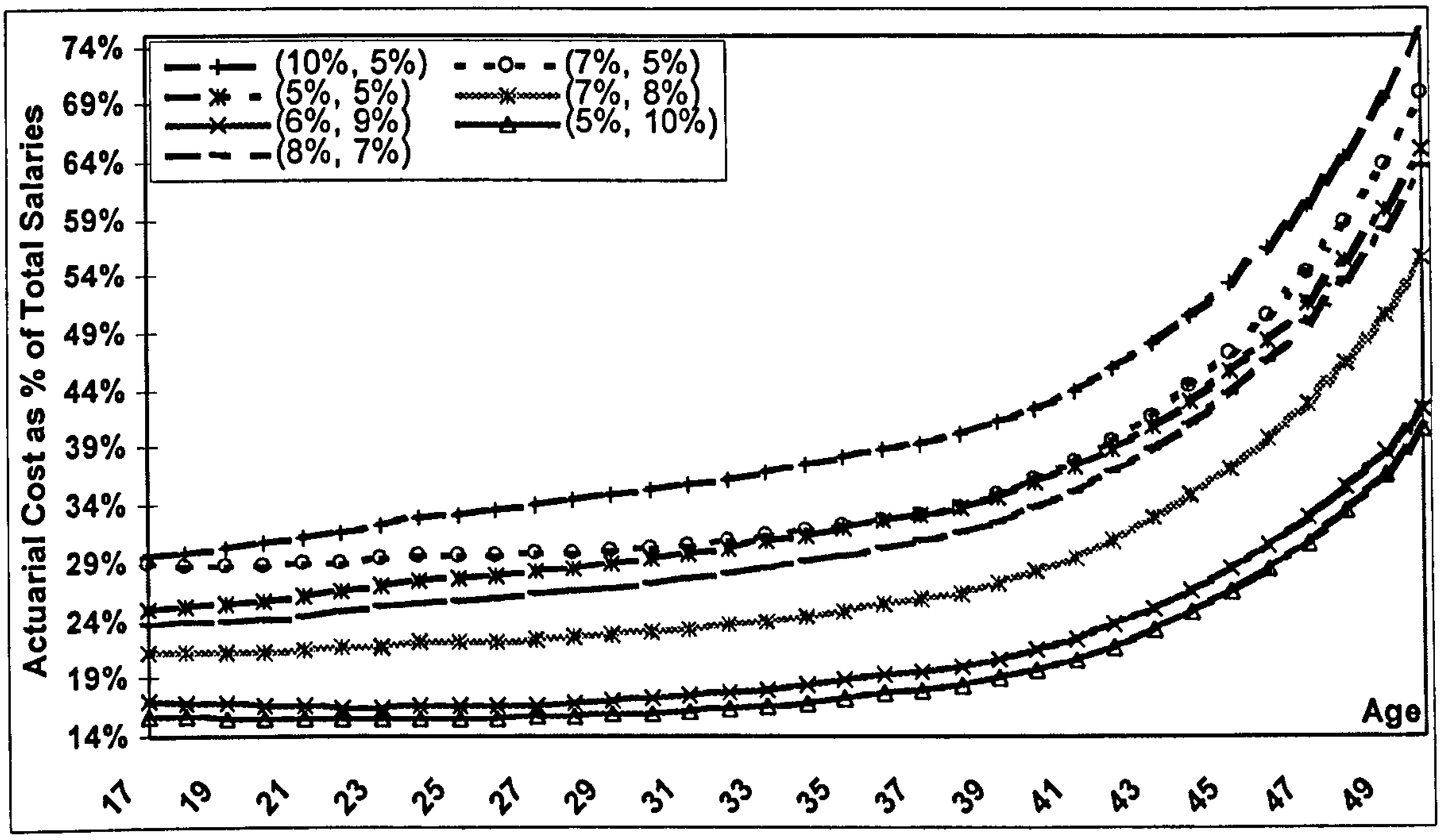
7.7.4. Consolidated Salary

Taking the benefits from the two types of pensionable salaries together, basic and variable, (as a future objective for the system), it is found that the system can reach a level of actuarial cost somewhere between the current two categories of contribution rate. Figure 7.8 shows these combined contribution rates for the same assumed rates of interest and salary growth. It indicates that if the two salaries are combined in one pensionable salary unit, under the assumptions of a normal entry age of 30 and assumed future interest and salary growth rates of 6% and 5% respectively, the

[11] The other schemes within the PPSF are not subject to the variable pensionable salaries

normal actuarial cost is 28.1%. However, increasing the assumed interest and salary growth rates to 7% and 9% respectively, at the entry age of 30 increases this cost slightly to 28.7%.

Figure 7.8. Percentage actuarial cost of total salaries for different interest and salary growth rates (γ, δ) and different age at entry for Law 79/1975



It is clear that the combination of the annual salary escalation and the rate of return on the invested funds will have an important effect on the required contribution rates for new entrants to the system. The analysis implies that improving the return on the invested funds is the most crucial factor for reducing the current levels of contributions. It also indicates that the continuation of the current relatively high level of salary escalation is increasing the actuarial cost for the new entrants to system.

This analysis gives an indication that the ESIPS can cope with delaying the entry of new entrants under the current levels of contribution rate. The analysis also indicates that by combining the two salaries in just one pansionable salary unit under the assumptions of a normal entry age of 30 and assumed future interest and salary growth rates of 5% and 7% respectively, the normal actuarial cost is 29.1% as shown in **Table 7.2**. Increasing the assumed interest and salary growth rates to 7% and 9% reduces this cost slightly to 27.9%.

Table 7.2: Normal actuarial cost for new entrants at age 30 for selected combination of interest and salary escalation rates for the GSF

(γ, δ)	(10%, 5%)	(7%, 5%)	(5%, 5%)	(5%, 10%)	(6%, 9%)	(7%, 9%)	(8%, 7%)
Basic	35.7	30.6	26.8	16.4	20.2	21.9	26.6
Variable	32.8	27.7	23.0	8.3	11.5	20.3	21.1
Total	34.3	29.1	25.4%	13.0	17.2	21.1	25.2

Source: Derived by Author

7.7.5 Objective 2: The Required Interest Rate to Achieve an Actuarial Equilibrium

1- What is the required rate of return on the invested funds in order to achieve the required full funding level;
2- What are the results of the actuarial valuations conducted for the two Funds based on the demographic and economic assumptions discussed in the previous Chapters.

The effects of varying interest and salary growth rates on the funding ratio of the system are examined to determine the required interest rate on the invested funds, the most important objective. The method used in calculating the Fund liabilities was the present values of future liabilities for current active members, pensioners and survivors according to the concept of closed fund valuation. Also, the present value of future contribution for current active members was calculated according to the same assumptions used for estimating the liabilities. The actuarial surplus (or deficit) is equal to the value of the fund plus the present value of future contributions minus the present value of future liabilities for active members, survivors and pensioners. Based on these definitions, the required rate of return on the invested funds in order to keep the funding ratio at one (full funding) was estimated.

Figure 7.9 shows that a rate of interest of 6.5% and a salary growth rate of 7% can stabilise the funding ratio at one given the assumed demographic and economic assumptions. Every segment of the curve in this figure represents a specific rate of interest with a range of salary growth between 5-10%. It was found that for every specific interest rate an increase in salary growth could increase the funding ratio up to a specific limit which depends on the assumed rate of interest.

Figure 7.9: The funding ration (FR) of the GSF under different assumed interest and salary growth rates

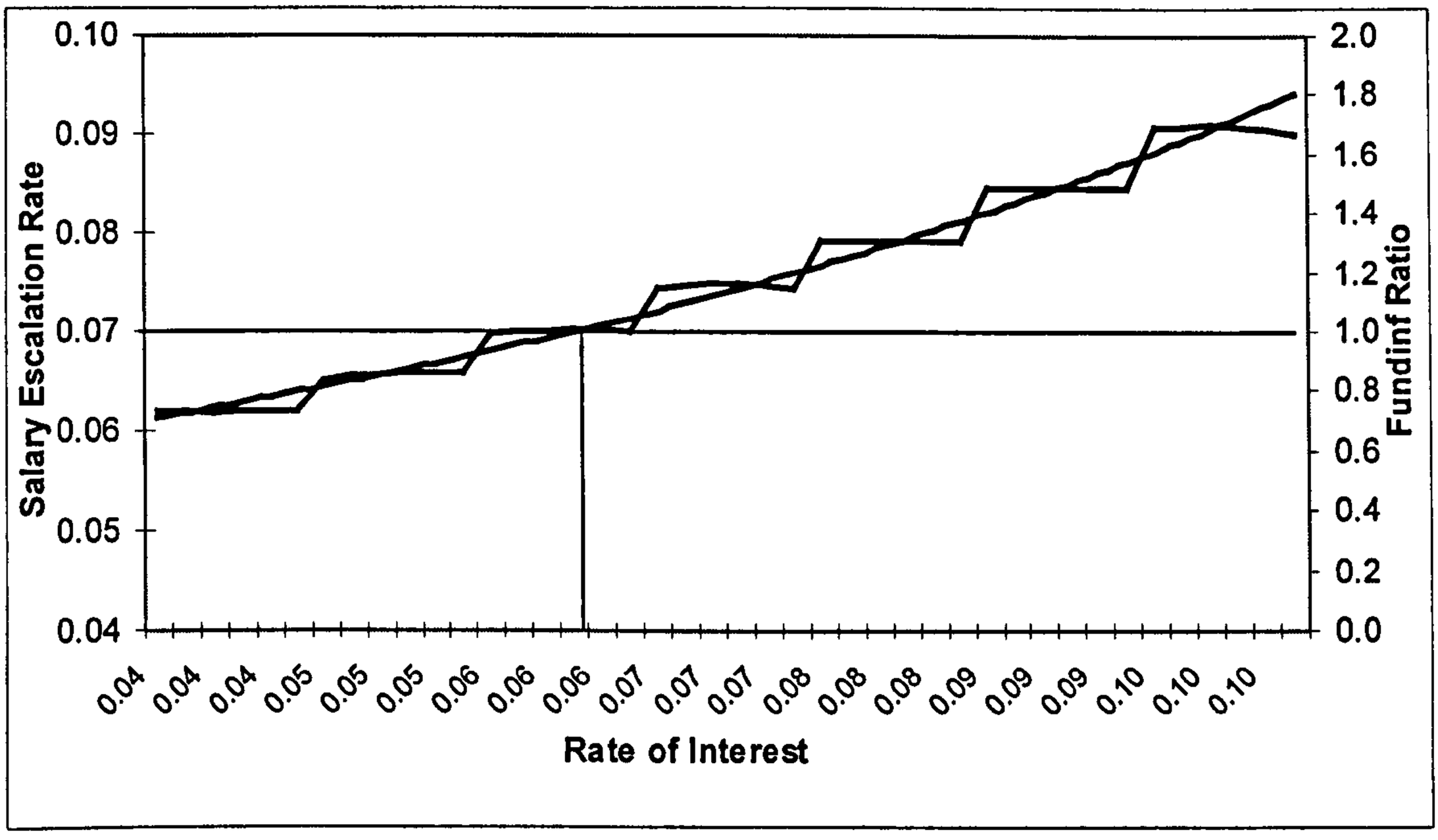
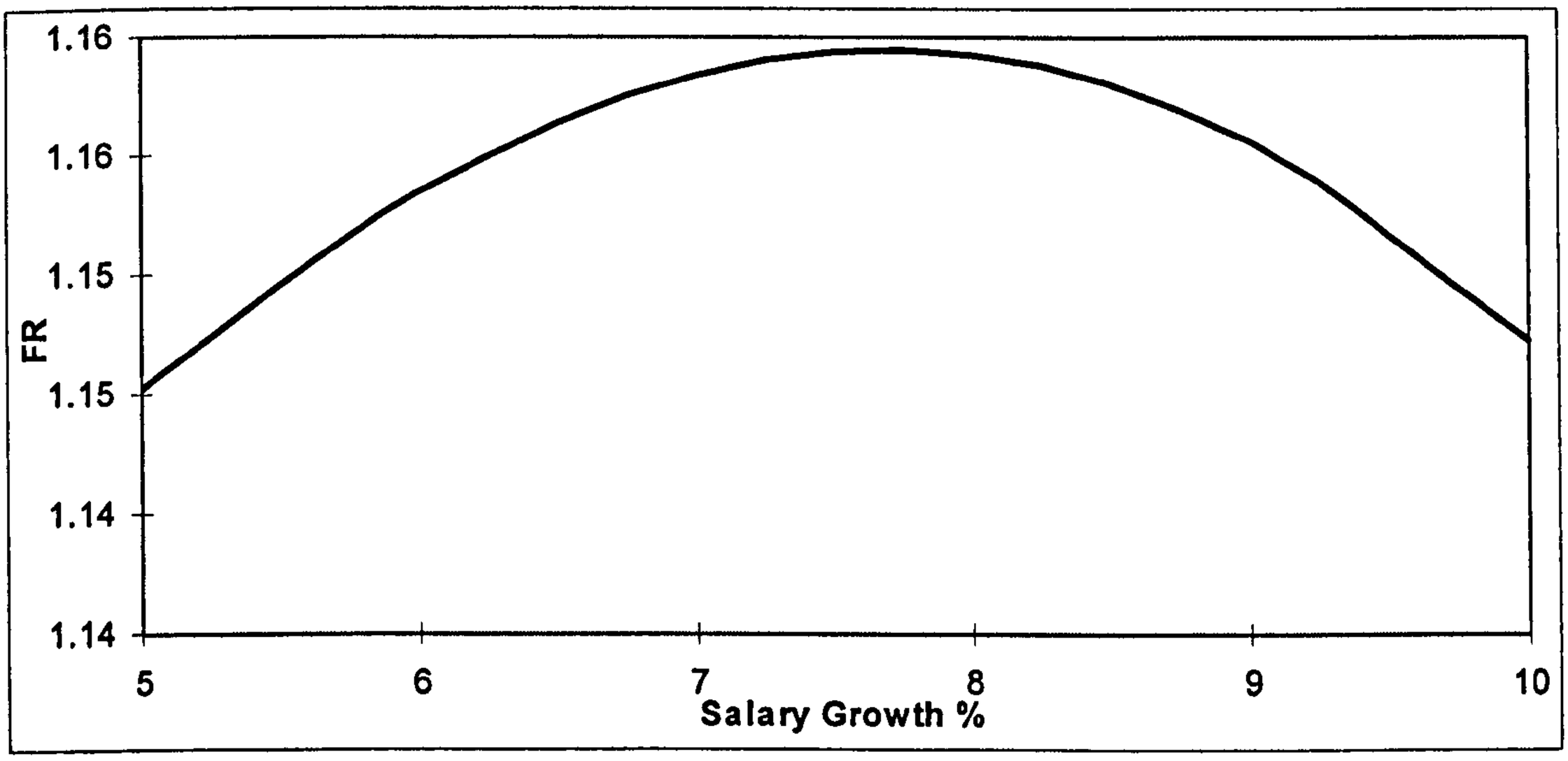


Figure 7.10 shows the FR for an interest rate of 7% for this range of salary growth. It shows that the FR increases when salary growth increases from 5% to around 8% and reduces with any further increase in salary growth.

Figure 7.10: The Funding Ratio (FR) under an assumed rate of interest rate of 7%



The salary growth at which the FR starts to decline increases as the assumed interest rate increases. This is because the interest rate is supposed to compensate part of the salary growth. Moreover, there is a positive relationship between the return on the assets required to stabilise the FR and the salary growth rates up to a level and after that level the relationship becomes negative.

Table 7.3 gives the results of the actuarial valuation of the GSF for an assumed rate of return on the invested funds of 7% and salary growth of 9%. The results of this valuation show a surplus which indicates that the required rate of return to achieve an equilibrium position is lower than 7%. However, this interest rate of 7% should be taken as the minimum rate for keeping the Fund in equilibrium. A similar valuation was carried out for the PPSF and the required interest rate to keep a 100% funding level was 7.2% (higher than that of the GSF).

Table 7.3. The actuarial valuation statement of the GSF on 30/6/1997 (LE m)

Assets		**Liabilities**	
	Value		Value
Fund	45805	Active members	89871
Present value of future contributions	68645	Pensioners	6412
Accrued Contribution	92	Survivors	3324
		Administration cost reserve	920
Total assets	104542	Total Liabilities	100527
Actuarial Surplus	4015		

Source: Derived by Author

7.7.6. Relationship between Salary Escalation and Interest Rate

As shown in Figure 7.6, that future salary escalation and rate of return can both have significant effect on the actuarial cost. Increasing the assumed rate of return on the invested funds can achieve a lower actuarial cost, but not as much as the increase in the assumed rate of salary escalation of the basic salary. However, increasing the salary growth rate in the case of the variable salary increases the actuarial cost for the ESSPS. The assumed rate of return on the invested funds has much more significant impact on the funding ratio of the system than the salary growth. Therefore, the Egyptian government has to consider the effect of its policy of 10% annual increases in salaries on the actuarial cost and the required rate of return on the invested funds.

7.7.7. The Actuarial Reduction Factor for Early Retirement

The adequate reduction factor to be used in reducing the pension value calculated ate the NRA in the case of adopting Early retirement by a member of the system was estimated for both basic and variable salary. This factor was calculated assuming an interest rate of 7% per annum and the number of years remaining to the NRA. The result is it is presented in Table 7.4.

Table 7.4: The actuarial reduction factor applicable to the early retirement pension.

Age	Reduction Factor	Age	Reduction Factor	Age	Reduction Factor
36	60.4	44	26.8	52	10.3
37	55.4	45	23.8	53	8.9
38	50.6	46	21.0	54	7.5
39	46.0	47	18.6	55	6.2
40	41.7	48	16.5	56	4.9
41	37.5	49	14.7	57	3.6
42	33.7	50	13.2	58	2.3
43	30.1	51	11.7	59	1.0

Source: Derived by Author

7.8. Conclusion

In summary, due to the young population structure in Egypt, if the assumed moderate economic growth is achieved, total pension subsidy expenditure is expected to stay below 5% of GDP until the end of the projection period. The basic conclusions drawn from the status quo projections are as follows: Until 2010, the GSF may collect sufficient contributions to cover the expenditure, while the PPSF is expected to face a relatively small size of cash deficit. After 2010, both Funds are expected to have emerging cash-flow deficits and by 2025, the estimated deficit will be 33% and 20% of the expenditure, respectively, under the medium cost and moderate economic growth scenarios. These negative cash balances must be covered either by Government subsidy, the liquidation of assets placed in the NIB, or implementations of adequate cost containment measures (i.e. increasing contribution rates or reducing the expenditure).

It is clear that the current contribution rates are higher than the actuarial cost for any assumed interest and salary growth rates higher than 6% and 5%, respectively even, under the assumption of a normal entry age of 30. Therefore, the current contribution rates should be reduced to a level which will depend on three factors: the assumed normal entry age, the assumed future interest rate and the assumed future salary growth. For securing a funding ratio of one, the system needs to ensure a rate of return of 6.5-7% with salary growth of not more than 7%.

Chapter 8

Summary, Recommendations and Future Work

This chapter summarises the findings and the major points made in this thesis. Implications of the projection and valuation results and recommendations for the development of the ESSPS and improving its performance are also presented.

8.1. Summary

On examining its structural, management, financial aspects and operational construction, it was found that the system has some major weaknesses and there is a need for structural changes and reforms in the policy and management techniques. Some of these weaknesses and required changes are summarised in the following sections. This should lead to the formulation of a reform program to improve the efficiency and sustainability of retirement income provision, assuring the ultimate fulfilment of expectations arising from the system and the development of the pension sector in Egypt.

8.1.1 The ESSPS Structure

1. The ESSPS is a comprehensive system in scope and coverage which, given, favourable economic growth is sustainable. It provides social protection in respect of a range of contingencies to around 98% of the country's employees, which is thought to have reduced the scope of private pension funds. It seeks to do so through a system financed, mainly, in accordance with social insurance principles from three sources of revenue: earnings related contributions from employees and employers, interest on the invested assets from the NIB and an annual subsidy from the Treasury.
2. The system is a funded defined benefit scheme (and practically is defined contribution as well). The benefits are not meant merely to prevent poverty: they are intended to provide a relatively high replacement rate for lost earnings. The system is relatively expensive for employees and employers. Contributions are normally payable at the rate of around 35-40% of the basic salary plus 30-35% of the variable salary subject to the same earnings limits that are applicable on benefits. The employers pay approximately two-third of these total costs.

3. Although the system generally satisfies relatively many of the criteria for a good pension system, a lot of improvement is needed to tackle the problems which obstruct its development. At the root of these problems, there is the political interference in the management of the system, a complicated legislative structure which needs to be revised, total dependency on the state in providing retirement income, an inappropriate investment strategy, non-compliance and contribution evasion, and the impact of inflation on pension payments.
4. The existing system and its structure is well established, far from crisis and provides the level of social protection which is envisaged by the system's structure. However, the comprehensive structure of the system is reduced significantly by administrative weaknesses at both the institutional and operational levels. The system lacks real autonomy and dynamism and the legislation and rules are complex. Radical managerial and operational reform is necessary to ensure that the system can survive, achieve its objectives and use its resources more effectively.
5. Problems and weaknesses in the benefit and contribution structure need to be addressed to ensure more effective use of resources, adequate levels of social protection, remove inequities and ensure that contributions are made with due regard to earnings levels. Among these problems are: the effective coverage and compliance of workers is lower than intended (except for civil servants and public employees) and the system is operating at a lower level of insurable earnings, used to determine both contributions and benefits, than was intended.
6. The division of earnings between basic and variable components creates anomalies and opportunities for evasion, and erodes the earnings-related objective of the system.
7. Early retirement has a strong impact on the financing position of the system and needs consideration. The reduction in benefit is less than actuarially required and since the rules are difficult to enforce, many people receive pensions when they are still working, which is having a significant impact on the cost of the ESSPS.
8. There is no built-in mechanism for indexing pensions, which results in the erosion of real pensions over time. Average pension levels are still low, particularly for widows and self employed members.
9. There are clearly some provisions that might be termed "over-generous", such as the survivors' benefits (although the average pension level for each survivor is

low), while others are too restrictive, such as unemployment benefits. The contributions for unemployment insurance exceed the rate required for meeting the liabilities. Some revision of over-generous arrangements would free up resources that could be better targeted elsewhere, particularly in improving the unemployment benefits.

10. Although there are supplementary occupational pension schemes operated by employers, opportunities for private pension funds and private savings are limited, as it is clearly envisaged that the Egyptian population will depend only on the social insurance system for providing retirement income.
11. The relationship between the Treasury, the NIB and the two public Funds represents the key focus of policy issues in social security financing. However, the financial structure of the system and the division of responsibility for financing the system and the management of funds are not transparent and rather complicated, making it difficult to determine accountability between different public institutions. The GSF and the PPSF work separately in respect of finance and management.

8.1.2. Investment Strategy and the Treasury Subsidy

1. The pre-funding of the system has resulted in a large pool of assets that represents a significant share of the national economy (amounted to LE 95 billion, representing 37% of GDP at current prices at the end of June 1997). However, they have nearly all been usurped by the government (accumulated debt of the NIB and loans to the Treasury) to finance its various long-term development plans. This indicates that the Social Insurance Funds are functioning as vehicles to transfer excess contributions and the subsidy from tax revenues into the NIB to fund its national development projects. Thus, these assets are not readily realisable when needed to meet expenditure and do not even provide market rates of interest.
2. The failing of this investment strategy, which is always regarded as the main cause of actuarial deficit in most of the actuarial valuations, has led the Government to accept its responsibility and to take care of the cost of pension increases. As a result, the Treasury provides an annual subsidy to the Social Insurance Funds which has been rising over time. This annual subsidy represents a major part of the total benefit expenditure, reaching 58.2% of the total expenditure in 1996/97 compared with 21.7% in 1979/80, and represented 20% of

Government expenditure in 1997-98. However, these subsidies to the Social Insurance Funds are used as a source of income for the NIB and hence for financing public projects.

3. As a result of this strategy, the system has not built the capacity to manage the its assets and therefore the level of responsibility for the investment of funds through the ESSPS is very limited.

8.1.3. Projection and Valuation Results

1. Both Funds together have accumulated assets equivalent to 13.5 years' annual expenditure (16.7 years and 11.5 years, for the GSF and the PPSF, respectively) at the end of June 1997. Expenditure on benefits has been increasing rapidly at an average rate of 20% per annum over the last ten years, which is creating some cash-flow liquidity pressures. The ratio of expenditure to contributions shows that in 1979/80 expenditure represented 49% of contribution income (i.e.51% of contributions were re-invested) but that in 1996/97 more than 77% of contributions were allocated to meet expenditure. The Treasury subsidy to the system, however, represents a small proportion of the GDP (1.82% of GDP in 1998/99).
2. Increase in the levels of non compliance, contribution evasion, and unemployment among young members of the labour force as a result of the rapid increase in the population have put more strain on both income and expenditure and increased the likelihood of a liquidity shortage sooner rather than later.
3. We have applied the actuarial projection technique to project the annual cash flow of the system under three different demographic and economic scenarios. We explored the possibility of a liquidity shortage and tested the system's future financial sustainability over 1997-2025. It was found that the system is expected to face a negative cash-flow from 2010 under the medium cost assumptions (the PPSF may have this liquidity shortage before year 2010) and the contribution would cover only 80% of the expenditure by 2025.
4. This will require the liquidation of some of the assets loaned to NIB and the Treasury, which may eventually push the system towards PAYG system requiring sustainable economic growth in order to be able to continue providing the increasing annual subsidy to the system.
5. The casual workers' scheme is neither equitable nor financially sustainable.

6. The high rate of salary increases over the last two decades is putting significant pressure on the system.
7. We have also applied the actuarial valuation technique to determine the required rate of interest to maintain an equilibrium position of full funding of the system's liabilities under different future salary growth rates using a set of economic and demographic assumptions and the 1997 data. We also tested the adequacy of the current contribution rates for new entrants under the same assumed interest and salary growth rates according to the same set of assumptions.
8. This actuarial investigation has revealed that the system can stabilise the funding ratio at 100% and achieve surplus under two conditions. The first and most important requirement is a return on its assets of at least 6.5% per annum. The second is that the level of annual salary growth should be within 7-8% per annum.
9. It was found that the current contribution rates are higher than required for new entrants for both basic and variable salaries under the assumption of 7% interest and 9% salary growth. It was found that the current contribution rates of basic and variable salaries are equivalent to entry at ages 43 and 41 respectively. If the two salaries are regarded as one salary unit, it is found that the required contribution rate to pay for both benefits is 23% at entry age of 30. It was found that the current contribution rates are equivalent to an entry age of 30 under the assumptions of interest and salary growth rates of 6% and 5% for the basic and 5.5% and 6% for the variable salaries respectively. This confirms our earlier arguments that part of the contributions are effectively taxation rather than saving for retirement.
10. This actuarial investigation shows that there are some factors which tend to disturb the equilibrium of the system. The first factor is the increased incidence of early retirement (particularly female members) as the reductions in pension are not consistent with the required actuarial reductions and that there is no reduction on retirement from age 55. The second factor is the survivors' benefits (particularly for male members) which put a large financial burden on the system. The third factor is the annual increases in the salaries, which have varied between 10-15% over the last 15 years.
11. In achieving the stated objectives, an Egyptian life table was constructed, the population mortality, fertility, the size of the population within the social security area and future labour force and total unemployment rates were projected using

appropriate methodologies. The mortality, fertility, unemployment and population projections made were consistent for the whole country.

12. It was found that population mortality is improving faster at birth, infancy, young ages and early adulthood than at late adulthood and old ages, for males and females. Moderate improvements were noticed at middle ages, with no improvement or even deterioration at very old ages. Life expectancy at birth for both males and females have improved significantly from 35.7 and 41.5 in 1937 to 65.4 and 69.2 in 1996 for males and females, respectively. They are projected to rise to 72.1 and 75.4 years for males and females, respectively, in 2025. However, it was found that the mortality of the Egyptian population is nearly half a century behind that of the English population.
13. Fertility has been declining significantly, particularly from the second half of the 1980s, and it is expected to continue declining. The TPFRs is expected to decline from 3.82 children per woman in 1996 to 2.5 in 2025;
14. It was found that the overall population of Egypt is increasing but at a declining rate of growth and the total population is expected to reach 106.2 million by year 2025 according to the medium assumption. The analysis reveals that the dominant impact on the population size arises from fertility assumptions rather than the mortality assumptions. The declining fertility rates and extended life expectancy will cause the population profile to age, although this ageing is moderate and significant effects will not materialise until well into 2100-2200.
15. It is clear that demographic changes impose strains on the economy in the long term and could become quite significant when there is an increasing direct link between the projected population, age structure of the contributors and the State liabilities towards the system.
16. The labour force in Egypt is characterised by declining male participation, increasing female participation, a large gender-imbalance and rapid growth in the working age population. There are many factors which increase the likelihood of having high unemployment levels in the future unless an effective employment program is achieved so the level of unemployment might decline. Applying a stochastic time series model, it is projected that the total unemployment rate under medium alternative decreases gradually from 10% in 1998 to 8% by 2025.

8.2. Recommendations

Special arrangements or procedures have to be constructed to make the system respond better to the changing environment. The following recommendations for the reform of the ESSPS are intended to improve its efficiency and create a better pension provision in Egypt.

8.2.1 Legislation and Structure of the ESSPS

1. Review all social insurance legislation to introduce a simplified, consolidated, uniform and integrated legislative structure for the system. Review procedures for the issue of legislation, policy and administrative instructions to make the system better fit within the new environment.
2. Continue operating the system as social insurance-based Funds independent from the government budget and according to actuarial principles. Strengthen the financial linkages between the two Funds, simplify the methods used to calculate pension entitlements, increase the system's efficiency and reduce its complexity.
3. Prepare, as a long term objective, for the establishment of a fully integrated public Fund in which financing, administration, and valuation would be combined in a unified body.
4. Develop comprehensive, accurate and automated data-bases covering all contributors and beneficiaries of the two Funds that are integrated with those maintained by the ESSPS and connected with that of the CAPMAS. Utilise the National Identity Numbers to ensure that the receipt of retirement income without the potential for duplication.
5. Adjust the current system to create a favourable environment for a long-term programme of economic restructuring and privatisation by shifting some of the pension responsibility gradually from the State to the private sector. This shift in responsibility requires the establishment of a mix of responsibilities between public and private schemes. Broadly, there are two possible approaches for achieving this objective:

a. Create a need for private sector provision and actively promote and support its development by holding back the social insurance system at its present level and restructuring its contributions and benefits. This could be done by adopting a flat rate system or by compressing the earnings related system

within a low ceiling and encouraging the development of private and occupational supplementary schemes through tax and other incentives; or

b. Reform the existing system by improving governance and compliance but with some limitation in scope to encourage reliance on occupational and private arrangements.

6. Encourage the creation and growth of supplementary defined contribution occupational and private pension funds with the main aims of improving investment choices and offering more benefits. These funds should, particularly, target earnings not covered by the social insurance system to supplement the benefits available from the state system and limit reliance on the system to the current level. Such funds would reduce the burden that the current system places on future generations and, therefore, they should have regard to contribution and benefit levels from the social insurance system.
7. Consider the establishment of a national fund for supplementary pensions[1] in the form of a privately run occupational scheme covering incomes that exceed the maximum participatory benefit in the first tier system;
8. Create an effective annuity market and issue government bonds to cope with the pension business. Introducing index-linked bonds, rather than fixed interest or variable rate bonds, can assist pension funds in meeting their real commitments.
9. Continue the policy of terminating contracting-out from the statutory schemes and continue efforts to re-include the schemes already exempted from the state system.
10. Change the reference earnings to be the aggregate earnings (basic + variable) for the purpose of determining pensionable salary and contributions. This would extend the scope of pensionable salary and would ensure a closer relationship between earnings, contributions and benefits. It would not be necessary to discontinue the two-tier salary system, which is a feature of national wage policy.
11. Consider the introduction of a long term gradual increase in the pension age[2] in combination with a broader package of measures to ensure that no one suffers a loss of accrued rights. This has to match the expected future change in the population profile over the coming 50 years, the increase in members' life expectancy and the labour force profile. The unemployment implications must be

---

[1] "In France, the second tier of pensions is organised as a national programme with specific benefits which are financed and administered through a number of industry-wide institutions, grouped under two central organisations

considered very carefully. Such a suggestion is subject to caveats about its political, social and economic acceptability and its real effects. As a suggestion the pension age might be raised by one year for every 10 years of time.

12. Extend the reference period for the determination of earnings in the pension formula so that, first, a longer reference period is used[3] and, second, the earnings are revalued by the proposed national average earnings index.
13. Consider reducing the contribution rates to change how costs are shared between workers and employers (i.e. make the employer contribution rates equal to that of the employees at maximum). Given that the current high contribution rates make up for the low return on assets, an improvement in the rate of return would help in reducing the employer's cost and may reduce contribution evasion and the level of unemployment. Determining the contribution levels in a national social security system should also include the participation of economists, sociologists and politicians to prevent the rates from becoming oppressive to the system's members or obstructive to the growth of industry or the investment of foreign and domestic capital.
14. Consider the indexation of pensions in payment to protect against inflation (either automatically every year or as a result of periodic reviews) so the real value of pensions will be maintained and pensioners will maintain their standard of living. This can be achieved by linking pensions to a consumer price index or to average salary increases as an integral part of the benefit formula instead of the current ad hoc adjustments by special increments. Automatically index the relevant ceilings and minimum benefits in line with average earnings.
15. Restrict and discourage early retirement by imposing age 55 as the minimum age of entitlement and supplementing this with stronger penalties for exercising the option of early retirement. A more equitable rate of reduction would be around 5% per year of anticipation.
16. Simplify and restrict the range of survivors' dependants eligible for benefits to reduce the level of over generosity and make the benefits more effective for the eligible dependants. This should produce a significant saving in expenditure on death benefits.

---

[2] Currently age 60 except for the self-employed and casual workers for whom it is 65.
[3] Italy, Spain and Portugal each has a social security pension based on final average earnings, with averaging over 5 years in the case of Italy and Portugal and 8 years in the case of Spain.

17. Give priority for increasing the rate of compliance among categories of workers with low compliance rates, particularly private sector workers and the growing numbers of informal sector workers.
18. Introduce a qualifying contribution period required prior to the award of invalidity benefits for civil servants and public sector workers of at least 3 months as for private sector workers, and consider extending it to a longer period of at least 6 months, for example, thereafter.
19. Extend the scope of the self employed scheme to some of those regarded as casual workers. Introduce measures to prevent low salary selection in the self-employed scheme. For instance, increase the minimum pensionable salary of the self employed scheme gradually and consistently (e.g. every two years). Taxable income could be used for guidance in this case.
20. Improve the scheme benefits in respect of employment injury with a related increase in contribution rates.
21. Change the funding strategy of the casual workers scheme (CSIS) by increasing the contribution rate to correspond with the principles of social insurance. This requires linking the level of contributions and the level of benefits and imposing a benefit disqualification for late payment of contributions. Thus the structural imbalance between the benefits and contributions of the casual workers scheme could be abolished. Reconsider some of the sectors subject to the CSIS as incomes of these sectors change with economic conditions.
22. If it is decided to continue the casual workers' scheme as a non-contributory tier of the system, it is better if it is removed from the ESSPS and finds sources of funding to support an adequate assistance system for those categories of the population who are unable to finance their future social security liabilities.
23. Review the unemployment protection arrangement to ensure that it is better integrated with economic reforms. Make unemployment benefits available to the vast majority of the unemployed and focussed on support for active job search.
24. Establish vesting and portability to ensure that pension entitlements (including the value of employer contributions) are easy transferred from one Fund to another on a change of employment which results in a change of the social security scheme.
25. Appoint a government actuary, as in the UK, to take responsibility for all actuarial advice related to the ESSPS and for regulating and supervising occupational and private pension schemes.

8.2.2. Mortality, Population and Labour Force Projections

1. Undertake a full-scale mortality investigation for the construction of new Egyptian life tables and the projection of future mortality trends decennially after the publication of data from the new census which should be made publicly available[4]. Prepare life tables for females according to marital status, based on census and deaths data. A generation approach to the projection of mortality rates should be also investigated.
2. Establish Egyptian Life Tables for active members and old age and invalidity pensioners, which are based on the updated mortality experience of the ESSPS to enable a more accurate assessment of the financial position of the system. This requires urgently more and continuous research into the mortality area which will have a significant impact on pension provisions in Egypt.
3. Carry out a full projection for the population covered by the social security system every second or third year at maximum. The assumptions made regarding fertility and mortality rates should be reviewed and revised for each new set of projections in line with changing circumstances. Reassess methodologies used for analysing relevant data and determining future assumptions. Databases containing both the original and revised population estimates should be maintained and subsequently used as an indicator for future population estimates.
4. Conduct a study to analyse the trend of fertility and its effect on the cost of the social security program.
5. Increase labour force participation to alleviate the future burden of social security provision on the economy and public finances.
6. Adjust the system to accommodate future expected increased mobility in the labour force and the shift in employment from the public to the private sector.

8.2.3. Funding and Investment Strategies

1. Improve the long-term solvency of the system by improving investment performance to reduce and ultimately abolish the State subsidy and enable the system to be financially independent and self-managed. This could allow the Treasury to allocate its resources to finance national development projects directly rather than through the ESSPS.

---

[4] This requires databases containing actual mortality data, together with data from past and future projections to allow measurement of the projections' performance against actual out-turn.

2. Over the short term, continue financing annual pension increases from general revenues but link them to an inflation index rather than to salary increases. Over the long term, pension increases should be integrated into the social insurance system rather than being met by the Treasury. This would imply a sharp rise in the liability of the social security unless there is a transition period given to the system to be able to cope with such liabilities.
3. Increase resources for the management and planning of investments, policy development and analysis, research, data collection and actuarial and statistical skills. Consider giving more real independence and responsibility to the system, which should gradually assumes the major role of selecting its own investment strategy.
4. Investment policy should be removed gradually from government control to avoid the problem of artificially low returns from government-controlled debt instruments. Any cash flow surplus or recovered assets should be invested in non-government instruments and in "real" assets (e.g. commercial projects, equities and properties), to hedge against inflation. This could reduce the Government debt to the system built up through Treasury subsidies, help in financing the extra costs of funding early retirements and increases to pension in payments, and limit future deficits.
4. Both Funds have to develop investment strategies and enhance their capacity in investment management to retain assets which are readily realisable when needed to meet expenditure and which can provide reasonably high yield. The Funds should gradually redeem the maturing investments as they are due rather than use them for roll-over of new investments to the NIB, but a sufficiently long transition period should be allowed.
5. As a short term solution for improving investment returns, allow the two Funds to invest a proportion of their assets with a group of specialist fund managers. Encourage the system to invest a small proportion of its funds in the Egyptian stock market to encourage its growth. This proportion could increase when the market becomes less risky, adequately regulated and has better transparency as to the value of the stocks.
6. If the Government wants to use some of the Funds' assets it has to guarantee the prevailing interest rate in the market with a minimum of 6% per annum (suppose

the market rate is less than 6%) to be given on the invested funds in order to reduce the likelihood of an actuarial deficit.

7. Provide the finance needed for the casual workers scheme directly from the Treasury, leaving the management and the actuarial aspects of the scheme to be dealt with the system.

8.2.4. Projection and Valuation of the System

1. Undertake medium and long-term actuarial projections of the system on a regular basis to check the financial status of the scheme and allow preemptive measures to ensure its long-term viability. Test alternative long-term reform strategies and ensure that the system as a whole is placed on a reliable long-term financial basis. Collect data against which the performance of projections can be assessed.
2. Conduct regular reviews of all the demographic and economic parameters and assumptions in order to ensure the accuracy of projection and valuation results.
3. Reduce the time interval between actuarial valuations to 3 years instead of the present 5 years to cope with changes in the economic situation.
4. Reconstruct the defined benefit model of the system to allow adjustment of contribution thresholds and earnings limits. This would help in ensure that the structure of the system reflects price and wage movements more generally in the economy.
5. Consider changing the reference earnings for the basic salary pension to career average which is revalued throughout the total period of insured membership[5].
6. Consider replacing the strategy of full funding to a strategy of partial funding which would be best fit for a defined benefit social insurance system.
7. Consider the effect of indexing the pension increases to an inflation index which is integrated into the social insurance system on the rise in the liability of the social insurance system particularly over the long-term liabilities.
8. Consider conducting the actuarial valuation of the two Funds on an open fund basis which includes not only the current members but also future members.

---

[5] In the case of a typical civil servant (University graduate), the revalued career average salary is approximately 65% of the average salary of the last three years. However, if a workers salary scale at retirement is twice that at first recruitment, the reevalued career average salary is approximately 75% of the average salary of the last three years. In general, if the wage profile increases at the end of the career, the ratio of the last three years' average salary to the revalued career average salary will be higher, thus resulting in a higher pension.

9. Establish a system for actuarial data collection and build up a data-base using modern computerised methods to facilitate the projection and valuation process, making the results more accurate and reliable, and support the actuarial research aspects;

It should be noted that extensive reforms require a sufficiently long transition period for implementation, since abrupt policy changes may impose sudden changes in the lifetime plans of workers near retirement age. It has also to be clear that until the system reaches financial maturity, its financial status and development will be influenced not only by the specific demographic and economic characteristics of its insured population but also by any new legislation or regulation.

Ultimately much depends on the economic growth of the country, the transformation of its labour force into one largely incorporated into the formal sector of the economy, how the system integrates with economic and structural reforms to ensure that policies are complementary and mutually supportive and greater maturity in its political and corporate governance. The growth of the Egyptian economy is imperative if these problems are to be overcome. The social dimension of economic reform has to have priority through the whole process as Egypt is a developing and relatively poor country.

8.3. Limitations of this research and Future Work

In achieving the objectives of this study a number of problems were faced, the main one being the lack of reliable data, a problem which faces most Egyptian researchers in all fields of knowledge. The complexity of the system and the huge number of parameters and variables justified some of the simplifications and approximations of the model scheme compared with the actual system. The model was based on the status quo and did not allow for any factor to improve the efficiency of the system, such as a change in asset allocation and pension indexation.

If some or all of these recommendations are to be adopted in a reform programme, it will require remodelling of the system in order to produce a new set of projection and valuation results. Every demographic or economic assumption used in modelling such a system needs to be reviewed in order to model it more accurately, particularly as changes occur over time and because of new circumstances. Other risks affecting the

future development of the social insurance pension system, such as those related to the rate of economic progress, birth rates and mortality improvements need to be considered in other research projects. Also the effect of indexing the pension on the long term liabilities of the system needs to be investigated. A long-term projection needs to be carried on under the new structure of the system.

References

Al-Marzou, Y. & Farid S.M. (1993). Reproductive Patterns and Child Survival in Saudi Arabia. Ministry of Health, Riyadh, Saudi Arabia.

Anderson, J.L. & Dow, J.B. (1964). Construction of Mortality & Other Tables, Volume II. Cambridge University Press, Cambridge.

Andrews, G.H. & Beekman, J.A. (1987). Actuarial Projecting for the Old-Age, Survivors and Disability Insurance Program of Social Security in the USA. Actuarial Education and Research Fund, Itasca, Illinois, USA.

Balci, H. (2000). Cash-Flow Modelling for Defined Benefit Pension Scheme. MSc in Actuarial Science Dissertation, City University, London.

Barrick, N.J. & Zayatz, T.A. (1996). Short-Range Actuarial Projections of the Old-Age, Survivors, and Disability Insurance Program. Actuarial Study No. 111. Social Security Administration, USA.

Beekman, J.A. & Kabir, MD.H. (1997). An Old-Age Social Security Program for Bangladesh. Insurance Mathematics and Economics, 21,97-102.

Beniamin, B. & Haycocks, H.W. (1972). The Analysis of Mortality and other Actuarial Statistics. The Institute of actuaries and the Faculty of Actuaries in Scotland.

Benjamin, B. & Pollard, J.H. (1992), The Analysis of Mortality and other Actuarial Statistics. The Institute of actuaries and the Faculty of Actuaries in Scotland, Clays Ltd, U.K.

Benjamin, B. & Soliman, A.S. (1993). Mortality on the Move. Institute of Actuaries, Oxford.

Benjamin, B., Haberman, S., Helowcz, G., Kaye, G., Wilkie, A.D., (1987). Pensions: the Problems of Today and Tomorrow. (Allan & Unwin), London.

Berin, B.N. (1989). The Fundamentals of Pension Mathematics. The Society of Actuaries, Itasca, Illinios, USA.

Bhrolchain, M.N. (1993). New Perspectives on Fertility in Britain. Office of Population Census & Surveys, A Publication of the Government Statistical, UK.

Bizley, M.T.L. (1958). A Measure of Smoothness and Some Remarks on a New Principle of Graduation. Journal of the Institute of Actuaries, 84, 125-165.

Blake, D. & Orszag, J.M. (1998). The Simple Economics of Funded and Unfunded Pension System. University of London, London.

Booth, H. (1984). Transferring Gompertz's Functions for Fertility analysis. The Development of a Standard for the Relational Compertz Function. Population Studies 38, pp495-506.

Booth, P., Chadburn, R., Cooper, D., Haberman, S. & James, D., (1999). Modern Actuarial Theory and Practice, Chapman & Hall/CRC Press, New York.

Booth, P.M. & Dickinson, G. (1997). The Insurance Solution. Research Paper. European Policy Forum, London.

Booth, P.M. & Stroinski K. (1994). The Development of Competition and Privatisation of Insurance Institutions in Poland: Lessons for the Actuarial Profession and Regulators. Communist Economies & Economic Transformation, Vol. 6, No. 3.

Bowers, N.L., Gerber, H.U., Hickman, J.C., Jones, D.A. & Nesbitt, C.J. (1997). Actuarial Mathematics. The Society of Actuaries, Itasca, Illinios, USA.

Brass, W. (1981). The Use of the Compertz Relational Model to Estimate Fertility. Paper Presented at the IUSSP, Conference in Manila.

Brass, W. (1996). Demographic Data Analysis in Less Developed Countries: 1946-1996. Population Studies, 50, 451-467. UK.

Centre for Insurance Studies, Egypt (1988). Guide to Provisions and Procedures for Social Insurance Scheme in Egypt. Centre for Insurance Studies, Cairo, Egypt.

Centre for Insurance Studies, Egypt (1988). The Main Features of Social Insurance Policy in Egypt. Centre for Insurance Studies, Cairo, Egypt.

Chambers, M.J. & Hastie, T.J. (1993). Statistical Models in S. USA.

Chatfield, C. (1996). The Analysis of Time Series. Fifth Edition, Chapman and Hall/CRC.

Coale, A.J. & Trussell, T.J. (1974). Model fertility Schedules: Variations in the Age Structure of Child Bearing in Human population, Population Index 40, 185-258.

Committee on Social Security-Retirement and Disability Income. Social Security, Productivity and Demographics. North American Actuarial Journal, Volume 3, No.2, 144-149.

Daykin, C.D. & Haberman, S. (1996). 1990-1992 English Life Tables No. 15. Office for National Statistics, London.

Daykin, C.D. & Lewis, D. (1999). Crisis of Longer Life: Reforming Pension Systems. British Actuarial Journal, 5, II, 357-375.

Daykin, C.D. (1998). Funding the Future? Problems in Pension Reform. Politeia, London.

Daykin, C.D. (1998). The Evolution of Social Security in the UK. A partnership Between Public and Private. The Institute of Actuaries, London.

Daykin, C.D. (2000). Pension Reform and Funding Options. The 13th International Conference of Social Security Actuaries and Statisticians, Quebec, Canada.

Daykin, C.D. (1998). Demographic Developments and Social Security Reforms. Seminar at City University, London.
Department of International Economic and Social Affairs (1983). Indirect Techniques for Demographic Estimation. Population Studies, No. 81, United Nations.

Egyptian Financial Group (1996). Guide to the Egyptian Capital Market. Cairo, Egypt.

ElAshry, F.M. (1991). Some Development Implications of Population Growth in Egypt. MPhil thesis, Cairo Demographic Centre, Cairo, Egypt.

El-Biblawi, H. (1990). Mobility. A Paper Presented in CAPMAS, Labour Information System Project, Preliminary Report, Cairo, Egypt.

English Life Table No. 11 (1956), 1950-1952 English Life Table No. 11. Office for Population and Census Survey, London.

Exelby, J. (1997). Private Educators step in to Steady a Stumbling Public System. Journal of the American Chamber of Commerce. Egypt.

Farid, S.M., Khalifa, A.M. & Abdel-Azeeem, F. (1993). Egypt Maternal and Child Health Survey 1991. Central Agency for Public Mobilisation and Statistics, Cairo, Egypt.

Fergany, N. (1988). The Nature of the Employment Problem in Egypt. Research Paper. National Conference on Employment Strategy, Cairo, Egypt.

ForFar, D.O., McCutcheon, J.J. & Wilkie, A.D. (1988). On Graduation by Mathematical Formula. Journal of the Institute of Actuaries, 115, 1 and T.F.A. 41,97.

Foster R.S. (1994). A Stochastic Evaluation of The Short-Range Economic Assumptions in the 1994 OASDI Trustees Report. Actuarial Study NO. 109. Department of Health and Human Services, USA.

Fowler, N. (1984). Population, Pension Costs and Pensioners' Incomes. A Background Paper for the Inquiry into Provision for Retirement. Crown, London.

Frees, E.W., Kung, Yueh-Chuan, Rosenberg, M.A., Young, V.R. & Lai, Siu-Wai (1998). Forecasting Social Security Actuarial Assumptions. North American Actuarial Journal, Volume 1, No.4, 49-82.

Gillion, C. (1999). The Development and Reform of Social Security Pensions: The approach of the International Labour Office. International Labour Organisation, Geneva.

Girgis. M.R.S. (1991). Unemployment in the Egyptian Market, Differentials and Expectations Analysis. Research Paper. Cairo Demographic Centre, Cairo, Egypt.

GN26 " Terminology of Pension Funding Method. Publication for the Institute and Faculty of Actuaries.

Government Actuary's Department (2001). National Population Projections: Review of Methodology for Projecting Mortality. Government Actuary's Department, UK.

Government Actuary's Department, UK (1997). Report on The Non-State Pension Schemes in Egypt. Government Actuary's Department, UK.

Government Sector Fund, Egypt (1962-1992). Actuarial Valuation Reports. Cairo, Egypt.

Haapa-aho, J. (2000). Actuarial Modelling as a Tool for Pension Insurance Projections. The 13th International Conference of Social Security Actuaries and Statisticians, Canada.

Hallouda, A.M., Faris S.M. & Cochrane S.H. (1988). Demographic Responses to Modernization. Central Agency for Public Mobilisation and Statistics, Cairo, Egypt.

Hansen, B., & Samir, R. (1982). Employment Opportunities and Equity in a Changing Economy: Egypt in the 1980s. International Labour Organisation, Geneva.

Hastie, T. & Tibshirani, R. (1990). Generalized Additive Models. Chapman and Hall, London.

Ibrahim, F. & Nagib, S. (1994). Financing and Funding the Egyptian Pension Scheme, The Academy of Technology and Scientific Research, Cairo, Egypt.

International Labour Organisation (1997). Pension Model A technical Guide Financial, Actuarial and statistical Branch Social Security Department, International Labour Organisation, Geneva.

International Labour Organisation (1997). Report on Social Security in Egypt.

Iyer, S. (1999). Actuarial Mathematics of Social Security Pensions. International Labour Organisation, Geneva.

Jollans, A. (1997). Pensions and the Ageing Population. Presented to the Staple Inn Actuarial Society, London.

Kenawi, R.S. (1996). An Eye on the Egyptian Labour Force. Journal of the American Chamber of Commerce. Egypt.

Khorasanee, M.Z. (2000). Pension Funds Lectures' Notes. Department of Actuarial Science and Statistics, City University, London.

Khorasanee, M.Z. (1999). Actuarial Modelling of Defined Contribution Pension Schemes. PhD thesis, City University, London.

Khorasanee, M.Z. (1999). Pension Funds Lectures' Notes. Department of Actuarial Science and Statistics, City University, London.

Lee, E.M. (1986). An Introduction to Pension Schemes, The Institute of Actuaries and the Faculty of Actuaries in Scotland, Chameleon Press Limited, London.

Lee, R. & Carter, L. (1992). Modelling and Forecasting the Time Series of US Mortality. Journal of the American Statistical Association 87, No. 419.

Macdonald A. S., Cairns A. J.G., Gwilt P. L.& Miller K. A., (1998). An International Comparison of Recent Trends in Population Mortality, British Actuarial Journal, 4, I, 3-141.

Mackellar, L., Ermolieva, T. & Westlund, A., (2000), A Social Forecasting and Simulation Model, International Institute for Applied Systems Analysis, Laxenburg, Austria.

Ministry of Insurance and Social Affairs (1975-1999). Annual Report in Social Insurance. The Ministry of Insurance and Social Affairs, Cairo, Egypt.

Mohamed, A.F.S. (1997). The Egyptian Pension Scheme, Present and Future Development. MSc in Actuarial Science Dissertation, City University, London.

Mohamed, W.A. (1997). Graduation Using Generalised and additive Models Applied on Egyptian Experience. MSc in Actuarial Science Dissertation, City University, London.

Mousa, et.al. (1970). Demand Forcasting for Manpower in Egypt (1994-2000). Research Paper No. 23. Cairo Demographic Centre, Cairo, Egypt.

Myers, R.J. (1985). Implications of Population Changes in Social Insurance Systems Providing Old-Age Benefits. Insurance Mathematics and Economics 4.

Nagi, A. (1988). Labour Force in Egypt: Its Dimensional and Structural Changes during the Two Decades 1960-82. Unpublished MPhil thesis, Cairo Demographic Centre, Cairo, Egypt.

Nagib, S. (1979). Relative Increases to Social Insurance Contributions in Egypt. Cairo University, Egypt.

Nagib, S. (1985). Actuarial Soundness of the Egyptian Social Insurance Scheme (Technical Basis and Pace of Funding). Journal of the Faculty of Commerce, Cairo University, Egypt.

Nassef, A.F. (1970). The Egyptian Labour Force Its Dimensions and Changing Structure, (1907-1960) Population Studies Centre. University of Pennsylvania, Philadelphia.

Newell, C. (1988). Methods and Models in Demography, Belhaven Press, London.

Orszag, J.M., Orszag, P.R. & Herbertsson, T.T. (2000). Population Dynamics and Convergence in Fertility Rates. Research Paper. Institute of Economic Studies, Iceland.

Philip, D.E. (1997). The Reform of Retirement Income Provision in the EU. The Pensions Institute Discussion Paper PI-9708, Birkbeck Collage, University of London.

Pollard, A.H., Yusuf, F. & Pollard, G.N. (1974). Demographic Techniques. Sydney, Pergamon Press, Australia.

Pollard, J.H. (1998). An Old Tool-Modern Application, Actuarial Research Paper No. 001/98. Actuarial and Demographic Studies Department, Macquarie University, Sydney, Australia.

Pollard, J.H. (1989). Projection of Age-Specific Mortality Rates.

Pollard, J.H. (1973). Mathematical Models for the Growth of Human Populations. Cambridge University Press, Cambridge.

Pressat, R. (1978). Statistical Demography. Cambridge University Press, Cambridge.

Private and Public Business Sector Fund, Egypt (1962-1992). Actuarial Valuation Reports. Cairo, Egypt.

Psomiadis, D. (1997). An Investigation Into the 1982-1994 Mortality Experience of the Greek Population. MSc in Actuarial Science Dissertation, City University, London.

Renn, D.F. (1988). Population Structures and Projections. The Institute of Actuaries, London.

Renshaw, A.E. & Haberman, S. (1997). A Simple Graphical Method for the Comparison of Two Mortality Experiences. Actuarial Research Paper Number 96, Department of Actuarial Science and Statistics, City University, London.

Rust, J. (1993). Pensions and the Labour Market: Reading List for Lecture Series on Pensions and Public Finance in an Ageing Society. University of Wisconsin, Netherlands.

Sabra, E.A.E. (1998). Actuarial Modelling of the Egyptian State Pension Scheme. MSc in Actuarial Science Dissertation, City University, London.

Scholz, W., Cichon, M. & Hagemejer, K. (2000). Social Budgeting. International Labour Organisation, Geneva.

Scott, W.F. (1995). Advanced Life Contingencies. Department of Actuarial Mathematics and Statistics, Heriot-Watt University, Edinburgh, UK.

Scott, W.F. (2000). Mortality Studies. Department of Mathematical Science, University of Aberdeen, Aberdeen, UK.

Shaker M.R. (1990). Some Indicators of Imbalance in the Egyptian Labour Market. Research Paper. Cairo Demographic Centre, Cairo, Egypt.

Soliman, A.S. (1989). Studies in Female Labour Supply: Egypt. PhD thesis, City University, London.

Soliman, M.A. (1995). Some Aspects of Unemployment in Egypt in 1988 with Prospects of Future Unemployment Up To 1997. MPhil thesis, Cairo Demographic Centre, Cairo, Egypt.

Sung, J.H. (1997). Dynamic Programming Approaches To Pension Funding. PhD thesis, City University, London.

Thatcher, R. (1994). Centenarians: 1991 Estimates. Population Trends No. 75, TSO.

The Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds (1999). The Annual Report.USA.

The Government Actuary (1996). National Population Projections 1994-Based. UK.

The World Bank (1993). Report on Complementary Pension Funds in Egypt. The World Bank, Cairo, Egypt.

Thullen, P. (1964). The Scaled Premium System for the Financing of Social Insurance Pension Schemes. International Review in Actuarial and Statistical Problems of Social Security, No. 10. Geneva.

Trowbridge, C.L. & Farr, C.E. (1976). The Theory and Practice of Pension Funding. Richard D. Irwin, Inc., USA.

Tzeis, G. (1996). An application of generalised additive models in the graduation of the Greek National Pension National Pension Scheme Mortality and Morbidity Experience. MSC in Actuarial Science Dissertation, City University, London.

UNDP (Institute of National Planning) (1996). Human Development Report, Egypt.

Venables, W.N. & Ripley, B.D. (1998). Modern Applied Statistics with S-Plus. Second Edition. Springer-Verlag, New York.

Verrall, R. (1996). A unified Framework for Graduation. Actuarial Research Paper Number 91. Department of Actuarial Science and Statistics, City University, London.

Verrall, R.(1993). Graduation by Dynamic Regression Methods. Journal of the Institute of Actuaries, 120, 153-170.

Verrall, R.(1995). Whittaker Graduation and Parametric State Space Models. Actuarial Research Paper Number 79. Department of Actuarial Science and Statistics, City University, London.

Wahba, M. (1983). Manpower Dynamics and Education in Egypt. Unpublished MPhil thesis, Cairo Demographic Centre, Cairo, Egypt.

Willets, R. (1999). Mortality in The Next Millennium. December 1999 issue. Stable Inn Actuarial Society.

Willmore, L. (1998). Social Security and the Provision of Retirement Income. United Nations, New York.

Wilson, A.F. & Thornton, P.N. (1992). A realistic Approach to Pension Funding. Journal of the Institute of Actuaries, 119, II, 229-312.

Winograd, E. (1997). Egyptian Labour Is Not Really A Bargain. Journal of the American Chamber of Commerce in Egypt.

Winsborough, H.H. & Lutz, W. (1991). Future Demographic Trends in Europe and North America. International Institute for applied Systems Analysis, Laxenburg, Austria.

World Bank (1991). Egypt, Alleviating Poverty During Structural Adjustment. Washington.

World Bank (1994). Averting the Old Age Crisis.

World Bank (1996). Egypt Social Fund gets $120 million Boost from IDA. World Bank Group, Press Release, No.96/25/MENA.

World Bank (1997). Arab Republic of Egypt Country Economic Memorandum, Vol.II.

World Bank (1997). Arab Republic of Egypt Country Economic Memorandum, Vol.II.

World Bank (1997). Egypt Country Brief, the World Bank Group.

World Bank (1998). Egypt in the Global Economy: Strategic Choices for Savings, Investments and Long-Term Growth. Washington DC.

Yang E.B. (1992). Economic Projections for OASDHI Cost and Income Estimates: 1992. Actuarial Study NO. 108. Department of Health and Human Services, USA.

Young, A.G. & Daykin, C.D. (1987). The Effect of Demographic Factors and Indexation on the Long Term Financing of the State Earnings-Related Pension Scheme, Journal of the Institute of Actuaries, 30, 181-198.

Zayyan, E.S.N. (1991). Labour Force Dynamic With Particular Reference to Unemployment (Egypt, 1976-1986). MPhil thesis, Cairo Demographic Centre, Cairo, Egypt.

Statistics:

Cairo Demographic Centre (1994). Population Projections for Social Economic Development in Egypt, CDC Series on Population and Development, Cairo, Egypt.

Central Agency for Public Mobilisation and statistics (1998). The Statistical Annual Year Book. Cairo, Egypt.

Central Agency for Public Mobilisation and Statistics (CAPMAS) (1997). Statistical Yearbook.

Egyptian Insurance Supervisory Authority (1995-1999). The Year Book. The Egyptian Insurance Supervisory Authority, Cairo, Egypt.

Ministry of Economy (1998). Recent Economic Developments and Statistics.

Ministry of Insurance and Social Affairs (1980-1997). Annual Report of Social Insurance (in Arabic), Egypt.

Mohamed Atteya. Social Insurance Sector (Tables and Graphs). .

New African (1997-1998). Annual Yearbook. IC Publication.

World Bank (1996). Trends in Developing Economies.

World Labour Report (1997-2000). Income Security and Social Protection in a Changing World, International Labour Organisation, Geneva.

World of Information (1997). The Africa Review, the Economic and Business Report, 20th Edition.

Appendix 1

Table 1.1 :Basic Salaries for Civil Servants and Public Enterprise Workers (Without the Special Annual Increments)

Category	Civil Servants			Public Enterprice Workers		
	Basic Salary Without Increment (Monthly Amount in L.E.)	Regular Annual Increment (Monthly Amount in L.E.)	Average Length of Service	Basic Salary Without Increment (Monthly Amount in L.E.)	Regular Annual Increment (Monthly Amount in L.E.)	Percentage of Promotion
Chief Director	216.916	10 (for 5 Years)		216.917		
Director of Central	31	59.7				
Department	140-202.75	10 (for 5 Years)		140-207.75	6.25	
General Manager	125-192	6.0		125-197	6	100%
Grade 1	95-174	5.0	1 Year	95-179	5	100%
Grade 2	70-159	5.0	2 Year	70-164	4 and 5 (for Salary>73)	50%
Grade 3	48-13	4.0	6 Year	48-139	3 and 4 (for Salary>55)	25%
Grade 4	38-101	2.0	6 Year	38-106	2	20%
Grade 5	36-77	1.5	7 Year	36-82	1.5	10%
Grade 6	35-62	1.5	6 Year	35-67	1.5	

Source: MISAs

Appendix 1

Table 1.2 :The Death Benefit (or Pension) Inherited by Dependants.

Case no.	Beneficiary of Pension	Due Shares In Pension			
		Widow or Husband	Children	Parents	Brothers and Sisters
1.	Widow or husband and one or more children	1/2	1/2 (to be distributed equally if more than one)	-	-
2.	Widow or husband and one or more parents	2/3	-	1/3 (for either or both, to be distributed equally)	-
3.	Widow or husband and one brother or more	3/4	-	-	1/4 (to any or all of them to be distributed equally)
4.	Widow or husband only	3/4	-	-	-
5.	Widow or husband and one or more children and one or two parents	1/3	1/2 (to be distributed equally if more than one)	1/6 (for either or both, to be distributed equally)	-
6.	one or more children	-	2/3 (to be distributed equally if more than one)	-	-
7.	One child and one or two parents	-	2/3	1/3 (for either or both, to be distributed equally)	-
8.	More than one child and one or two parents	-	5/6 (to be distributed equally if more than one)	1/6 (for either or both, to be distributed equally)	-
9.	One or two parents	-	-	1/2 (for either or both, to be distributed equally)	-
10.	One or more brother or sister	-	-	-	1/2 (to either or all of them and to be distributed equally between them)
11.	One or two parents and one brother or sister or more	-	-	1/2 (for either or both, to be distributed equally)	1/4 (to either or all of them and to be distributed equally between them)

Source:Law 79/1975

Appendix 1

Table 1.3 : The Additional Compensation Proportions

Age	%
17	267
18	267
19	267
20	267
21	267
22	267
23	267
24	267
25	267
26	260
27	253
28	247
29	240
30	233
31	227
32	220
33	213
34	207
35	200
36	193
37	187
38	180
39	173
40	167
41	160
42	153
43	147
44	140
45	133
46	127
47	120
48	113
49	107
50	100
51	93
52	87
53	80
54	73
55	67
56	60
57	53
58	47
59	40
60	33
61	25
62	25
63	20
64	20
65	20

Source:Law 79/1975

Table 2.1.A: Demographic Indicators of the Population and Members of the ESSPS over 1958-1998

Category	1958	1963	1968	1973	1978	1983	1988	1993	1998
Population (m)	24.7	28.0	30.7	34.1	38.3	44.0	50.0	55.9	62.3
Annual Population Growth (%)	2.4	2.5	1.9	2.4	2.4	2.8	2.6	2.3	1.9
Population aged 15-64 (m)	13.3	15.2	17.3	19.3	21.8	24.7	28.5	32.2	36.2
% of Total Population	54.0	54.3	56.3	56.7	57.0	56.8	56.9	57.7	58.1
Population aged 60+ (m)	1.5	1.7	1.9	2.1	2.4	2.6	2.9	3.3	3.9
% of Total Population	6.1	6.1	6.2	6.2	6.1	5.9	5.8	5.9	6.2
Contributors (m)	N/A	N/A	N/A	3.6	8.0	10.4	13.1	15.5	17.0
Beneficiaries (m)	N/A	N/A	N/A	0.8	1.4	4.2	5.1	5.8	6.5
Contributors + Beneficiaries	N/A	N/A	N/A	4.4	9.4	15.1	18.2	21.3	23.5
Contributors+Beneficiaries to Population	N/A	N/A	N/A	12.8	24.6	34.3	36.4	38.1	37.7
Dependency Ratio (%)	11.9	11.8	11.6	11.6	11.4	11.0	10.7	10.7	11.1
Contributors to Population (%)	N/A	N/A	N/A	10.6	20.9	23.7	26.1	27.7	27.2
Beneficiaries to Contributors (%)	N/A	N/A	N/A	21.1	17.5	38.0	38.9	37.4	38.2
Beneficiaries to population 60+ (%)	N/A	N/A	N/A	35.6	59.0	158.3	173.9	175.1	167.3

Source: MISAs and CAPMAS Annual Reports 1958-1998

Appendix 2

Other Demographic Indicators

The child-woman ratio[1] declined from 661 (per 1000 females) in the 1950s to 551 over 1990-95. The crude birth rate[2] declined from 48.6 (per 1000) in the 1950s to 28.6 over 1990-95. The gross reproduction rate[3] also declined from 3.2 per woman in the 1950s to less than 1.8 over 1990-95. The net reproduction rate[4] declined from 2.1 per woman in the 1950s to 1.6 over 1990-95. The total fertility rate[5] declined from more than 7 children per woman in the 1960s to 3.8 in the 1990s. The general fertility rate[6] declined from 201.6 (per 1000 women) in the 1950s to 120.1 over 1990-95. The sex ratio at birth[7] has been stable at 1.1 per female at birth. The net migration has been insignificant over the last 50 years (around zero per 1000).

The crude death rate8 declined from 24 (per 1000) in the 1950s to 6.7 in 1998-99. The infant mortality rate9 declined significantly from 200 (per 1000) in the 1950s to around 60 over 1990-95. Life expectancy at birth for males has risen from 41.2 years in the 1950s to 64.7 years in 1997, and for females from 43.6 years in the 1950s to 68.3 years in 1997. Life expectancy for both sexes combined has risen from 42.4 years in the 1950s to 66.6 years in 1997, which implies that payments have been required for longer periods.

The Age structure and marriage rates within the Egyptian Families[10]

The difference between the husband and wife ages increases with the increase of the husband's age as shown in the following Table.

Husband Age (Years)	Difference in wife's age (Years)
≤ 24	3
25 to < 35	4
35 to < 45	5
45 to < 55	6
≥ 55	8

Source: CAPMAS

[1] Th child-woman ratio = Population aged 0-4 / Females' aged 15-49.
[2] The crude birth rate =The number of new-born / Total population.
[3] The gross reproduction rate = Sum of age-specific fertility rates of daughters for all ages 15-49.
[4] The net reproduction rate = Sum of the product of age-specific fertility rates of daughters aged x and the rate of survival until age x for x = 15 to 49.
[5] The total fertility rate (per woman) = Sum of age-specific fertility rates for all ages 15-49.
[6] The general fertility rate = The number of new-born / Female population aged 15-49.
[7] The sex ratio = The number of male new-born / The number of female new-born.
[8] The crude death rate = The number of death / Total population
[9] Infant mortality rate = The number of infant death (within one year of birth) / The number of live births.
[10] These statistics are estimated according to the CAPMAS publications and past actuarial reports.

The rates of marriage among males and females within Egypt

Insured Age	Marriage Rate (%)	
	Males	Females
≤ 25	15	50
25 to < 30	40	75
30 to < 35	80	90
≥ 35	95	90

Source: CAPMAS

The differences in ages between father and the youngest child according to the age structure relationships within the Egyptian families[11]

Insured Age	The Age Of the Youngest Child	Insured Age	The Age Of the Youngest Child
Less than 27	4	52	14
28	5	53	15
29	5	54	15
30	5	55	16
31	6	56	16
32	6	57	16
33	6	58	17
34	7	59	17
35	7	60	18
36	7	61	18
37	8	62	19
38	8	63	19
39	9	64	20
40	9	65	21
41	10	66	21
42	10	67	22
43	11	68	23
44	11	69	23
45	12	70	24
46	12	71	25
47	13	72	26
48	13	73	27
49	13	74	28
50	14	75	29
51	14	76+	30

Source: CAPMAS

[11] It is also assumed that the average difference between the children's ages is 2 years.

Appendix 2

Table 2.1.B* : Members of the ESSPS over 1973-1998 (Thousands)

Members of the GSF & PPSF	1975	1979	1983-84	1988-89	1993-94	1998-99
GSF Contributors (CON)	1750	2101	2403	3025	3621	4000
Pensioners (PENS)	168	259	240	316	384	482
Beneficiaries (BEN)	630	931	915	1129	1398	1727
PENS/CON (%)[12]	9.59	12.33	9.99	10.45	10.60	12.05
Beneficiaries/CON (%)	35.98	44.31	38.08	37.32	38.61	43.18
PPSF Contributors (CON)	2092	7171	8749	10484	12268	13453
Pensioners (PENS)	N/A	249	822	963	1052	1352
Beneficiaries (BEN)	193	838	3403	4104	4447	5119
PENS/CON (%)	N/A	3.47	9.39	9.19	8.75	10.05
Beneficiaries /CON (%)	9.23	11.70	38.90	39.15	36.25	38.05
Total member of the system	4665	11041	14514	18742	21734	24299

The Egyptians Working Abroad Scheme.

Year	1979	1984-85	1988-89	1993-94	1998-99
No. of Covered People	7	21	32	56	23[13]
% of the system	0.08	0.18	0.24	0.43	0.13
No. of Pensioners	N/A	N/A	1	3	4
% of the System	N/A	N/A	0.08	0.21	0.22
Total Beneficiaries	N/A	N/A	2	4	6
% of the System	N/A	N/A	0.04	0.07	0.09

The Number of Members of the CSIS Over 1979-99

Year	1979	1984-85	1988-89	1993-94	1998-99
No. of active members	3553	3963	4531	5355	5918
% of the system	39.08	34.21	33.54	33.70	33.91
No. of Pensioners	N/A	N/A	442	445	567
% of the System	N/A	N/A	38.94	34.26	38.25
Total Beneficiaries	N/A	N/A	1475	1704	2102
% of the System	N/A	N/A	28.19	29.15	30.70

The Directors and Self-Employed Scheme over 1979-99.

Year	1979	1984-85	1988-89	1993-94	1998-99
No. of Covered People	380	960	1194	1502	1820
% of the system	4.2	8.3	8.8	9.5	10.4
No. of Pensioners	N/A	N/A	60	94	135
% of the System	N/A	N/A	4.7	6.6	7.4
Total Beneficiaries	N/A	N/A	244	394	535
% of the Total System	N/A	N/A	4.7	6.7	7.8

* Source: MISAs Annual Reports 1975-1999

---

[12] The two periods which are exceptionally high for the two proportions are 1979 and 1998-99 with only common reason which is the increase of the early retirement rates as a result of changing the economic situations.

[13] In 1997, the management of the fund decided to terminate the insurance of those who had stopped paying contributions for the last 6 months, which reduced the number of covered people from 68 thousands in 1994-95 to 20 thousands in 1995-96.

Table 2.2.A : Historical Development of Income and expenditure of Social Insurance System

GSF

	1977	1978	1979	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Income																							
Contributions	170.7	196.4	232.2	235.0	269.0	415.0	466.0	540.0	741.0	904.0	968.0	1151.0	1357.0	1562.0	1830.0	2041.0	2566.0	3072.0	3636.0	4273.0	4886.0	5527.0	5938.0
Treasury Subsidy	6.4	7.9	22.0	28.0	53.0	83.0	83.0	103.0	130.0	172.0	189.0	185.0	292.0	297.0	417.0	548.0	715.0	975.0	1124.0	1287.0	1469.0	1681.2	1920.0
Return on Invested Assets	73.4	81.4	91.1	95.0	134.0	155.0	180.0	261.0	310.0	367.0	435.0	655.0	684.0	811.0	840.0	977.0	1490.0	2072.0	2637.0	3369.0	4200.0	4762.0	5562.0
Others	2.9	1.6	2.7	2.2	3.0	22.0	9.0	259.0	7.0	55.0	11.0	43.0	55.0	97.0	100.0	100.0	74.0	363.0	144.0	150.0	166.0	197.0	265.0
Total	253.3	287.4	348.0	360.2	459.0	675.0	738.0	1163.0	1188.0	1498.0	1603.0	2034.0	2388.0	2767.0	3187.0	3666.0	4845.0	6482.0	7541.0	9079.0	10721.0	12167.2	13685.0
% of Total																							
Contributions	67.4	68.3	66.7	65.2	58.6	61.5	63.1	46.4	62.4	60.3	60.4	56.6	56.8	56.5	57.4	55.7	53.0	47.4	48.2	47.1	45 6	45.4	43.4
Treasury Subsidy	2.5	2.7	6.3	7.8	11.5	12.3	11.2	8.9	10.9	11.5	11.8	9.1	12.2	10.7	13.1	14.9	14.8	15.0	14.9	14.2	13.7	13.8	14.0
Return on Invested Assets	29.0	28.3	26.2	26.4	29.2	23.0	24.4	22.4	26.1	24.5	27.1	32.2	28.6	29.3	26.4	26.7	30.8	32.0	35.0	37.1	39.2	39.1	40.6
Others	1.1	0.6	0.8	0.6	0.7	3.3	1.2	22.3	0.6	3.7	0.7	2.1	2.3	3.5	3.1	2.7	1.5	5.6	1.9	1.7	1.5	1.6	1.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Expenditure																							
Benefits	79.9	88.0	117.5	129.0	166.0	210.0	235.0	289.0	350.0	429.0	471.0	567.0	722.0	778.0	955.0	1166.0	1374.0	1747.0	2020.0	2330.0	2687.0	3107.0	3574.0
Admin. Expen	1.4	1.9	2.1	2.5	2.9	3.9	4.9	7.9	11.0	12.0	9.0	13.0	21.0	26.0	25.0	28.0	34.0	44.0	49.0	60.0	71.0	75.0	83.3
Total	81.2	89.8	119.6	131.5	168.9	213.9	239.9	296.9	361.0	441.0	480.0	580.0	743.0	804.0	980.0	1194.0	1408.0	1791.0	2069.0	2390.0	2758.0	3182.0	3657.3
% of Total																							
Benefits	98.3	97.9	98.3	98.1	98.3	98.2	98.0	97.3	97.0	97.3	98.1	97.8	97.2	96.8	97.4	97.7	97.6	97.5	97.6	97.5	97.4	97.6	97.7
Admin. Expen	1.7	2.1	1.7	1.9	1.7	1.8	2.0	2.7	3.0	2.7	1.9	2.2	2.8	3.2	2.6	2.3	2.4	2.5	2.4	2.5	2.6	2.4	2.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Admin. Expen. of Inc.	0.5	0.6	0.6	0.7	0.6	0.6	0.7	0.7	0.9	0.8	0.6	0.6	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.7	0.7	0.6	0.6
End of the Year Net cash-flow and Reserve																							
Net cash-flow	172.0	197.6	228.4	228.7	290.1	461.1	498.1	866.1	827.0	1057.0	1123.0	1454.0	1645.0	1963.0	2207.0	2472.0	3437.0	4691.0	5472.0	6689.0	7963.0	8985.2	10027.7
Increase in Reserve	168.9	192.7	223.5	112.0	279.0	456.0	490.0	1851.0	846.0	1005.0	1093.0	1490.0	1630.0	1930.0	2168.0	2123.0	3813.0	4790.0	5417.0	6651.0	7574.0	8847.0	9852.0
Reserve	1799.8	1992.5	2216.0	2328.0	2607.0	3063.0	3553.0	5404.0	6250.0	7255.0	8348.0	9838.0	11468.0	13398.0	15566.0	17689.0	21499.0	26287.0	31704.0	38355.0	45928.0	54775.0	64627.0

Source: MISAs Annual Reports 1977-1999

Table 2.2.B : Historical Development of Income and expenditure of Social Insurance System

PPSF

	1977	1978	1979	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Income																							
Contributions	198.8	233.6	297.7	315.0	417.0	602.0	666.0	857.0	1087.0	1248.0	1316.0	1485.0	1661.0	1860.0	2052.0	2289.0	2642.0	3024.0	3481.0	3832.0	4225.0	4814.0	5326.0
Treasury Subsidy	5.1	5.4	17.4	30.2	81.9	190.9	231.9	269.1	293.8	325.0	328.6	370.8	464.0	572.0	736.0	969.0	1254.0	1578.0	1884.0	2210.0	2626.0	3157.0	3578.0
Return on Invested Assets	60.7	69.9	90.3	95.5	142.5	169.4	202.5	270.0	349.4	418.7	498.4	715.5	805.0	981.0	1205.0	1402.0	1835.0	2370.0	2948.0	3637.0	4367.0	4810.0	5349.0
Others	29.3	33.3	33.7	40.0	85.0	63.0	77.0	98.0	145.0	189.0	202.0	420.0	275.0	301.0	367.0	300.0	275.0	338.0	410.0	401.0	448.0	494.0	525.6
Total	293.9	342.2	439.1	480.7	726.4	1025.3	1177.4	1494.1	1875.2	2180.7	2345.0	2991.3	3205.0	3714.0	4360.0	4960.0	6006.0	7310.0	8723.0	10080.0	11666.0	13275.0	14778.6
% of Total																							
Contributions	67.6	68.3	67.8	65.5	57.4	58.7	56.6	57.4	58.0	57.2	56.1	49.6	51.8	50.1	47.1	46.1	44.0	41.4	39.9	38.0	36.2	36.3	36.0
Treasury Subsidy	1.7	1.6	4.0	6.3	11.3	18.6	19.7	18.0	15.7	14.9	14.0	12.4	14.5	15.4	16.9	19.5	20.9	21.6	21.6	21.9	22.5	23.8	24.2
Return on Invested Assets	20.6	20.4	20.6	19.9	19.6	16.5	17.2	18.1	18.6	19.2	21.3	23.9	25.1	26.4	27.6	28.3	30.6	32.4	33.8	36.1	37.4	36.2	36.2
Others	10.0	9.7	7.7	8.3	11.7	6.1	6.5	6.6	7.7	8.7	8.6	14.0	8.6	8.1	8.4	6.0	4.6	4.6	4.7	4.0	3.8	3.7	3.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Expenditure																							
Benefits	52.5	68.9	105.5	128.0	211.0	351.0	420.0	485.0	555.0	635.0	693.0	828.0	974.0	1140.0	1393.0	1702.0	2093.0	2574.0	3013.0	3477.0	4110.0	5025.0	5869.0
Admin. Expen	6.5	8.5	10.4	11.0	15.0	26.0	32.0	34.0	38.0	44.0	36.0	48.0	63.0	58.0	69.0	75.0	85.0	99.0	100.0	120.0	166.0	150.0	172.0
Total	59.0	77.4	115.9	139.0	226.0	377.0	452.0	519.0	593.0	679.0	729.0	876.0	1037.0	1198.0	1462.0	1777.0	2178.0	2673.0	3113.0	3597.0	4276.0	5175.0	6041.0
% of Total																							
Benefits	89.0	89.1	91.0	92.1	93.4	93.1	92.9	93.4	93.6	93.5	95.1	94.5	93.9	95.2	95.3	95.8	96.1	96.3	96.8	96.7	96.1	97.1	97.2
Admin. Expen	11.0	10.9	9.0	7.9	6.6	6.9	7.1	6.6	6.4	6.5	4.9	5.5	6.1	4.8	4.7	4.2	3.9	3.7	3.2	3.3	3.9	2.9	2.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Admin. Expen. of Inc.	2.2	2.5	2.4	2.3	2.1	2.5	2.7	2.3	2.0	2.0	1.5	1.6	2.0	1.6	1.6	1.5	1.4	1.4	1.1	1.2	1.4	1.1	1.2
End of the Year Net cash-flow and Reserve																							
Net cash-flow	235.0	264.9	323.3	341.7	500.4	648.3	725.4	975.1	1282.2	1501.7	1616.0	2115.3	2168.0	2516.0	2898.0	3183.0	3828.0	4637.0	5610.0	6483.0	7390.0	8100.0	8737.6
Increase in Reserve	219.8	264.5	532.2	171.1	436.0	609.0	700.0	2033.0	1276.0	1440.0	1539.0	2038.0	2044.0	2527.0	2808.0	2725.0	3437.0	4649.0	5411.0	5915.0	7209.0	7882.0	8501.4
Reserve	1564.2	1828.7	2360.9	2535.0	2971.0	3580.0	4280.0	6313.0	7589.0	9029.0	10568.0	12606.0	14650.0	17177.0	19985.0	22710.0	26147.0	30668.0	36079.0	41994.0	49203.0	57085.0	65586.4

Source: MISAs Annual Reports 1977-1999

Table 2.2.C : Historical Development of Income and expenditure of Social Insurance Scheme

Both Funds Conslidated

	1977	1978	1979	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Income																							
Contributions	369.5	430.0	529.9	550.0	686.0	1017.0	1132.0	1397.0	1828.0	2152.0	2284.0	2636.0	3018.0	3422.0	3882.0	4330.0	5208.0	6096.0	7117.0	8105.0	9111.0	10341.0	11264.0
Treasury Subsidy	11.5	13.3	39.4	58.2	134.9	273.9	314.9	372.1	423.8	497.0	517.6	555.8	756.0	869.0	1153.0	1517.0	1969.0	2553.0	3008.0	3497.0	4095.0	4838.2	5498.0
Return on Invested Assets	134.0	151.3	181.4	190.5	276.5	324.4	382.5	531.0	659.4	785.7	933.4	1370.5	1489.0	1792.0	2045.0	2379.0	3325.0	4442.0	5585.0	7006.0	8567.0	9572.0	10911.0
Others	32.2	35.0	36.4	42.2	88.0	85.0	86.0	357.0	152.0	244.0	213.0	463.0	330.0	398.0	467.0	400.0	349.0	701.0	554.0	551.0	614.0	691.0	790.6
Total	547.2	629.6	787.1	840.9	1185.4	1700.3	1915.4	2657.1	3063.2	3678.7	3948.0	5025.3	5593.0	6481.0	7547.0	8626.0	10851.0	13792.0	16264.0	19159.0	22387.0	25442.2	28463.6
% of Total																							
Contributions	67.5	68.3	67.3	65.4	57.9	59.8	59.1	52.6	59.7	58.5	57.9	52.5	54.0	52.8	51.4	50.2	48.0	44.2	43.8	42.3	40.7	40.6	39.6
Treasury Subsidy	2.1	2.1	5.0	6.9	11.4	16.1	16.4	14.0	13.8	13.5	13.1	11.1	13.5	13.4	15.3	17.6	18.1	18.5	18.5	18.3	18.3	19.0	19.3
Return on Invested Assets	24.5	24.0	23.1	22.7	23.3	19.1	20.0	20.0	21.5	21.4	23.6	27.3	26.6	27.7	27.1	27.6	30.6	32.2	34.3	36.6	38.3	37.6	38.3
Others	5.9	5.6	4.6	5.0	7.4	5.0	4.5	13.4	5.0	6.6	5.4	9.2	5.9	6.1	6.2	4.6	3.2	5.1	3.4	2.9	2.7	2.7	2.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Expenditure																							
Benefits	132.4	156.9	223.0	257.0	377.0	561.0	655.0	774.0	905.0	1064.0	1164.0	1395.0	1696.0	1918.0	2348.0	2868.0	3467.0	4321.0	5033.0	5807.0	6797.0	8132.0	9443.0
Admin. Expen	7.9	10.3	12.5	13.5	17.9	29.9	36.9	41.9	49.0	56.0	45.0	61.0	84.0	84.0	94.0	103.0	119.0	143.0	149.0	180.0	237.0	225.0	255.3
Total	140.2	167.2	235.4	270.5	394.9	590.9	691.9	815.9	954.0	1120.0	1209.0	1456.0	1780.0	2002.0	2442.0	2971.0	3586.0	4464.0	5182.0	5987.0	7034.0	8357.0	9698.3
% of Total																							
Benefits	94.4	93.8	94.7	95.0	95.5	94.9	94.7	94.9	94.9	95.0	96.3	95.8	95.3	95.8	96.2	96.5	96.7	96.8	97.1	97.0	96.6	97.3	97.4
Admin. Expen	5.6	6.2	5.3	5.0	4.5	5.1	5.3	5.1	5.1	5.0	3.7	4.2	4.7	4.2	3.8	3.5	3.3	3.2	2.9	3.0	3.4	2.7	2.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% Admin. Expen. of Inc.	1.4	1.6	1.6	1.6	1.5	1.8	1.9	1.6	1.6	1.5	1.1	1.2	1.5	1.3	1.2	1.2	1.1	1.0	0.9	0.9	1.1	0.9	0.9
End of the Year Net cash-flow and Reserve																							
Net cash-flow	407.0	462.4	551.7	570.4	790.5	1109.4	1223.5	1841.2	2109.2	2558.7	2739.0	3569.3	3813.0	4479.0	5105.0	5655.0	7265.0	9328.0	11082.0	13172.0	15353.0	17085.2	18765.3
Increase in Reserve	388.7	457.2	755.7	283.1	715.0	1065.0	1190.0	3884.0	2122.0	2445.0	2632.0	3528.0	3674.0	4457.0	4976.0	4848.0	7250.0	9439.0	10828.0	12566.0	14783.0	16729.0	18353.4
Reserve	3364.0	3821.2	4576.9	4863.0	5577.0	6643.0	7832.0	11715.0	13837.0	16281.0	18913.0	22441.0	26115.0	30572.0	35548.0	40396.0	47646.0	57085.0	67913.0	80479.0	95262.0	111991.0	130344.4

Source: MISAs Annual Reports 1977-1999

Table 2.2.D : Historical Development of Income and expenditure of Social Insurance Scheme

Nominal GDP (at Market Price), Income and Expenditure as a % of GDP

GSF

	1977	1978	1979	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
Income																							
Contributions	1.7	1.8	1.7	1.5	1.6	2.0	1.8	1.7	2.0	2.1	1.9	1.9	1.8	1.6	1 6	1.5	1.6	1.8	1.8	1.9	1.9	2.0	2.0
Treasury Subsidy	0.1	0.1	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0 3	0 4	0.4	0.5	0.6	0 5	0 6	0.6	0 6	0 6
Return on Invested Assets	0.7	0.7	0.7	0.6	0.8	0.7	0.7	0.8	0.8	0.9	0 8	1.1	0.9	0.8	0 8	0.7	0.9	1.2	1.3	1.5	1.6	1.7	1.8
Others	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.8	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.2	0.1	0.1	0.1	0.1	0 1
Total	2 6	2 6	2.6	2.3	2.7	3.3	2 8	3.7	3.2	3.5	3.1	3.3	3.1	2 9	2 9	2 6	3.1	3.7	3.7	3 9	4.2	4.3	4 5
Expenditure																							
Benefits	0.8	0.8	0.9	0.8	1.0	1.0	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0 8	0.9	0.8	0.9	1.0	1.0	1.0	1.1	1.1	1.2
Admin. Expen	0.0	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0 0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.8	0.8	0.9	0 9	1.0	1.0	0 9	0.9	1.0	1.0	0.9	0.9	1.0	0 8	0.9	0 9	0 9	1.0	1 0	1.0	1.1	1.1	1 2
End of the Year Net cash-flow and Reserve																							
Net cash-flow	1.7	1.8	1.7	1.5	1.7	2.2	1.9	2.7	2.2	2.5	2.2	2.4	2.1	2.0	2.0	1.8	2 2	2.7	2.7	2.9	3.1	3.2	3.3
Increase in Reserve	1.7	1.7	1.7	0.7	1.6	2.2	1.9	5.9	2.3	2.4	2.1	2.4	2.1	2.0	1.9	1 5	2.4	2.7	2.6	2.9	3.0	3.2	3 3
Reserve	18.1	17.8	16 4	15.0	15.2	14.8	13.7	17.1	16.8	17.0	16.2	16 0	14.9	13 9	14.0	12.7	13 7	15.0	15 5	16 6	18.0	19 6	21.4

PPSF

Income																							
Contributions	2.0	2.1	2.2	2.0	2.4	2.9	2.6	2.7	2.9	2.9	2.6	2.4	2.2	1.9	1.8	1.6	1.7	1.7	1.7	1.7	1.7	1.7	1.8
Treasury Subsidy	0.1	0 0	0.1	0 2	0.5	0.9	0.9	0.9	0.8	0 8	0.6	0.6	0.6	0.6	0.7	0.7	0.8	0.9	0.9	1.0	1.0	1.1	1.2
Return on Invested Assets	0.6	0.6	0.7	0.6	0.8	0.8	0.8	0.9	0.9	1.0	1.0	1.2	1.0	1.0	1.1	1.0	1.2	1.4	1.4	1.6	1.7	1.7	1.8
Others	0.3	0.3	0.2	0.3	0.5	0 3	0.3	0.3	0.4	0.4	0.4	0.7	0.4	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Total	3 0	3.1	3 3	3.1	4 2	4 9	4.5	4.7	5 0	5.1	4.6	4.9	4.2	3 9	3 9	3.6	3.8	4.2	4.3	4.4	4.6	4.7	4 9
Expenditure																							
Benefits	0.5	0.6	0 8	0.8	1.2	1.7	1.6	1.5	1.5	1.5	1.3	1.3	1.3	1.2	1.3	1.2	1.3	1.5	1.5	1.5	1.6	1.8	1.9
Admin. Expen	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1
Total	0.6	0.7	0.9	0 9	1.3	1.8	1.7	1.6	1.6	1.6	1 4	1 4	1.4	1.2	1.3	1 3	1.4	1.5	1.5	1 6	1.7	1.8	2.0
End of the Year Net cash-flow and Reserve																							
Net cash-flow	2.4	2.4	2.4	2.2	2 9	3.1	2.8	3.1	3.4	3.5	3.1	3.4	2.8	2.6	2.6	2.3	2.4	2.6	2.7	2.8	2.9	2.9	2.9
Increase in Reserve	2.2	2.4	3.9	1.1	2.5	2.9	2.7	6.4	3.4	3 4	3.0	3.3	2.7	2.6	2.5	2.0	2.2	2.7	2 6	2.6	2.8	2.8	2.8
Reserve	15 8	16.3	17.5	16.4	17.3	17.3	16.5	20 0	20.4	21 2	20 5	20 5	19.1	17 9	18 0	16.3	16 6	17.5	17.6	18 2	19.2	20.4	21.7

Both Funds Conslidated

Income																							
Contributions	3 7	3.8	3.9	3.6	4.0	4.9	4.4	4.4	4.9	5.1	4.4	4.3	3 9	3.6	3.5	3.1	3.3	3 5	3.5	3.5	3.6	3 7	3.7
Treasury Subsidy	0.1	0.1	0.3	0.4	0 8	1.3	1.2	1.2	1.1	1.2	1.0	0.9	1.0	0.9	1.0	1.1	1.3	1.5	1.5	1.5	1.6	1.7	1.8
Return on Invested Assets	1.4	1.4	1.3	1.2	1.6	1.6	1.5	1.7	1.8	1.8	1.8	2.2	1.9	1.9	1.8	1.7	2.1	2.5	2.7	3.0	3.3	3.4	3.6
Others	0.3	0.3	0.3	0.3	0.5	0.4	0.3	1.1	0.4	0.6	0.4	0 8	0.4	0.4	0.4	0.3	0.2	0.4	0.3	0.2	0.2	0.2	0.3
Total	5 5	5 6	5 8	5 4	6 9	8 2	7.4	8 4	8.2	8.6	7.7	8.2	7.3	6.7	6 8	6 2	6.9	7.9	7.9	8.3	8.8	9.1	9 4
Expenditure																							
Benefits	1.3	1.4	1.7	1.7	2.2	2.7	2.5	2.5	2.4	2.5	2.3	2.3	2.2	2.0	2.1	2.1	2.2	2.5	2.5	2.5	2.7	2.9	3.1
Admin. Expen	0.1	0 1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Total	1 4	1.5	1.7	1.7	2 3	2 8	2.7	2 6	2 6	2.6	2.3	2.4	2 3	2.1	2 2	2.1	2 3	2.6	2.5	2.6	2.7	3 0	3 2
End of the Year Net cash-flow and Reserve																							
Net cash-flow	4.1	4.1	4.1	3.7	4.6	5.3	4.7	5.8	5.7	6.0	5.3	5.8	5.0	4.7	4.6	4.1	4.6	5.3	5.4	5.7	6.0	6.1	6.2
Increase in Reserve	3.9	4.1	5.6	1.8	4.2	5.1	4.6	12.3	5.7	5.7	5.1	5.7	4.8	4.6	4.5	3.5	4 6	5.4	5.3	5 4	5.8	6.0	6.1
Reserve	33 9	34.1	33 9	31.4	32.5	32 0	30 2	37.1	37.2	38.3	36.7	36.4	34 0	31.8	32.0	29 0	30.3	32 6	33.1	34 8	37 2	40 0	43 2

Source: MISAs Annual Reports 1977-1999

Appendix 2

Table 2.2.E : Historical Development of Income and expenditure of Social Insurance Scheme

Other Financial indicators

Expenditure/Contributions	1977	1978	1979	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99
GSF	47.6	45.7	51.5	56.0	62.8	51.5	51.5	55.0	48.7	48.8	49.6	50.4	54.8	51.5	53.6	58.5	54.9	58.3	56.9	55.9	56.4	57.6	61.6
PPSF	29.7	33.1	38.9	44.1	54.2	62.6	67.9	60.6	54.6	54.4	55.4	59.0	62.4	64.4	71.2	77.6	82.4	88.4	89.4	93.9	101.2	107.5	113.4
Both Funds	37.9	38.9	44.4	49.2	57.6	58.1	61.1	58.4	52.2	52.0	52.9	55.2	59.0	58.5	62.9	68.6	68.9	73.2	72.8	73.9	77.2	80.8	86.1
State Subsidy/Expenditure																							
GSF	7.8	8.8	18.4	21.3	31.4	38.8	34.6	34.7	36.0	39.0	39.4	31.9	39.3	36.9	42.6	45.9	50.8	54.4	54.3	53.8	53.3	52.8	52.5
PPSF	8.7	7.0	15.0	21.7	36.2	50.6	51.3	51.8	49.5	47.9	45.1	42.3	44.7	47.7	50.3	54.5	57.6	59.0	60.5	61.4	61.4	61.0	59.2
Both Funds	8.2	8.0	16.7	21.5	34.2	46.4	45.5	45.6	44.4	44.4	42.8	38.2	42.5	43.4	47.2	51.1	54.9	57.2	58.0	58.4	58.2	57.9	56.7
State Subsidy/Contribution																							
GSF	3.7	4.0	9.5	11.9	19.7	20.0	17.8	19.1	17.5	19.0	19.5	16.1	21.5	19.0	22.8	26.8	27.9	31.7	30.9	30.1	30.1	30.4	32.3
PPSF	2.6	2.3	5.9	9.6	19.6	31.7	34.8	31.4	27.0	26.0	25.0	25.0	27.9	30.8	35.9	42.3	47.5	52.2	54.1	57.7	62.2	65.6	67.2
Both Funds	3.1	3.1	7.4	10.6	19.7	26.9	27.8	26.6	23 2	23.1	22.7	21.1	25.0	25.4	29.7	35.0	37.8	41.9	42.3	43.1	44.9	46.8	48.8
Reserve/Expenditure																							
GSF	22.2	22.2	18.5	17.7	15.4	14.3	14.8	18.2	17.3	16.5	17.4	17.0	15.4	16.7	15.9	14.8	15.3	14.7	15.3	16.0	16.7	17.2	17.7
PPSF	26.5	23.6	20.4	18.2	13.1	9.5	9.5	12.2	12.8	13.3	14.5	14.4	14.1	14.3	13.7	12.8	12.0	11.5	11.6	11.7	11.5	11.0	10.9
Both Funds	24.0	22.9	19.4	18.0	14.1	11.2	11.3	14.4	14 5	14 5	15.6	15.4	14.7	15.3	14.6	13.6	13.3	12.8	13.1	13.4	13.5	13.4	13.4
Growth of reserve																							
GSF		10.7	11.2	5.1	12.0	17.5	16.0	52.1	15.7	16.1	15.1	17.8	16.6	16.8	16.2	13.6	21.5	22.3	20.6	21.0	19.7	19.3	18.0
PPSF		16.9	29.1	7.4	17.2	20.5	19.6	47.5	20.2	19.0	17.0	19.3	16.2	17.2	16.3	13.6	15.1	17.3	17.6	16.4	17.2	16.0	14.9
Both Funds		13.6	19.8	6.3	14.7	19.1	17.9	49.6	18.1	17.7	16.2	18.7	16.4	17.1	16.3	13.6	17.9	19.8	19.0	18.5	18.4	17.6	16.4
Rate of Return on investment (by Hardy's formula)																							
GSF		4.3	4.3	4.2	5.4	5.5	5.4	5.8	5.3	5.4	5.6	7.2	6.4	6.5	5.8	5.9	7.6	8.7	9.1	9.6	10.0	9.5	9.3
PPSF		4.1	4.3	3.9	5.2	5.2	5.2	5.1	5.0	5.0	5.1	6.2	5.9	6.2	6.5	6.6	7.5	8.3	8.8	9.3	9.6	9.1	8.7
Both Funds		4.2	4.3	4.0	5.3	5.3	5.3	5.4	5.2	5.2	5.3	6.6	6.1	6.3	6.2	6.3	7.6	8.5	8.9	9.4	9.7	9.2	9.0
% of Net cash-flow to Total Income																							
GSF	67.9	68.7	65.6	63.5	63.2	68.3	67.5	74.5	69.6	70.6	70.1	71.5	68.9	70.9	69.3	67.4	70.9	72.4	72.6	73.7	74.3	73.8	73.3
PPSF	79.9	77.4	73.6	71.1	68.9	63.2	61.6	65.3	68.4	68.9	68.9	70.7	67.6	67.7	66.5	64.2	63.7	63.4	64.3	64.3	63.3	61.0	59.1
Both Funds	74.4	73.4	70.1	67.8	66.7	65.2	63.9	69.3	68 9	69.6	69 4	71.0	68.2	69.1	67.6	65.6	67.0	67.6	68.1	68 8	68.6	67.2	65.9

Source: MISAs Annual Reports 1977-1999

Appendix 2

Table 2.3 : The Development of Liabilities, Reserves and Invested Funds Over 1977-1999

GSF

	1977	1978	1979	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-2000
Total Liabilities	1808.9	2005.9	2239.5	2432.3	2625.2	3098.1	3568.4	5425.9	6280.9	7315.1	8402.9	9895.9	11522.9	13454.7	15635.6	18200.0	21593.6	26419.5	31861.1	38531.9	46238.1	55225.9	65185.7	N/A
Reserves	1799.8	1992.5	2216.0	2328.0	2607.0	3063.0	3553.0	5404.0	6250.0	7255.0	8348.0	9838.0	11468.0	13398.0	15566.0	17689.0	21499.0	26287.0	31704.0	38355.0	45928.0	54775.0	64627.0	N/A
% Invested	99.5	99.3	99.0	95.7	99.3	98.9	99.6	99.6	99.5	99.2	99.3	99.4	99.5	99.6	99.6	97.2	99.6	99.5	99.5	99.5	99.3	99.2	99.1	N/A
Invested Resrve	1384.1	1949.7	2192.8	2293.1	2573.5	2981.7	3423.7	5241.1	6009.2	6984.7	8011.6	9320.2	10867.9	12607.5	14763.5	17484.6	20930.9	25261.3	30330.0	36190.0	43109.4	50680.4	58896.6	N/A
% of Assets	76.5	97.2	97.9	94.3	98.0	96.2	95.9	96.6	95.7	95.5	95.3	94.2	94.3	93.7	94.4	96.1	96.9	95.6	95.2	93.9	93.2	91.8	90.4	N/A
Inv. In NIB	503.0	679.1	908.7	1093.6	1278.5	1668.1	2102.8	2638.4	3342.9	4256.4	5250.3	6442.2	8162.9	9911.3	11974.7	14595.0	17567.0	21078.6	25587.7	31176.2	38405.1	45493.4	53414.0	N/A
% of Invested	36.3	34.8	41.4	47.7	49.7	55.9	61.4	50.3	55.6	60.9	65.5	69.1	75.1	78.6	81.1	83.5	83.9	83.4	84.4	86.1	89.1	89.8	90.7	N/A

PPSF

Total Liabilities	1620.7	1878.1	2423.3	2601.7	3052.6	3704.5	4423.3	6520.4	7833.9	9312.2	10895.9	16973.9	15149.5	17607.3	20493.4	22884.3	26590.6	31263.6	36846.5	43216.9	50540.6	58535.2	67146.4	N/A
Reserves	1564.2	1828.7	2360.9	2535.0	2971.0	3580.0	4280.0	6313.0	7589.0	9029.0	10568.0	12606.0	14650.0	17177.0	19985.0	22710.0	26147.0	30668.0	36079.0	41994.0	49203.0	57085.0	65586.4	N/A
% of Liabilities	96.5	97.4	97.4	97.4	97.3	96.6	96.8	96.8	96.9	97.0	97.0	74.3	96.7	97.6	97.5	99.2	98.3	98.1	97.9	97.2	97.4	97.5	97.7	N/A
Invested Resrve	1490.5	1711.9	2210.3	2366.2	2743.4	3273.1	3954.5	5960.3	7030.0	8384.4	9862.9	11861.1	13686.7	15871.0	18444.2	20693.4	24118.3	28489.3	33357.5	38716.7	44137.1	49671.6	55123.2	N/A
% of ILiabilities	92.0	91.2	91.2	90.9	89.9	88.4	89.4	91.4	89.7	90.0	90.5	69 9	90.3	90.1	90.0	90.4	90.7	91.1	90.5	89.6	87.3	84.9	82.1	N/A
Inv. In NIB	1481.1	1698.1	2187.4	2313.3	2439.2	2947.7	3608.4	4434.3	5443.3	6761.1	8177.6	9990.2	11815.7	13928.1	16405.5	18516.7	21672.2	25831.8	30599.7	35745.4	40950.2	46263.6	51543.0	N/A
% Invested	99.4	99.2	99.0	97.8	88.9	90.1	91.2	74.4	77.4	80.6	82.9	84.2	86.3	87.8	88.9	89.5	89.9	90.7	91.7	92.3	92.8	93.1	93.5	N/A

Both Funds

Total Liabilities	3429.6	3884.0	4662.8	5034.0	5677.8	6802.6	7991.7	11946.3	14114.8	16627.3	19298.8	26869.8	26672.4	31062.0	36129.0	41084.3	48184.2	57683.1	68707.6	81748.8	96778.7	113761.0	132332.1	N/A
Reserves	3364.0	3821.2	4576.9	4863.0	5578.0	6643.0	7833.0	11717.0	13839.0	16284.0	18916.0	22444.0	26118.0	30575.0	35551.0	40399.0	47646.0	56955.0	67783.0	80349.0	95131.0	111860.0	130213.4	N/A
% of Liabilities	98.1	98.4	98.2	96.6	98.2	97.7	98.0	98.1	98.0	97.9	98.0	83.5	97.9	98 4	98.4	98.3	98.9	98.7	98.7	98.3	98.3	98.3	98.4	N/A
Invested Resrve	2874.6	3661.6	4403.1	4659.3	5316.9	6254.8	7378.2	11201.4	13039.2	15369.1	17874.5	21181.3	24554.6	28478.5	33207.7	38178.0	45049.2	53750.6	63687.5	74906.7	87246.5	100352.0	114019.8	N/A
% of ILiabilities	83.8	94.3	94.4	92.6	93.6	91.9	92.3	93.8	92.4	92.4	92.6	78.8	92.1	91.7	91.9	92.9	93.5	93.2	92.7	91.6	90.2	88.2	86.2	N/A
Inv. In NIB	1984.1	2377.2	3096.1	3406.9	3717.7	4615.8	5711.2	7072.7	8786.2	11017.5	13427.9	16432.4	19978.6	23839.4	28380.2	33111.7	39239.2	46910.4	56187.4	66921.6	79355.3	91757.0	104957.0	N/A
% of Investment	69.0	64.9	70.3	73.1	69.9	73.8	77.4	63.1	67.4	71.7	75.1	77.6	81.4	83.7	85.5	86 7	87.1	87.3	88.2	89.3	91.0	91.4	92.1	N/A
% Average Rate of Return on Invested Funds	4.7	4.6	4.2	4.3	4.0	5.3	5.3	5.3	5.4	5.2	5.2	5.3	6.6	6.1	6.3	6.2	6.3	7.6	8.5	8.9	9.4	9.7	9.2	9.0
% Inflation	10.3	12.9	11.1	10.3	20.7	10.3	14.8	18.3	17.0	13.4	24.4	22.8	19.2	26.8	16.8	19.7	13.6	12.1	9.1	9 4	7.3	6.2	3.8	3.7

Source: MISAs Annual Reports 1977-1999

Appendix 2

Table 2.4.A : The Salary Scale of ESSPS

Age	GSF	PPSF
16	-	82
17	100	86
18	100	91
19	100	95
20	100	100
21	105	105
22	110	110
23	115	116
24	120	122
25	126	128
26	132	134
27	138	141
28	145	148
29	152	155
30	159	163
31	166	171
32	174	180
33	183	189
34	191	198
35	200	208
36	210	218
37	220	229
38	230	241
39	241	253
40	252	265
41	264	279
42	277	293
43	290	307
44	304	333
45	318	339
46	333	356
47	349	373
48	366	392
49	383	412
50	401	432
51	420	454
52	440	476
53	461	500
54	483	525
55	506	552
56	530	579
57	555	608
58	581	639
59	609	670
60	638	704
61	668	739
62	699	776
63	733	815
64	767	856
65	801	899

Source: GSF and PPSF 1997

Table 2.4.B : The Invalidity Rates of ESSPS

Age	GSF	PPSF
16	0.000090	0.000040
17	0.000100	0.000040
18	0.000100	0.000040
19	0.000120	0.000040
20	0.000130	0.000040
21	0.000150	0.000050
22	0.000170	0.000050
23	0.000190	0.000060
24	0.000210	0.000060
25	0.000230	0.000070
26	0.000260	0.000070
27	0.000290	0.000080
28	0.000320	0.000080
29	0.000350	0.000090
30	0.000380	0.000100
31	0.000420	0.000110
32	0.000460	0.000120
33	0.000500	0.000130
34	0.000540	0.000140
35	0.000580	0.000150
36	0.000630	0.000160
37	0.000680	0.000170
38	0.000730	0.000190
39	0.000780	0.000200
40	0.000830	0.000220
41	0.000890	0.000240
42	0.000950	0.000260
43	0.001010	0.000280
44	0.001070	0.000310
45	0.001130	0.000330
46	0.001200	0.000360
47	0.001270	0.000390
48	0.001350	0.000430
49	0.001440	0.000460
50	0.001540	0.000500
51	0.001670	0.000540
52	0.001810	0.000590
53	0.001950	0.000640
54	0.002100	0.000700
55	0.002270	0.000750
56	0.002460	0.000820
57	0.002660	0.000890
58	0.002850	0.000960
59	0.003050	0.001050
60	0.003350	0.001130
61	0.003750	0.001230
62	0.004150	0.001340
63	0.004550	0.001450
64	0.005050	0.001570
65	-	0.001570

Source: GSF and PPSF 1997

Table 2.4.C : The Early Retirement Rates of ESSPS

Age	GSF	PPSF
16	0.000000	0.000000
17	0.000000	0.000000
18	0.000000	0.000000
19	0.000000	0.000000
20	0.000000	0.000000
21	0.000000	0.000000
22	0.000000	0.000000
23	0.000000	0.000000
24	0.000000	0.000000
25	0.000000	0.000000
26	0.000000	0.000000
27	0.000000	0.000000
28	0.000000	0.000000
29	0.000000	0.000000
30	0.000000	0.000000
31	0.000000	0.000000
32	0.000000	0.000000
33	0.000000	0.000000
34	0.000000	0.000000
35	0.000000	0.000000
36	0.000000	0.000000
37	0.000000	0.000000
38	0.000000	0.000000
39	0.000000	0.000000
40	0.000000	0.000000
41	0.000000	0.000000
42	0.000000	0.000000
43	0.000000	0.000000
44	0.000000	0.000000
45	0.001000	0.001150
46	0.001000	0.001150
47	0.001000	0.001150
48	0.001000	0.001150
49	0.001000	0.001150
50	0.002500	0.002875
51	0.002500	0.002875
52	0.002500	0.002875
53	0.002500	0.002875
54	0.002500	0.002875
55	0.010000	0.011500
56	0.009000	0.010350
57	0.008000	0.009200
58	0.007000	0.008050
59	0.006000	0.006900
60	0.830000	0.954500
61	0.040000	0.046000
62	0.040000	0.046000
63	0.040000	0.046000
64	0.040000	0.046000
65	-	0.046000

Source: GSF and PPSF 1997

Appendix 3

Table 3.1: The total Number of Exposed to Risk and Death Over 1994-96

Age	Exposed to Risk		Deaths	
	Male	Female	Male	Female
0 - 1	2707393	2557130	74456	70601
0 - 4	12712993	12139568	102143	98661
5 - 9	11780101	11042025	11533	9016
10 - 14	10997908	10476358	9440	7165
15 - 19	9671863	8903131	10848	7527
20 - 24	8209796	7743455	10058	6478
25 - 29	7123732	6798203	10372	7379
30 - 34	6133600	5845705	12447	7639
35 - 39	5260442	5083342	15029	10073
40 - 44	4483259	4311387	20865	11004
45 - 49	3778113	3665074	27249	15599
50 - 54	3102961	3155093	33240	22123
55 - 59	2448743	2522912	42909	26671
60 - 64	1860454	2068093	57985	41657
65 - 69	1368259	1527242	66167	50562
70 - 74	905024	1045812	69367	61298
75+	789134	910470	119834	147489

Source: CAPMAS Annual Reports 1994-1996

Appendix 3

Table 3.2.A: Male and Female Exposure and Death

Age	Estimated Individual Exposures		Grouped Exposures		Estimated Individual Deaths		Grouped Deaths		Individual Crude Rate		Graduated	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male (Whittakar, df=12)	Female (Whittakar, df=13)
0	2707393	2557130	2707393	2557130	74456	70601	74456	2557130	0.027501	0.027609	0.027501	0.027609
1	2607026	2489605			13411	14458			0.005144	0.005807	0.004138	0.004994
2	2521407	2423973			6317	6496			0.002505	0.002680	0.002973	0.003130
3	2458541	2362247			4419	4093			0.001797	0.001733	0.002187	0.002054
4	2418625	2306613	10005599	9582438	3540	3012	27687	9582438	0.001464	0.001306	0.001673	0.001446
5	2395136	2259536			2916	2386			0.001217	0.001056	0.001337	0.001094
6	2377775	2223446			2516	1994			0.001058	0.000897	0.001118	0.000887
7	2359474	2198975			2255	1727			0.000956	0.000785	0.000977	0.000763
8	2337237	2184432			2001	1514			0.000856	0.000693	0.000889	0.000690
9	2310479	2175635	11780101	11042025	1845	1395	11533	11042025	0.000799	0.000641	0.000840	0.000652
10	2279482	2165759			1810	1395			0.000794	0.000644	0.000819	0.000639
11	2244497	2146334			1795	1401			0.000800	0.000653	0.000820	0.000643
12	2204854	2111613			1843	1434			0.000836	0.000679	0.000839	0.000661
13	2159781	2059755			1956	1453			0.000906	0.000705	0.000872	0.000687
14	2109294	1992897	10997908	10476358	2036	1482	9440	10476358	0.000965	0.000744	0.000915	0.000718
15	2054304	1910490			2106	1507			0.001025	0.000789	0.000963	0.000751
16	1996103	1834424			2156	1515			0.001080	0.000826	0.001012	0.000781
17	1935768	1770718			2189	1503			0.001131	0.000849	0.001061	0.000807
18	1874029	1717874			2202	1505			0.001175	0.000876	0.001105	0.000826
19	1811659	1669625	9671863	8903131	2195	1497	10848	8903131	0.001212	0.000897	0.001145	0.000839
20	1750016	1631420			2105	1345			0.001203	0.000824	0.001179	0.000848
21	1691130	1588757			2028	1305			0.001199	0.000821	0.001211	0.000858
22	1636771	1546976			1963	1270			0.001199	0.000821	0.001242	0.000872
23	1587843	1506841			1977	1276			0.001245	0.000847	0.001276	0.000893
24	1544037	1469462	8209796	7743455	1986	1282	10058	7743455	0.001286	0.000872	0.001314	0.000922
25	1503798	1434988			1994	1381			0.001326	0.000962	0.001360	0.000958
26	1464829	1397872			2022	1455			0.001380	0.001041	0.001415	0.001001
27	1425517	1360797			2063	1512			0.001447	0.001111	0.001481	0.001046
28	1385267	1322111			2115	1516			0.001527	0.001147	0.001558	0.001094
29	1344321	1282435	7123732	6798203	2178	1515	10372	6798203	0.001620	0.001181	0.001648	0.001144
30	1303452	1240415			2319	1432			0.001779	0.001154	0.001750	0.001200
31	1263614	1202176			2407	1444			0.001905	0.001201	0.001865	0.001266
32	1225267	1166320			2483	1490			0.002026	0.001278	0.001993	0.001345
33	1188416	1133580			2574	1562			0.002166	0.001378	0.002135	0.001440
34	1152851	1103214	6133600	5845705	2664	1711	12447	5845705	0.002311	0.001551	0.002292	0.001549
35	1118309	1076448			2753	1853			0.002461	0.001721	0.002467	0.001668
36	1084537	1047555			2861	1964			0.002638	0.001875	0.002666	0.001792
37	1051431	1017749			2981	2022			0.002835	0.001987	0.002893	0.001916
38	1018977	986657			3126	2101			0.003068	0.002129	0.003155	0.002036
39	987188	954933	5260442	5083342	3308	2133	15029	5083342	0.003351	0.002234	0.003456	0.002155
40	956081	921451			3616	2055			0.003782	0.002230	0.003799	0.002279
41	925686	890368			3914	2078			0.004228	0.002334	0.004184	0.002421
42	895999	860873			4176	2151			0.004661	0.002499	0.004608	0.002593
43	866973	832860			4445	2281			0.005127	0.002739	0.005067	0.002808
44	838520	805835	4483259	4311387	4714	2439	20865	4311387	0.005622	0.003026	0.005556	0.003074
45	810524	779821			4961	2574			0.006121	0.003301	0.006072	0.003398
46	782857	754490			5215	2879			0.006662	0.003816	0.006613	0.003784
47	755427	730923			5459	3114			0.007226	0.004261	0.007179	0.004228
48	728189	709618			5693	3384			0.007818	0.004769	0.007775	0.004723
49	701116	690222	3778113	3665074	5922	3647	27249	3665074	0.008446	0.005284	0.008410	0.005256
50	674175	673670			6123	3936			0.009083	0.005843	0.009096	0.005816
51	647321	655362			6362	4353			0.009828	0.006642	0.009854	0.006386
52	620520	633996			6619	4444			0.010667	0.007010	0.010709	0.006952
53	593779	609440			6905	4649			0.011629	0.007628	0.011689	0.007524
54	567166	582625	3102961	3155093	7231	4741	33240	3155093	0.012750	0.008137	0.012829	0.008126
55	540795	552028			7574	4797			0.014005	0.008690	0.014169	0.008806
56	514792	524834			8014	4933			0.015568	0.009399	0.015752	0.009628
57	489243	501163			8521	5219			0.017416	0.010414	0.017614	0.010663
58	464199	481161			9091	5590			0.019585	0.011618	0.019785	0.011979

Source: Derived by Author

Appendix 3

Table 3.2.A: Male and Female Exposure and Death

Age	Estimated Individual Exposures		Grouped Exposures		Estimated Individual Deaths		Grouped Deaths		Individual Crude Rate		Graduated	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male (whittakar, df=12)	Female (whittakar, df=13)
59	439714	463725	2448743	2522912	9709	6132	42909	2522912	0.022080	0.013223	0.022262	0.013611
60	415902	450901			10640	7216			0.025583	0.016004	0.025013	0.015556
61	392955	434242			11237	7849			0.028596	0.018075	0.027958	0.017714
62	371034	415806			11673	8428			0.031461	0.020269	0.031020	0.019980
63	350200	394962			12036	8916			0.034369	0.022574	0.034180	0.022306
64	330363	372182	1860454	2068093	12399	9248	57985	2068093	0.037531	0.024848	0.037453	0.024679
65	311251	348691			12642	9384			0.040617	0.026912	0.040908	0.027196
66	292466	326313			13049	9631			0.044617	0.029516	0.044638	0.030044
67	273712	305273			13246	10108			0.048394	0.033111	0.048739	0.033385
68	254864	283289			13498	10421			0.052962	0.036786	0.053312	0.037384
69	235966	263677	1368259	1527242	13732	11017	66167	1527242	0.058195	0.041784	0.058431	0.042102
70	217187	244953			14020	11774			0.064553	0.048066	0.064120	0.047439
71	198737	227038			14085	12225			0.070873	0.053846	0.070372	0.053216
72	180693	209208			14014	12386			0.077557	0.059204	0.077175	0.059228
73	162978	191298			13789	12557			0.084606	0.065641	0.084573	0.065500
74	145429	173315	905024	1045812	13459	12356	69367	1045812	0.092547	0.071292	0.092645	0.072187
75											0.101648	0.079348
76											0.111351	0.087382
77											0.121980	0.096229
78											0.133624	0.105972
79											0.146379	0.116701
80											0.160352	0.128517
81											0.175658	0.141529
82											0.192426	0.155858
83											0.210794	0.171639
84											0.230916	0.189017
85											0.252958	0.208154
86											0.277105	0.229229
87											0.303556	0.252438
88											0.332533	0.277997
89											0.364275	0.306144
90											0.399047	0.337140
91											0.437139	0.371274
92											0.478867	0.408865
93											0.524578	0.450262
94											0.574652	0.495850
95											0.629506	0.546053
96											0.689596	0.601340
97											0.755423	0.662224
98											0.827533	0.729273
99											0.906526	0.803110
100											0.993060	0.884423
101											1.087854	0.973969
102											1.191696	
103											1.305451	
104												

Source: Derived by Author

Appendix 3

Table 3.2.B: The Egyptian Life Table 1994-96

Age	m_x		q_x		p_x		l_x		μ_x		e^o	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0	0.027501	0.027609	0.027501	0.027609	0.972499	0.972391	100000	100000			65.4	69.2
1	0.004138	0.004994	0.004129	0.004981	0.995871	0.995019	97250	97239	0.004844	0.006183	66.2	70.1
2	0.002973	0.003130	0.002968	0.003125	0.997032	0.996875	96848	96755	0.003455	0.003821	65.5	69.5
3	0.002187	0.002054	0.002185	0.002052	0.997815	0.997948	96561	96452	0.002526	0.002487	64.7	68.7
4	0.001673	0.001446	0.001671	0.001445	0.998329	0.998555	96350	96254	0.001892	0.001689	63.8	67.8
5	0.001337	0.001094	0.001336	0.001094	0.998664	0.998906	96189	96115	0.001480	0.001237	62.9	66.9
6	0.001118	0.000887	0.001117	0.000886	0.998883	0.999114	96060	96010	0.001211	0.000972	62.0	66.0
7	0.000977	0.000763	0.000977	0.000762	0.999023	0.999238	95953	95925	0.001037	0.000813	61.1	65.0
8	0.000889	0.000690	0.000889	0.000690	0.999111	0.999310	95859	95852	0.000926	0.000719	60.1	64.1
9	0.000840	0.000652	0.000839	0.000652	0.999161	0.999348	95774	95786	0.000859	0.000666	59.2	63.1
10	0.000819	0.000639	0.000818	0.000639	0.999182	0.999361	95694	95723	0.000825	0.000642	58.2	62.2
11	0.000820	0.000643	0.000820	0.000643	0.999180	0.999357	95615	95662	0.000816	0.000639	57.3	61.2
12	0.000839	0.000661	0.000839	0.000661	0.999161	0.999339	95537	95601	0.000827	0.000650	56.3	60.3
13	0.000872	0.000687	0.000872	0.000687	0.999128	0.999313	95457	95538	0.000854	0.000673	55.4	59.3
14	0.000915	0.000718	0.000914	0.000718	0.999086	0.999282	95374	95472	0.000892	0.000702	54.4	58.3
15	0.000963	0.000751	0.000962	0.000751	0.999038	0.999249	95286	95403	0.000938	0.000735	53.5	57.4
16	0.001012	0.000781	0.001012	0.000781	0.998988	0.999219	95195	95332	0.000988	0.000767	52.5	56.4
17	0.001061	0.000807	0.001060	0.000806	0.998940	0.999194	95098	95257	0.001037	0.000795	51.6	55.5
18	0.001105	0.000826	0.001105	0.000825	0.998895	0.999175	94998	95181	0.001084	0.000817	50.6	54.5
19	0.001145	0.000839	0.001144	0.000838	0.998856	0.999162	94893	95102	0.001126	0.000833	49.7	53.5
20	0.001179	0.000848	0.001178	0.000848	0.998822	0.999152	94784	95022	0.001162	0.000844	48.7	52.6
21	0.001211	0.000858	0.001210	0.000858	0.998790	0.999142	94672	94942	0.001195	0.000853	47.8	51.6
22	0.001242	0.000872	0.001241	0.000872	0.998759	0.999128	94558	94860	0.001226	0.000864	46.8	50.7
23	0.001276	0.000893	0.001275	0.000893	0.998725	0.999107	94441	94778	0.001258	0.000881	45.9	49.7
24	0.001314	0.000922	0.001314	0.000922	0.998686	0.999078	94320	94693	0.001294	0.000906	45.0	48.8
25	0.001360	0.000958	0.001359	0.000958	0.998641	0.999042	94196	94606	0.001336	0.000939	44.0	47.8
26	0.001415	0.001001	0.001414	0.001000	0.998586	0.999000	94068	94515	0.001386	0.000979	43.1	46.9
27	0.001481	0.001046	0.001480	0.001046	0.998520	0.998954	93935	94421	0.001446	0.001023	42.1	45.9
28	0.001558	0.001094	0.001557	0.001094	0.998443	0.998906	93796	94322	0.001517	0.001070	41.2	45.0
29	0.001648	0.001144	0.001646	0.001144	0.998354	0.998856	93650	94219	0.001601	0.001119	40.3	44.0
30	0.001750	0.001200	0.001749	0.001200	0.998251	0.998800	93496	94111	0.001697	0.001171	39.3	43.1
31	0.001865	0.001266	0.001864	0.001265	0.998136	0.998735	93332	93998	0.001806	0.001231	38.4	42.1
32	0.001993	0.001345	0.001991	0.001344	0.998009	0.998656	93159	93879	0.001927	0.001303	37.5	41.2
33	0.002135	0.001440	0.002133	0.001439	0.997867	0.998561	92973	93753	0.002062	0.001390	36.5	40.2
34	0.002292	0.001549	0.002289	0.001548	0.997711	0.998452	92775	93618	0.002210	0.001492	35.6	39.3
35	0.002467	0.001668	0.002464	0.001667	0.997536	0.998333	92562	93473	0.002376	0.001607	34.7	38.3
36	0.002666	0.001792	0.002663	0.001791	0.997337	0.998209	92334	93317	0.002562	0.001730	33.8	37.4
37	0.002893	0.001916	0.002889	0.001914	0.997111	0.998086	92088	93150	0.002774	0.001854	32.9	36.5
38	0.003155	0.002036	0.003150	0.002034	0.996850	0.997966	91822	92972	0.003018	0.001976	32.0	35.5
39	0.003456	0.002155	0.003450	0.002152	0.996550	0.997848	91533	92783	0.003298	0.002095	31.1	34.6
40	0.003799	0.002279	0.003792	0.002277	0.996208	0.997723	91217	92583	0.003620	0.002215	30.2	33.7
41	0.004184	0.002421	0.004175	0.002418	0.995825	0.997582	90872	92372	0.003985	0.002346	29.3	32.7
42	0.004608	0.002593	0.004598	0.002590	0.995402	0.997410	90492	92149	0.004390	0.002501	28.4	31.8
43	0.005067	0.002808	0.005054	0.002804	0.994946	0.997196	90076	91910	0.004832	0.002693	27.5	30.9
44	0.005556	0.003074	0.005541	0.003069	0.994459	0.996931	89621	91653	0.005307	0.002932	26.7	30.0
45	0.006072	0.003398	0.006054	0.003393	0.993946	0.996607	89124	91371	0.005810	0.003226	25.8	29.1
46	0.006613	0.003784	0.006591	0.003777	0.993409	0.996223	88585	91061	0.006338	0.003582	25.0	28.2
47	0.007179	0.004228	0.007154	0.004219	0.992846	0.995781	88001	90717	0.006891	0.003997	24.1	27.3
48	0.007775	0.004723	0.007746	0.004712	0.992254	0.995288	87371	90335	0.007472	0.004468	23.3	26.4
49	0.008410	0.005256	0.008375	0.005243	0.991625	0.994757	86695	89909	0.008086	0.004984	22.5	25.5
50	0.009096	0.005816	0.009056	0.005799	0.990944	0.994201	85969	89438	0.008743	0.005533	21.7	24.7
51	0.009854	0.006386	0.009807	0.006366	0.990193	0.993634	85190	88919	0.009462	0.006100	20.9	23.8
52	0.010709	0.006952	0.010652	0.006928	0.989348	0.993072	84355	88353	0.010264	0.006669	20.1	22.9
53	0.011689	0.007524	0.011621	0.007496	0.988379	0.992504	83456	87741	0.011176	0.007235	19.3	22.1
54	0.012829	0.008126	0.012749	0.008093	0.987251	0.991907	82486	87083	0.012230	0.007816	18.5	21.3
55	0.014169	0.008806	0.014071	0.008768	0.985929	0.991232	81435	86378	0.013464	0.008448	17.7	20.4
56	0.015752	0.009628	0.015630	0.009582	0.984370	0.990418	80289	85621	0.014919	0.009188	17.0	19.6
57	0.017614	0.010663	0.017463	0.010607	0.982537	0.989393	79034	84801	0.016636	0.010105	16.2	18.8
58	0.019785	0.011979	0.019594	0.011909	0.980406	0.988091	77654	83901	0.018651	0.011273	15.5	18.0
59	0.022262	0.013611	0.022021	0.013521	0.977979	0.986479	76132	82902	0.020979	0.012745	14.8	17.2
60	0.025013	0.015556	0.024709	0.015438	0.975291	0.984562	74456	81781	0.023604	0.014542	14.1	16.4

Source: Derived by Author

Appendix 3

Table 3.2.B: The Egyptian Life Table 1994-96

Age	m_x		q_x		ρ_x		l_x		μ_x		e^o	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
61	0.027958	0.017714	0.027578	0.017561	0.972422	0.982439	72616	80518	0.026466	0.016611	13.5	15.7
62	0.031020	0.019980	0.030551	0.019786	0.969449	0.980214	70613	79104	0.029478	0.018837	12.8	14.9
63	0.034180	0.022306	0.033612	0.022064	0.966388	0.977936	68456	77539	0.032591	0.021138	12.2	14.2
64	0.037453	0.024679	0.036771	0.024382	0.963229	0.975618	66155	75828	0.035803	0.023482	11.6	13.5
65	0.040908	0.027196	0.040094	0.026835	0.959906	0.973165	63722	73980	0.039155	0.025904	11.1	12.9
66	0.044638	0.030044	0.043671	0.029604	0.956329	0.970396	61168	71994	0.042733	0.028558	10.5	12.2
67	0.048739	0.033385	0.047587	0.032843	0.952413	0.967157	58496	69863	0.046635	0.031628	10.0	11.6
68	0.053312	0.037384	0.051936	0.036706	0.948064	0.963294	55713	67568	0.050961	0.035282	9.4	10.9
69	0.058431	0.042102	0.056782	0.041244	0.943218	0.958756	52819	65088	0.055802	0.039646	8.9	10.3
70	0.064120	0.047439	0.062138	0.046352	0.937862	0.953648	49820	62404	0.061210	0.044701	8.4	9.8
71	0.070372	0.053216	0.067990	0.051851	0.932010	0.948149	46724	59511	0.067189	0.050294	7.9	9.2
72	0.077175	0.059228	0.074316	0.057538	0.925684	0.942462	43547	56426	0.073722	0.056210	7.5	8.7
73	0.084573	0.065500	0.081148	0.063436	0.918852	0.936564	40311	53179	0.080821	0.062343	7.0	8.2
74	0.092645	0.072187	0.088545	0.069684	0.911455	0.930316	37040	49805	0.088540	0.068810	6.6	7.7
75	0.101648	0.079348	0.096728	0.076329	0.903272	0.923671	33760	46335	0.097081	0.075707	6.2	7.3
76	0.111351	0.087382	0.105464	0.083731	0.894536	0.916269	30495	42798	0.106457	0.083280	5.8	6.8
77	0.121980	0.096229	0.114940	0.091815	0.885060	0.908185	27279	39215	0.116612	0.091733	5.5	6.4
78	0.133624	0.105972	0.125207	0.100635	0.874793	0.899365	24143	35614	0.127754	0.101029	5.1	6.0
79	0.146379	0.116701	0.136319	0.110252	0.863681	0.889748	21120	32030	0.139963	0.111268	4.8	5.6
80	0.160352	0.128517	0.148332	0.120725	0.851668	0.879275	18241	28499	0.153340	0.122545	4.5	5.2
81	0.175658	0.141529	0.161303	0.132119	0.838697	0.867881	15535	25058	0.167996	0.134967	4.1	4.9
82	0.192426	0.155858	0.175288	0.144498	0.824712	0.855502	13030	21748	0.184055	0.148649	3.9	4.6
83	0.210794	0.171639	0.190343	0.157929	0.809657	0.842071	10746	18605	0.201650	0.163720	3.6	4.2
84	0.230916	0.189017	0.206522	0.172479	0.793478	0.827521	8700	15667	0.220928	0.180321	3.3	3.9
85	0.252958	0.208154	0.223876	0.188215	0.776124	0.811785	6903	12965	0.242050	0.198607	3.1	3.7
86	0.277105	0.229229	0.242450	0.205202	0.757550	0.794798	5358	10524	0.265190	0.218750	2.8	3.4
87	0.303556	0.252438	0.262284	0.223499	0.737716	0.776501	4059	8365	0.290538	0.240936	2.6	3.1
88	0.332533	0.277997	0.283408	0.243163	0.716592	0.756837	2994	6495	0.318301	0.265372	2.4	2.9
89	0.364275	0.306144	0.305838	0.264239	0.694162	0.735761	2146	4916	0.348700	0.292283	2.2	2.7
90	0.399047	0.337140	0.329576	0.286763	0.670424	0.713237	1489	3617	0.381971	0.321915	2.0	2.5
91	0.437139	0.371274	0.354601	0.310752	0.645399	0.689248	999	2580	0.418364	0.354534	1.8	2.3
92	0.478867	0.408865	0.380867	0.336205	0.619133	0.663795	644	1778	0.458133	0.390423	1.7	2.1
93	0.524578	0.450262	0.408294	0.363091	0.591706	0.636909	399	1180	0.501529	0.429883	1.5	2.0
94	0.574652	0.495850	0.436758	0.391347	0.563242	0.608653	236	752	0.548779	0.473219	1.4	1.8
95	0.629506	0.546053	0.466080	0.420862	0.533920	0.579138	133	458	0.600057	0.520729	1.2	1.7
96	0.689596	0.601340	0.496012	0.451466	0.503988	0.548534	71	265	0.655427	0.572672	1.1	1.5
97	0.755423	0.662224	0.526209	0.482914	0.473791	0.517086	36	145	0.714757	0.629220	1.0	1.4
98	0.827533	0.729273	0.556203	0.514859	0.443797	0.485141	17	75	0.777571	0.690370	0.8	1.3
99	0.906526	0.803110	0.585357	0.546821	0.414643	0.453179	8	36	0.842818	0.755794	0.7	1.2
100	0.993060	0.884423	0.612790	0.578131	0.387210	0.421869	3	17	0.571619	0.824593	0.8	1.1

Source: Derived by Author

Appendix 3

Link Function

This is the function that links the random and systematic components together through the relation $\eta = g(m)$

The link function must be monotone increasing such that its inverse exists. This is because through this inverse we can get

$$m = g^{-1}(\eta)$$

Principal types of link functions:

(1) Identity $\eta = \pi$

(2) Logit $\eta = \log(\pi/(1-\pi))$

(3) Probit $\eta = \Phi^{-1}(\pi)$

(4) Complementary log-log $\eta = \log(-\log(1-\pi))$

(5) Log $\eta = \log(\pi)$

(6) Inverse $\eta = 1/\pi$

Where π denotes the mean-value parameter of the distribution.

For example in the case of binomial distribution, there are three link functions can be used within the statistical package which will be used. These link functions are logit, probit and c log-log.

The next table shows the principal distributions of the exponential family and their what so called natural or canonical link functions

Distribution	Link function
Normal	Identity
Binomial	Logit
Poisson	Log
Gamma	Inverse

So, now we can say that Y has a likelihood function and its general form is as follows

$$l(y,\theta) = [\prod_{i=1}^{n}(s(y_i)t(\theta))]\exp[\sum_{i=1}^{n}a(y_i)b(\theta)]$$

with mean $m = E(Y)$ and link function $\eta = g(m)$, where $\eta = X\beta$.

Tests of graduation:

It was mentioned in that testing and checking the fitted model is the last stage before deciding which one of the fitted models is the best. It was shown also that there are two criteria through which we can judge the fitted model. These two criteria are smoothness and adherence to data.

Smoothness Measurement

The main assumption the graduation process is based on is that there is a belief that the true underlying mortality rates progress smoothly throughout the whole age range. Therefore, the smoothness of the fitted model's curve should be examined. The criterion used to test the smoothness of a curve is that the third order difference is small. Mathematically, this criterion can be written as follows

$$\sum_{x} |\Delta^3 q_x| \to 0 .$$

However, as it was mentioned earlier, the curve of graduated rates using a parametric formula is in general smooth especially if the polynomials are of low degrees. Therefore, this measurement will be applied mainly to examine the smoothness of the non-parametric fitted curves.

Tests of Adherence to Data

The best fitted model is the model that gives fitted values as close as possible to the original data (without ignoring the smoothness). There are many statistical tests can be carried out to test the goodness of fit of each model. Six of these tests will be considered here. These tests are chi-square test, individual standardised deviations test, cumulative deviations test, sign test, grouping of signs test and serial correlation test. According to the statistical traditions, the null and alternative hypotheses that will be examined should be determined first. The null hypothesis H_0: 'The true underlying mortality rates at each age for the experience were the graduated ones'. The alternative hypothesis H_1: 'The null hypothesis is not true'.

[1] Chi - Square test

In the statistical literature, the actual number of deaths is approximately normally distributed provided that the expected number of deaths is large enough (in practice greater than 5). So,

$$A_x \sim N(R_x \hat{q}_x, R_x \hat{q}_x (1-\hat{q}_x)).$$

Therefore, the statistic χ^2 has a Chi Square distribution with degrees of freedom n-k where

$$\chi^2 = \sum_x \frac{(A_x - R_x \hat{q}_x)^2}{R_x \hat{q}_x (1 - \hat{q}_x)},$$

where n is the number of ages or groups of ages and k is the number of parameters in the parametric case or the number of lost degrees of freedom in the non-parametric case. Then the calculated value of χ^2 statistic will be compared with the equivalent theoretical value of the Chi square distribution at degrees of freedom n-k and level of significance 0.05. If the statistic's value is greater than the theoretical value, then the null hypothesis will be rejected. Although the chi-square test is an important test, it has some deficiencies because it may not pick up the following

(1) A few large deviations counterbalanced by large small deviations;

(2) A large positive or negative cumulative deviations over some or whole of the age range;

(3) An imbalance between positive and negative deviations;

(4) An excessive clumping of deviations of the same sign.

[2] Individual standardised deviations test

The standardised deviations can be defined as follows

$$z_x = \frac{A_x - R_x \hat{q}_x}{(R_x \hat{q}_x (1 - \hat{q}_x))^{1/2}}.$$

As it was shown in the chi-square test, the actual number of deaths is approximately normally distributed. Then, the standardised deviation given by z_x has a standard normal distribution.

i.e. $z_x \sim N(0,1)$.

Therefore, the idea behind this test is to compare the structure of the actual standardised deviations with the structure of expected standardised deviations under the standard normal distribution.

This can be done by comparing the actual number of standardised deviations lies into each of the following intervals with the expected number of standardised deviations lies within the same intervals

- n * 0.02
- n * 0.14
- n * 0.34
+ n * 0.34
+ n * 0.14
+ n * 0.02
+ n * 0.00

Where n is the number of ages

If the two structures of the actual and expected standardised deviations are similar then, the actual standardised deviations are normally distributed and the null hypothesis is accepted.

[3] Cumulative deviations test

It is known that A_x is approximately normally distributed with mean $R_x \hat{q}_x$ and variance $R_x \hat{q}_x(1-\hat{q}_x)$. Then,

$$\sum_{x=x_1}^{x_2}(A_x - R_x \hat{q}_x) \sim N\left(0, \sum_{x=x_1}^{x_2} R_x \hat{q}_x(1-\hat{q}_x)\right).$$

This leads to that the following statistic has a standard normal distribution

$$\frac{\sum_{x=x_1}^{x_2}(A_x - R_x \hat{q}_x)}{\left(\sum_{x=x_1}^{x_2} R_x \hat{q}_x(1-\hat{q}_x)\right)^{1/2}} \sim N(0, 1).$$

This statistic can be calculated for a specific age range or for the whole age range. This test is two tailed so, if the absolute value of that statistic is greater than the theoretical value of standard normal distribution at a level of significance 0.025 then, the null hypothesis will be rejected.

[4] The Sign test

It would be expected that about half of the graduated rates would be above the curve of the crude rates and the other half to be below it. Therefore, if the number of positive deviations is denoted by n_1 then,

$n_1 \sim$ Bin (n, ½), with probability function of the form $\binom{n}{n_1}(1/2)^n$,

where n is the total number of deviations.

If n is large enough (over 20) then,

$n_1 \sim N(n/2, n/4)$. Then $z(n_1) = \dfrac{(n_1 \pm 1/2) - (n/2)}{(n/4)^{1/2}} \sim N(0, 1)$,

where $(n_1 \pm ½)$ denotes the number of positive deviations after the continuity correction. Again, this test is two tailed so, if the absolute value of $z(n_1)$ is greater than the theoretical value of standard normal at 0.025 level of significance then, the null hypothesis will be rejected.

[5] Grouping of signs test

This test is concerned with the number of runs of deviations of the same sign. Under this test, the number of the positive runs is compared with that expected number of runs if the positive and negative deviations signs are randomly arranged. Under the assumption of random arranging, the number of runs of positive signs (denoted by g) is hypergeometrically distributed with a probability function of the form

$$\Pr(G = g) = \frac{\binom{n_1 - 1}{g - 1}\binom{n_n + 1}{g}}{\binom{n}{n_1}}$$

with mean and variance of the form

$$E(g) = \frac{n_1(n_2 + 1)}{n_1 + n_2}, \quad \mathrm{Var}(g) = \frac{(n_1 n_2)^2}{(n_1 + n_2)^3},$$

where n_2 is the number of the negative deviations signs.

The statistic $z(g) = \dfrac{g - E(g)}{(\mathrm{Var}(g))^{1/2}}$ is approximately normally distributed. This test is one tailed so, if the value of the statistic z(g) is less than minus the theoretical value of the standard normal distribution at 0.05 level of significance then the null hypothesis will be rejected.

[6] Serial correlation test

If the graduated rates are not overgraduated or undergraduated then, it would be expected that the standardised deviations at successive ages will behave as if they are independent. Let r_1 denotes the correlation coefficient between any two successive standardised deviations which is defined as follows

$$r_1 = \frac{\frac{1}{n-1}\sum_x (z_x - \bar{z})(z_{x+1} - \bar{z})}{\frac{1}{n}\sum_x (z_x - \bar{z})^2}, \text{ where } \qquad \bar{z} = \frac{1}{n}\sum_x z_x .$$

If n is large enough then, $z(r_1) = \dfrac{r_1 - 0}{(\frac{1}{n})^{1/2}} \qquad \sim N(0, 1).$

This test is right hand tailed so, if the value of $z(r_1)$ is greater than the standard normal value at 0.05 level of significance then the null hypothesis will be rejected.

The Graduatrion Statistical Results of Fitting the Whittaker Model For Males and Females:

Whittaker model with df = 12 for Males

Chi-square test	39.7
Cumulative test	-0.0000368
Sign test	-0.9613
Grouping test	1.651
Serial Correlation test	-2.033
Smoothness test	0.000683

Individual standardised deviations test:

interval	actual	expected
-inf - -3	0	0
-3 - -2	0	1
-2 - -1	12	10
-1 - 0	27	23
0 - 1	19	23
1 - 2	8	10
2 - 3	3	1
3 - inf	0	0
	69	69

Whittaker model with df = 13 for Females

Chi-square test	41.96
Cumulative test	-0.0000014
Sign test	-0.415
Grouping test	1.5127
Serial Correlation test	-2.438
Smoothness test	0.000841

Individual standardised deviations test:

interval	actual	expected
-inf - -3	0	0
-3 - -2	0	1
-2 - -1	12	10
-1 - 0	24	23
0 - 1	24	23
1 - 2	8	10
2 - 3	2	1
3 - inf	0	0
	69	69

Table 4.1.A : Male Crude Central Death Rate 1948-1996

Year	Totals	Age Groups																
		0 - 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75+
1948	0.022735	0.217545	0.043231	0.004050	0.003629	0.004742	0.005402	0.006972	0.007996	0.008946	0.012617	0.014956	0.020024	0.027682	0.034797	0.052680	0.076415	0.236129
1949	0.022072	0.206067	0.047638	0.003711	0.003226	0.004247	0.005279	0.006511	0.007595	0.008227	0.012311	0.012755	0.020437	0.016524	0.031356	0.037687	0.076083	0.234997
1950	0.020439	0.209213	0.039890	0.003612	0.003195	0.004053	0.004919	0.005866	0.006513	0.006995	0.009920	0.010034	0.017995	0.013087	0.028134	0.035003	0.074560	0.240941
1951	0.020582	0.208895	0.044710	0.003455	0.002736	0.003643	0.004390	0.005228	0.005991	0.006651	0.009075	0.009239	0.016805	0.012954	0.026664	0.034140	0.073094	0.236820
1952	0.018887	0.207547	0.037452	0.002929	0.002383	0.003179	0.003918	0.004819	0.005343	0.005913	0.008180	0.008822	0.015791	0.013160	0.025181	0.033807	0.067919	0.213318
1953	0.020346	0.219539	0.047540	0.003083	0.002178	0.002867	0.003568	0.004318	0.004886	0.005234	0.007506	0.008430	0.015225	0.013029	0.024177	0.035539	0.066654	0.213076
1954	0.018536	0.207617	0.037076	0.002819	0.002032	0.002658	0.003197	0.004155	0.004714	0.005438	0.007644	0.008424	0.015110	0.012500	0.024797	0.034541	0.065976	0.218252
1955	0.018166	0.191754	0.042489	0.002783	0.001883	0.002459	0.002970	0.004057	0.003701	0.004912	0.006718	0.007668	0.013365	0.012011	0.022462	0.033217	0.059592	0.202705
1956	0.017003	0.177073	0.030565	0.004010	0.001906	0.002407	0.003331	0.004007	0.004146	0.005196	0.007118	0.008297	0.014672	0.013756	0.025139	0.037896	0.066760	0.226955
1957	0.018468	0.171099	0.040663	0.004286	0.001917	0.002449	0.003126	0.003811	0.004244	0.005338	0.006836	0.008359	0.015211	0.014410	0.024844	0.040560	0.071365	0.245762
1958	0.017057	0.184584	0.028865	0.004005	0.001792	0.002288	0.002921	0.003561	0.003966	0.004989	0.006388	0.007811	0.014214	0.013466	0.023216	0.037902	0.066687	0.264666
1959	0.016911	0.161794	0.032897	0.002307	0.001940	0.002300	0.002834	0.003568	0.004208	0.005373	0.006712	0.008531	0.015272	0.016069	0.026363	0.045404	0.071516	0.245559
1960	0.017573	0.160922	0.037920	0.002449	0.002061	0.002306	0.002697	0.003423	0.004060	0.004994	0.006569	0.008461	0.015122	0.016824	0.027422	0.048097	0.071654	0.245545
1961	0.016491	0.168933	0.031014	0.002080	0.001885	0.002254	0.002776	0.003595	0.003782	0.004791	0.006031	0.007958	0.013793	0.016332	0.025202	0.049177	0.069785	0.241123
1962	0.018093	0.198291	0.039608	0.002370	0.002021	0.002077	0.002567	0.003231	0.004115	0.004690	0.006475	0.008785	0.014510	0.020011	0.028589	0.047008	0.063422	0.206581
1963	0.015931	0.189664	0.027819	0.002038	0.001914	0.002138	0.002572	0.003234	0.004066	0.004496	0.006143	0.008370	0.014317	0.019307	0.028306	0.047229	0.060555	0.201069
1964	0.016008	0.189318	0.031589	0.002247	0.001905	0.002063	0.002379	0.003039	0.003598	0.004238	0.006158	0.007993	0.013557	0.019283	0.027690	0.045629	0.058757	0.191764
1965	0.014261	0.186748	0.023423	0.001779	0.001785	0.002003	0.002391	0.002818	0.003554	0.004516	0.005770	0.008072	0.012716	0.019858	0.024934	0.049499	0.051397	0.162971
1966	0.015693	0.210079	0.029863	0.002056	0.001801	0.002118	0.002516	0.002858	0.003643	0.004825	0.006327	0.009131	0.013488	0.022400	0.026962	0.056010	0.054948	0.167720
1967	0.014556	0.189987	0.023627	0.002016	0.001891	0.002208	0.002606	0.003152	0.003817	0.003909	0.006382	0.009425	0.013671	0.022210	0.027340	0.059318	0.056896	0.156971
1968	0.016301	0.211907	0.032488	0.002375	0.001974	0.002369	0.002707	0.002978	0.003811	0.004982	0.006529	0.009685	0.013876	0.023114	0.028732	0.060446	0.060454	0.154555
1969	0.014923	0.193482	0.023761	0.002304	0.001952	0.002392	0.002964	0.003119	0.003902	0.005022	0.006643	0.010598	0.014212	0.024574	0.030483	0.064824	0.065136	0.155638
1970	0.015565	0.183860	0.026955	0.002464	0.002052	0.002519	0.002940	0.003122	0.004090	0.005387	0.007212	0.010816	0.015455	0.025493	0.033665	0.065547	0.081908	0.170243
1971	0.013606	0.167103	0.020931	0.002386	0.002030	0.002404	0.002894	0.002948	0.003751	0.004973	0.006755	0.009996	0.014759	0.022502	0.029716	0.056216	0.075271	0.150505
1972	0.014868	0.187356	0.024484	0.002486	0.001976	0.002340	0.002835	0.002926	0.003736	0.004806	0.006808	0.010342	0.015510	0.023640	0.032360	0.062992	0.087059	0.168526

Source: Derived by Author

Table 4.1.A : Male Crude Central Death Rate 1948-1996

Year	Totals	Age Groups																
		0 - 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75+
1973	0.013627	0.171442	0.019250	0.002372	0.001867	0.002167	0.002951	0.003010	0.003540	0.004659	0.006355	0.010320	0.015348	0.022767	0.031697	0.060944	0.085178	0.169324
1974	0.013259	0.181529	0.018591	0.002184	0.001922	0.002079	0.002837	0.003104	0.003414	0.004577	0.006168	0.009869	0.015042	0.021385	0.030350	0.055735	0.081509	0.156538
1975	0.012869	0.167765	0.018163	0.002358	0.001993	0.002071	0.002944	0.003212	0.003360	0.004476	0.005679	0.009906	0.014664	0.022785	0.029600	0.057254	0.072054	0.164723
1976	0.012512	0.172473	0.015588	0.002105	0.001855	0.001980	0.002702	0.003194	0.003196	0.004562	0.005780	0.009817	0.014945	0.023067	0.029708	0.058297	0.073747	0.165014
1977	0.012615	0.162532	0.016290	0.002222	0.001958	0.002074	0.002794	0.003367	0.003362	0.004435	0.005619	0.009972	0.014798	0.023276	0.028360	0.057727	0.072071	0.167023
1978	0.011408	0.135756	0.011564	0.001974	0.001763	0.001974	0.002552	0.003230	0.003298	0.004150	0.005576	0.009627	0.015079	0.023383	0.028533	0.056739	0.069993	0.160819
1979	0.011467	0.141675	0.014459	0.002249	0.001726	0.001939	0.002302	0.002931	0.003133	0.003657	0.004983	0.008745	0.013803	0.021946	0.026947	0.052862	0.063352	0.142841
1980	0.010725	0.126912	0.009901	0.001830	0.001518	0.001898	0.002153	0.002880	0.002964	0.003487	0.005012	0.008476	0.014002	0.022129	0.027987	0.052376	0.064342	0.156722
1981	0.010620	0.109791	0.009748	0.001779	0.001457	0.001867	0.002201	0.002719	0.003026	0.003363	0.005002	0.008163	0.014684	0.022416	0.031002	0.053714	0.070277	0.162784
1982	0.010463	0.102293	0.011437	0.001962	0.001413	0.001786	0.002112	0.002488	0.002964	0.003367	0.004942	0.008140	0.014002	0.021003	0.030287	0.048776	0.064685	0.156674
1983	0.010230	0.090410	0.008681	0.001877	0.001392	0.001724	0.002073	0.002456	0.002949	0.003339	0.004768	0.008134	0.014961	0.022245	0.031487	0.054866	0.068968	0.171531
1984	0.010016	0.087090	0.008836	0.001677	0.001312	0.001552	0.001927	0.002269	0.002724	0.003205	0.004761	0.007661	0.014466	0.022838	0.031427	0.052051	0.065664	0.167417
1985	0.010018	0.068171	0.008053	0.001800	0.001315	0.001624	0.002121	0.002457	0.003088	0.003695	0.005137	0.008370	0.015057	0.026421	0.031460	0.063247	0.068054	0.180672
1986	0.009763	0.061123	0.006647	0.001680	0.001253	0.001466	0.001855	0.002405	0.002648	0.003350	0.004770	0.008207	0.016585	0.025390	0.034555	0.062677	0.068781	0.195373
1987	0.009729	0.062100	0.006536	0.001714	0.001253	0.001398	0.001750	0.002226	0.002678	0.003400	0.004978	0.007762	0.015855	0.025416	0.034336	0.063391	0.070784	0.192323
1988	0.008637	0.052797	0.005893	0.001541	0.001131	0.001370	0.001630	0.002108	0.002464	0.003315	0.004710	0.007078	0.012802	0.020892	0.032392	0.054782	0.062030	0.177888
1989	0.008204	0.042731	0.005540	0.001477	0.001126	0.001371	0.001530	0.001998	0.002267	0.003192	0.004635	0.006838	0.012566	0.019961	0.032645	0.056203	0.063160	0.175171
1990	0.007656	0.039182	0.004666	0.001349	0.001040	0.001319	0.001450	0.001977	0.002338	0.003238	0.004763	0.006720	0.012063	0.018653	0.031151	0.050868	0.062675	0.159684
1991	0.007519	0.035747	0.004348	0.001244	0.000987	0.001181	0.001395	0.001807	0.002286	0.003272	0.004652	0.006708	0.012202	0.018405	0.032020	0.050878	0.068306	0.157780
1992	0.007158	0.032264	0.004075	0.001144	0.000914	0.001114	0.001221	0.001644	0.002114	0.002977	0.004646	0.006651	0.011281	0.017805	0.031740	0.049034	0.069683	0.150356
1993	0.006999	0.029562	0.003311	0.001088	0.000875	0.001154	0.001218	0.001519	0.002099	0.002893	0.004698	0.006876	0.010998	0.017556	0.032118	0.049103	0.074485	0.149203
1994	0.007040	0.028853	0.003011	0.001040	0.000883	0.001025	0.001285	0.001556	0.002100	0.002953	0.004831	0.006930	0.011097	0.017789	0.032814	0.048365	0.078883	0.154406
1995	0.006878	0.027254	0.002787	0.000962	0.000854	0.001102	0.001162	0.001426	0.001999	0.002834	0.004550	0.007332	0.010445	0.017580	0.030950	0.049805	0.078749	0.157479
1996	0.006621	0.026435	0.002510	0.000936	0.000839	0.001239	0.001230	0.001391	0.001992	0.002789	0.004588	0.007362	0.010610	0.017218	0.029818	0.046940	0.072463	0.143918

Source: Derived by Author

Table 4.1.B : Female Crude Central Death Rate 1948-1996

Year	Totals	Age Groups															
		0 - 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75+
1948	0.020332	0.192602	0.042293	0.003122	0.002626	0.003115	0.003411	0.003946	0.004769	0.005068	0.007037	0.008321	0.010615	0.019478	0.024103	0.042207	0.056369	0.303835
1949	0.019192	0.184603	0.046937	0.003188	0.002278	0.002883	0.003118	0.003628	0.005537	0.005369	0.008371	0.006821	0.011852	0.007900	0.018217	0.022597	0.049990	0.253787
1950	0.017718	0.187798	0.038169	0.002902	0.002209	0.002630	0.003080	0.003718	0.005283	0.004637	0.007086	0.005200	0.011157	0.006163	0.016464	0.020375	0.047749	0.250458
1951	0.017924	0.188078	0.043568	0.002755	0.001871	0.002364	0.002831	0.003297	0.004776	0.004325	0.006584	0.004937	0.010046	0.006187	0.015391	0.020854	0.045291	0.235950
1952	0.016683	0.189646	0.037143	0.002418	0.001704	0.002093	0.002429	0.003149	0.004412	0.004131	0.005923	0.004635	0.009507	0.006191	0.014647	0.020947	0.044124	0.216877
1953	0.018788	0.209482	0.048563	0.002629	0.001682	0.002014	0.002269	0.002977	0.004098	0.003986	0.005628	0.004519	0.009503	0.005823	0.015010	0.021732	0.045220	0.223955
1954	0.017185	0.197820	0.038156	0.002346	0.001647	0.001924	0.002220	0.002740	0.003998	0.003782	0.005853	0.004389	0.009170	0.006211	0.015149	0.021705	0.046217	0.236112
1955	0.017078	0.185473	0.045076	0.002303	0.001482	0.001756	0.001875	0.002624	0.003233	0.003194	0.004896	0.004223	0.007905	0.006187	0.014376	0.020529	0.041520	0.214598
1956	0.015642	0.171778	0.032657	0.003472	0.001435	0.001759	0.001807	0.002277	0.003337	0.003497	0.004995	0.004252	0.008463	0.006654	0.014935	0.022177	0.045163	0.235874
1957	0.017080	0.169850	0.042956	0.003864	0.001419	0.001729	0.001758	0.002192	0.003302	0.003339	0.004941	0.004057	0.008645	0.006775	0.014628	0.024043	0.047910	0.244924
1958	0.015998	0.159096	0.040237	0.003620	0.001330	0.001620	0.001646	0.002053	0.003093	0.003128	0.004628	0.003800	0.008098	0.006346	0.013702	0.022521	0.044877	0.229414
1959	0.015508	0.159305	0.035023	0.002010	0.001499	0.001719	0.001870	0.002237	0.003097	0.003254	0.004572	0.004292	0.008214	0.007219	0.014875	0.026584	0.046815	0.245405
1960	0.016116	0.162718	0.040734	0.002051	0.001527	0.001824	0.001783	0.002097	0.003045	0.003255	0.004425	0.004323	0.008052	0.007610	0.014695	0.027088	0.045863	0.230571
1961	0.015141	0.174029	0.034071	0.001840	0.001401	0.001665	0.001501	0.001952	0.002759	0.003088	0.004026	0.004000	0.007535	0.007578	0.014111	0.028820	0.044501	0.238804
1962	0.017747	0.222283	0.046548	0.002230	0.001541	0.001574	0.001614	0.002035	0.002859	0.003290	0.003658	0.004284	0.008002	0.008260	0.015851	0.031204	0.046440	0.234226
1963	0.015145	0.216109	0.032384	0.001767	0.001359	0.001512	0.001421	0.001910	0.002778	0.003182	0.003389	0.004216	0.007408	0.008245	0.015170	0.029351	0.046768	0.230108
1964	0.015611	0.225613	0.038490	0.002053	0.001354	0.001469	0.001354	0.001826	0.002586	0.002891	0.003377	0.004052	0.006998	0.008151	0.014914	0.028947	0.044149	0.229150
1965	0.014036	0.228711	0.030631	0.001722	0.001265	0.001449	0.001302	0.001782	0.002415	0.003197	0.002975	0.004044	0.006552	0.008596	0.012892	0.031887	0.040176	0.217020
1966	0.016031	0.275147	0.039647	0.001914	0.001301	0.001546	0.001351	0.001905	0.002474	0.003418	0.002961	0.004539	0.006769	0.009586	0.013676	0.034162	0.043045	0.234057
1967	0.014332	0.240665	0.031076	0.002014	0.001267	0.001504	0.001387	0.001927	0.002443	0.003349	0.003004	0.004482	0.006806	0.009727	0.014358	0.035964	0.043953	0.227309
1968	0.016531	0.270516	0.043718	0.002220	0.001215	0.001613	0.001355	0.001926	0.002418	0.003327	0.003073	0.004643	0.007267	0.010147	0.014861	0.039178	0.044015	0.226485
1969	0.014630	0.236693	0.031270	0.002111	0.001305	0.001643	0.001472	0.001888	0.002380	0.003282	0.002940	0.005030	0.007276	0.010522	0.015864	0.040999	0.047930	0.237072
1970	0.015399	0.220760	0.035761	0.002380	0.001395	0.001703	0.001532	0.001971	0.002483	0.003433	0.003253	0.005166	0.007866	0.011245	0.016174	0.038426	0.060323	0.261030
1971	0.013366	0.197175	0.027870	0.002178	0.001319	0.001579	0.001533	0.001889	0.002209	0.003225	0.002951	0.005061	0.007533	0.010268	0.015257	0.033909	0.053841	0.231518
1972	0.014784	0.219090	0.031909	0.002338	0.001336	0.001668	0.001627	0.001975	0.002175	0.003181	0.003082	0.005047	0.007788	0.011455	0.016538	0.037850	0.060526	0.254364

Source: Derived by Author

Table 4.1.B : Female Crude Central Death Rate 1948-1996

Year	Totals	Age Groups															
		0 - 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75+
1973	0.013096	0.189606	0.024351	0.002051	0.001389	0.001541	0.001582	0.001912	0.002194	0.002897	0.002898	0.004919	0.007582	0.011263	0.016205	0.037207	0.058675	0.247226
1974	0.012790	0.197472	0.023546	0.001869	0.001292	0.001484	0.001598	0.001966	0.002159	0.002812	0.002802	0.004828	0.007645	0.011073	0.015899	0.036459	0.056041	0.223879
1975	0.012125	0.174917	0.022445	0.002034	0.001428	0.001430	0.001554	0.002016	0.001950	0.002814	0.002693	0.004973	0.007090	0.011082	0.015254	0.036899	0.047954	0.223847
1976	0.011731	0.173229	0.019143	0.001719	0.001300	0.001464	0.001541	0.002052	0.002102	0.002828	0.002758	0.005066	0.007281	0.011713	0.015718	0.038803	0.049526	0.226966
1977	0.011690	0.166747	0.019398	0.001947	0.001415	0.001478	0.001623	0.002133	0.002090	0.002767	0.002744	0.005159	0.007417	0.011781	0.016098	0.038502	0.049980	0.212134
1978	0.010067	0.133986	0.012942	0.001565	0.001210	0.001471	0.001581	0.002047	0.001948	0.002722	0.002741	0.005168	0.007405	0.011958	0.015889	0.038087	0.048459	0.201655
1979	0.010911	0.146882	0.017674	0.002013	0.001267	0.001522	0.001441	0.001945	0.002007	0.002691	0.002681	0.005072	0.007502	0.012220	0.016665	0.039176	0.047981	0.186554
1980	0.009890	0.129576	0.011138	0.001607	0.001115	0.001535	0.001452	0.001898	0.002049	0.002638	0.002629	0.004861	0.007647	0.011949	0.017405	0.040597	0.050602	0.196538
1981	0.009964	0.114437	0.011212	0.001482	0.001081	0.001525	0.001478	0.001955	0.002100	0.002613	0.002744	0.005237	0.008046	0.013266	0.018747	0.043565	0.057392	0.209114
1982	0.010005	0.108036	0.013524	0.001809	0.001072	0.001451	0.001445	0.001841	0.002064	0.002625	0.002869	0.005022	0.008025	0.012765	0.018847	0.041450	0.057068	0.195791
1983	0.009686	0.096493	0.009658	0.001652	0.001137	0.001435	0.001518	0.001832	0.002007	0.002665	0.002911	0.005195	0.008755	0.014066	0.019945	0.045548	0.063698	0.212800
1984	0.009446	0.093087	0.010060	0.001497	0.001000	0.001261	0.001444	0.001690	0.001995	0.002578	0.002896	0.004798	0.008354	0.015060	0.019523	0.043749	0.064725	0.197448
1985	0.009338	0.072702	0.009405	0.001486	0.001008	0.001362	0.001550	0.001968	0.002057	0.002898	0.003220	0.005523	0.008607	0.017784	0.019550	0.049808	0.067213	0.215758
1986	0.009115	0.064554	0.007349	0.001471	0.001052	0.001206	0.001418	0.001706	0.001980	0.002677	0.003151	0.005297	0.009851	0.017191	0.022978	0.049978	0.071171	0.231529
1987	0.009156	0.066466	0.007400	0.001431	0.001002	0.001145	0.001352	0.001661	0.001893	0.002804	0.003167	0.005222	0.009779	0.017324	0.022224	0.049637	0.073078	0.226857
1988	0.008294	0.058039	0.006851	0.001366	0.000964	0.001140	0.001308	0.001567	0.001777	0.002589	0.002918	0.004837	0.008102	0.013557	0.021370	0.042817	0.064982	0.210198
1989	0.007861	0.047058	0.006444	0.001356	0.000936	0.001139	0.001261	0.001544	0.001733	0.002491	0.002820	0.004710	0.007872	0.013213	0.021671	0.041809	0.063051	0.206183
1990	0.007255	0.042418	0.005095	0.001193	0.000908	0.001062	0.001161	0.001496	0.001622	0.002478	0.002818	0.004597	0.007549	0.012127	0.021042	0.037467	0.060495	0.191316
1991	0.007003	0.038334	0.004743	0.001029	0.000775	0.000952	0.001101	0.001351	0.001583	0.002425	0.002781	0.004504	0.007416	0.012022	0.021567	0.036980	0.059695	0.186507
1992	0.006708	0.034204	0.004649	0.000998	0.000762	0.000917	0.000992	0.001293	0.001451	0.002097	0.002811	0.004374	0.007218	0.011392	0.020919	0.035602	0.059000	0.178323
1993	0.006452	0.031294	0.003638	0.000892	0.000673	0.000868	0.000897	0.001181	0.001399	0.002112	0.002732	0.004394	0.007302	0.011106	0.021285	0.035331	0.060122	0.172589
1994	0.006266	0.028984	0.003127	0.000922	0.000764	0.000902	0.000905	0.001129	0.001385	0.002121	0.002651	0.004215	0.007289	0.010793	0.020670	0.033809	0.060728	0.166368
1995	0.006074	0.027231	0.002980	0.000776	0.000650	0.000768	0.000775	0.001070	0.001250	0.001901	0.002474	0.004220	0.006732	0.010564	0.019477	0.033457	0.058450	0.167742
1996	0.005907	0.026677	0.002680	0.000755	0.000641	0.000867	0.000831	0.001059	0.001288	0.001926	0.002535	0.004330	0.007020	0.010374	0.020289	0.032130	0.056777	0.152397

Source: Derived by Author

Appendix 4

Table 4.2.1.B.M : Male Projected Central Mortality Rates 1997-2025 (Variant II)

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
0	0.02501	0.02279	0.02079	0.01900	0.01740	0.01596	0.01466	0.01349	0.01243	0.00848	0.00603	0.00447	0.00345
1	0.00374	0.00340	0.00309	0.00281	0.00256	0.00234	0.00215	0.00197	0.00181	0.00121	0.00085	0.00062	0.00048
2	0.00273	0.00251	0.00232	0.00214	0.00198	0.00183	0.00170	0.00158	0.00147	0.00105	0.00077	0.00059	0.00047
3	0.00203	0.00188	0.00175	0.00163	0.00152	0.00142	0.00132	0.00124	0.00116	0.00086	0.00065	0.00051	0.00042
4	0.00156	0.00146	0.00136	0.00128	0.00120	0.00112	0.00105	0.00099	0.00094	0.00071	0.00055	0.00044	0.00037
5	0.00125	0.00118	0.00110	0.00104	0.00098	0.00092	0.00087	0.00082	0.00078	0.00060	0.00047	0.00039	0.00032
6	0.00105	0.00099	0.00093	0.00088	0.00083	0.00079	0.00075	0.00071	0.00067	0.00053	0.00042	0.00035	0.00030
7	0.00092	0.00087	0.00082	0.00078	0.00074	0.00070	0.00067	0.00063	0.00060	0.00048	0.00039	0.00032	0.00028
8	0.00084	0.00080	0.00076	0.00072	0.00068	0.00065	0.00062	0.00059	0.00056	0.00045	0.00037	0.00031	0.00027
9	0.00080	0.00076	0.00072	0.00068	0.00065	0.00062	0.00059	0.00057	0.00054	0.00044	0.00036	0.00031	0.00027
10	0.00078	0.00074	0.00071	0.00067	0.00064	0.00061	0.00059	0.00056	0.00054	0.00044	0.00037	0.00031	0.00027
11	0.00078	0.00075	0.00071	0.00068	0.00065	0.00062	0.00060	0.00057	0.00055	0.00045	0.00038	0.00033	0.00029
12	0.00080	0.00077	0.00073	0.00070	0.00067	0.00064	0.00062	0.00059	0.00057	0.00047	0.00040	0.00035	0.00031
13	0.00083	0.00080	0.00076	0.00073	0.00070	0.00068	0.00065	0.00062	0.00060	0.00050	0.00043	0.00037	0.00033
14	0.00088	0.00084	0.00081	0.00077	0.00074	0.00072	0.00069	0.00066	0.00064	0.00054	0.00046	0.00040	0.00036
15	0.00092	0.00089	0.00085	0.00082	0.00079	0.00076	0.00073	0.00071	0.00068	0.00058	0.00050	0.00044	0.00039
16	0.00097	0.00093	0.00090	0.00087	0.00083	0.00080	0.00078	0.00075	0.00072	0.00062	0.00053	0.00047	0.00042
17	0.00102	0.00098	0.00095	0.00091	0.00088	0.00085	0.00082	0.00079	0.00077	0.00066	0.00057	0.00051	0.00045
18	0.00106	0.00103	0.00099	0.00095	0.00092	0.00089	0.00086	0.00083	0.00081	0.00069	0.00061	0.00054	0.00049
19	0.00110	0.00106	0.00103	0.00099	0.00096	0.00093	0.00090	0.00087	0.00084	0.00073	0.00064	0.00057	0.00052
20	0.00114	0.00110	0.00106	0.00103	0.00099	0.00096	0.00093	0.00090	0.00088	0.00076	0.00067	0.00060	0.00054
21	0.00117	0.00113	0.00109	0.00106	0.00103	0.00099	0.00096	0.00094	0.00091	0.00079	0.00070	0.00063	0.00057
22	0.00120	0.00116	0.00113	0.00109	0.00106	0.00103	0.00100	0.00097	0.00094	0.00082	0.00073	0.00066	0.00060
23	0.00123	0.00120	0.00116	0.00112	0.00109	0.00106	0.00103	0.00100	0.00097	0.00085	0.00076	0.00069	0.00063
24	0.00127	0.00123	0.00120	0.00116	0.00113	0.00110	0.00107	0.00104	0.00101	0.00089	0.00079	0.00072	0.00066
25	0.00132	0.00128	0.00124	0.00121	0.00117	0.00114	0.00111	0.00108	0.00105	0.00093	0.00083	0.00076	0.00070
26	0.00137	0.00133	0.00130	0.00126	0.00123	0.00119	0.00116	0.00113	0.00110	0.00098	0.00088	0.00080	0.00074
27	0.00144	0.00140	0.00136	0.00132	0.00129	0.00125	0.00122	0.00119	0.00116	0.00103	0.00093	0.00085	0.00079
28	0.00151	0.00147	0.00143	0.00140	0.00136	0.00132	0.00129	0.00126	0.00123	0.00110	0.00099	0.00091	0.00084
29	0.00160	0.00156	0.00152	0.00148	0.00144	0.00141	0.00137	0.00134	0.00131	0.00117	0.00106	0.00097	0.00090
30	0.00170	0.00166	0.00162	0.00158	0.00154	0.00150	0.00147	0.00143	0.00140	0.00126	0.00114	0.00105	0.00098
31	0.00182	0.00177	0.00173	0.00168	0.00164	0.00161	0.00157	0.00153	0.00150	0.00135	0.00123	0.00113	0.00106
32	0.00194	0.00189	0.00185	0.00180	0.00176	0.00172	0.00168	0.00165	0.00161	0.00146	0.00133	0.00123	0.00115
33	0.00208	0.00203	0.00198	0.00194	0.00189	0.00185	0.00181	0.00177	0.00174	0.00157	0.00144	0.00133	0.00124
34	0.00223	0.00218	0.00213	0.00208	0.00204	0.00199	0.00195	0.00191	0.00187	0.00170	0.00156	0.00145	0.00135
35	0.00241	0.00235	0.00230	0.00225	0.00220	0.00216	0.00211	0.00207	0.00203	0.00184	0.00170	0.00157	0.00148
36	0.00260	0.00255	0.00249	0.00244	0.00239	0.00234	0.00229	0.00224	0.00220	0.00201	0.00185	0.00172	0.00162
37	0.00283	0.00276	0.00271	0.00265	0.00260	0.00254	0.00249	0.00245	0.00240	0.00219	0.00203	0.00189	0.00178
38	0.00308	0.00302	0.00296	0.00290	0.00284	0.00278	0.00273	0.00268	0.00263	0.00241	0.00223	0.00208	0.00196
39	0.00338	0.00331	0.00324	0.00318	0.00312	0.00306	0.00300	0.00295	0.00289	0.00266	0.00246	0.00230	0.00218
40	0.00371	0.00364	0.00357	0.00350	0.00343	0.00337	0.00331	0.00325	0.00319	0.00294	0.00273	0.00256	0.00242
41	0.00409	0.00401	0.00394	0.00386	0.00379	0.00372	0.00366	0.00359	0.00353	0.00326	0.00303	0.00285	0.00270
42	0.00451	0.00442	0.00434	0.00426	0.00419	0.00411	0.00404	0.00397	0.00391	0.00361	0.00337	0.00317	0.00300
43	0.00496	0.00487	0.00478	0.00469	0.00461	0.00453	0.00446	0.00438	0.00431	0.00399	0.00373	0.00351	0.00334
44	0.00544	0.00534	0.00525	0.00516	0.00507	0.00498	0.00490	0.00482	0.00475	0.00441	0.00412	0.00389	0.00370
45	0.00595	0.00584	0.00574	0.00564	0.00555	0.00546	0.00537	0.00529	0.00521	0.00484	0.00454	0.00429	0.00408
46	0.00648	0.00637	0.00626	0.00616	0.00606	0.00596	0.00587	0.00578	0.00569	0.00530	0.00498	0.00471	0.00449
47	0.00703	0.00692	0.00680	0.00669	0.00659	0.00649	0.00639	0.00629	0.00620	0.00579	0.00544	0.00516	0.00492
48	0.00762	0.00749	0.00738	0.00726	0.00715	0.00704	0.00694	0.00684	0.00674	0.00630	0.00594	0.00563	0.00538
49	0.00824	0.00811	0.00799	0.00786	0.00775	0.00763	0.00752	0.00742	0.00731	0.00685	0.00646	0.00614	0.00588

Source: Derived by Author

Appendix 4

Table 4.2.1.B.M : Male Projected Central Mortality Rates 1997-2025 (Variant II)

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
50	0.00891	0.00878	0.00865	0.00852	0.00839	0.00827	0.00816	0.00805	0.00794	0.00745	0.00704	0.00670	0.00641
51	0.00966	0.00951	0.00937	0.00924	0.00911	0.00898	0.00886	0.00874	0.00863	0.00811	0.00767	0.00731	0.00701
52	0.01049	0.01034	0.01019	0.01005	0.00991	0.00978	0.00965	0.00952	0.00940	0.00885	0.00839	0.00800	0.00769
53	0.01145	0.01129	0.01114	0.01098	0.01084	0.01069	0.01056	0.01042	0.01029	0.00971	0.00921	0.00880	0.00846
54	0.01257	0.01240	0.01223	0.01207	0.01191	0.01176	0.01161	0.01147	0.01133	0.01070	0.01017	0.00973	0.00936
55	0.01387	0.01367	0.01347	0.01328	0.01310	0.01291	0.01274	0.01257	0.01240	0.01163	0.01095	0.01036	0.00984
56	0.01540	0.01518	0.01496	0.01475	0.01455	0.01435	0.01415	0.01396	0.01378	0.01292	0.01217	0.01151	0.01093
57	0.01721	0.01696	0.01672	0.01648	0.01625	0.01603	0.01581	0.01560	0.01539	0.01444	0.01360	0.01286	0.01222
58	0.01931	0.01903	0.01876	0.01850	0.01824	0.01799	0.01774	0.01751	0.01727	0.01620	0.01526	0.01443	0.01371
59	0.02170	0.02139	0.02109	0.02079	0.02050	0.02022	0.01995	0.01968	0.01942	0.01821	0.01715	0.01623	0.01542
60	0.02435	0.02400	0.02366	0.02333	0.02301	0.02269	0.02238	0.02208	0.02179	0.02044	0.01926	0.01822	0.01730
61	0.02718	0.02679	0.02641	0.02604	0.02568	0.02533	0.02499	0.02465	0.02433	0.02282	0.02150	0.02034	0.01932
62	0.03012	0.02969	0.02926	0.02885	0.02845	0.02807	0.02769	0.02732	0.02696	0.02529	0.02383	0.02254	0.02142
63	0.03314	0.03266	0.03220	0.03175	0.03131	0.03088	0.03047	0.03006	0.02966	0.02783	0.02622	0.02481	0.02357
64	0.03626	0.03574	0.03523	0.03474	0.03426	0.03379	0.03334	0.03289	0.03246	0.03046	0.02870	0.02715	0.02580
65	0.03954	0.03897	0.03842	0.03789	0.03736	0.03685	0.03636	0.03587	0.03540	0.03322	0.03131	0.02962	0.02815
66	0.04307	0.04245	0.04186	0.04127	0.04070	0.04015	0.03961	0.03909	0.03857	0.03620	0.03411	0.03228	0.03068
67	0.04694	0.04627	0.04562	0.04498	0.04437	0.04376	0.04318	0.04260	0.04205	0.03946	0.03719	0.03520	0.03345
68	0.05124	0.05051	0.04980	0.04911	0.04843	0.04778	0.04714	0.04651	0.04591	0.04309	0.04061	0.03844	0.03654
69	0.05603	0.05523	0.05446	0.05370	0.05297	0.05225	0.05155	0.05087	0.05021	0.04714	0.04443	0.04206	0.03998
70	0.06133	0.06046	0.05961	0.05879	0.05799	0.05720	0.05644	0.05570	0.05497	0.05161	0.04866	0.04607	0.04379
71	0.06712	0.06617	0.06525	0.06435	0.06348	0.06262	0.06179	0.06098	0.06018	0.05651	0.05329	0.05045	0.04797
72	0.07339	0.07236	0.07135	0.07037	0.06942	0.06848	0.06757	0.06669	0.06582	0.06182	0.05830	0.05520	0.05249
73	0.08017	0.07904	0.07795	0.07688	0.07584	0.07482	0.07383	0.07287	0.07192	0.06756	0.06372	0.06035	0.05738
74	0.08752	0.08629	0.08510	0.08394	0.08280	0.08170	0.08062	0.07957	0.07854	0.07379	0.06961	0.06593	0.06270
75	0.09566	0.09432	0.09302	0.09176	0.09052	0.08932	0.08814	0.08699	0.08588	0.08070	0.07614	0.07212	0.06860
76	0.10436	0.10291	0.10150	0.10012	0.09878	0.09747	0.09619	0.09494	0.09373	0.08809	0.08313	0.07876	0.07493
77	0.11382	0.11225	0.11071	0.10922	0.10776	0.10633	0.10494	0.10359	0.10227	0.09614	0.09074	0.08599	0.08181
78	0.12410	0.12239	0.12072	0.11910	0.11751	0.11596	0.11445	0.11298	0.11155	0.10489	0.09902	0.09385	0.08931
79	0.13525	0.13340	0.13159	0.12982	0.12810	0.12642	0.12478	0.12319	0.12163	0.11439	0.10801	0.10240	0.09746
80	0.14735	0.14534	0.14337	0.14146	0.13959	0.13777	0.13599	0.13426	0.13257	0.12472	0.11779	0.11169	0.10632
81	0.16046	0.15828	0.15615	0.15408	0.15205	0.15008	0.14815	0.14627	0.14444	0.13592	0.12840	0.12178	0.11595
82	0.17466	0.17230	0.17000	0.16775	0.16556	0.16342	0.16133	0.15930	0.15731	0.14808	0.13992	0.13273	0.12641
83	0.19003	0.18748	0.18499	0.18255	0.18018	0.17787	0.17561	0.17340	0.17125	0.16125	0.15241	0.14462	0.13776
84	0.20666	0.20390	0.20120	0.19857	0.19601	0.19350	0.19106	0.18867	0.18634	0.17552	0.16595	0.15750	0.15006
85	0.22462	0.22164	0.21873	0.21589	0.21311	0.21041	0.20776	0.20518	0.20267	0.19096	0.18060	0.17146	0.16340
86	0.24403	0.24081	0.23766	0.23459	0.23160	0.22867	0.22582	0.22303	0.22031	0.20766	0.19646	0.18657	0.17785
87	0.26496	0.26149	0.25810	0.25479	0.25156	0.24840	0.24532	0.24231	0.23937	0.22571	0.21361	0.20291	0.19348
88	0.28754	0.28380	0.28014	0.27657	0.27308	0.26968	0.26636	0.26311	0.25994	0.24519	0.23213	0.22058	0.21039
89	0.31186	0.30783	0.30389	0.30005	0.29629	0.29262	0.28904	0.28554	0.28213	0.26622	0.25213	0.23966	0.22865
90	0.33805	0.33371	0.32947	0.32533	0.32129	0.31734	0.31348	0.30971	0.30603	0.28890	0.27370	0.26025	0.24838
91	0.36623	0.36156	0.35700	0.35255	0.34820	0.34395	0.33979	0.33574	0.33178	0.31333	0.29696	0.28246	0.26965
92	0.39653	0.39151	0.38661	0.38182	0.37714	0.37257	0.36810	0.36374	0.35948	0.33963	0.32200	0.30639	0.29259
93	0.42909	0.42370	0.41843	0.41328	0.40825	0.40334	0.39854	0.39386	0.38928	0.36793	0.34897	0.33216	0.31731
94	0.46406	0.45827	0.45261	0.44708	0.44168	0.43641	0.43125	0.42621	0.42129	0.39835	0.37797	0.35990	0.34391
95	0.50160	0.49538	0.48931	0.48338	0.47758	0.47191	0.46638	0.46097	0.45569	0.43105	0.40914	0.38972	0.37253
96	0.54187	0.53521	0.52869	0.52233	0.51610	0.51003	0.50409	0.49828	0.49261	0.46616	0.44264	0.42177	0.40330
97	0.58508	0.57793	0.57094	0.56411	0.55744	0.55092	0.54455	0.53832	0.53223	0.50385	0.47860	0.45620	0.43637
98	0.63141	0.62374	0.61625	0.60893	0.60177	0.59478	0.58794	0.58127	0.57474	0.54429	0.51721	0.49316	0.47187
99	0.68109	0.67287	0.66483	0.65698	0.64931	0.64181	0.63448	0.62732	0.62033	0.58767	0.55862	0.53282	0.50998
100	0.73434	0.72552	0.71691	0.70850	0.70027	0.69223	0.68438	0.67670	0.66920	0.63419	0.60304	0.57537	0.55087

Source: Derived by Author

Table 4.2.1.B.F : Female Projected Central Mortality Rates 1997-2025(Variant II)

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
0	0.02510	0.02286	0.02085	0.01905	0.01744	0.01599	0.01468	0.01351	0.01244	0.00847	0.00602	0.00445	0.00344
1	0.00443	0.00395	0.00353	0.00316	0.00284	0.00255	0.00230	0.00208	0.00188	0.00117	0.00077	0.00053	0.00039
2	0.00284	0.00258	0.00235	0.00214	0.00196	0.00179	0.00164	0.00151	0.00139	0.00094	0.00066	0.00048	0.00037
3	0.00188	0.00173	0.00159	0.00147	0.00136	0.00125	0.00116	0.00108	0.00100	0.00071	0.00052	0.00040	0.00031
4	0.00134	0.00124	0.00115	0.00107	0.00099	0.00092	0.00086	0.00081	0.00075	0.00055	0.00042	0.00032	0.00026
5	0.00102	0.00095	0.00089	0.00083	0.00077	0.00073	0.00068	0.00064	0.00060	0.00045	0.00035	0.00028	0.00023
6	0.00083	0.00078	0.00073	0.00068	0.00064	0.00061	0.00057	0.00054	0.00051	0.00039	0.00031	0.00025	0.00021
7	0.00072	0.00067	0.00063	0.00060	0.00056	0.00053	0.00050	0.00048	0.00045	0.00035	0.00028	0.00023	0.00020
8	0.00065	0.00061	0.00058	0.00055	0.00052	0.00049	0.00047	0.00044	0.00042	0.00033	0.00027	0.00022	0.00019
9	0.00062	0.00058	0.00055	0.00053	0.00050	0.00048	0.00045	0.00043	0.00041	0.00033	0.00027	0.00023	0.00019
10	0.00061	0.00058	0.00055	0.00052	0.00050	0.00047	0.00045	0.00043	0.00041	0.00033	0.00028	0.00023	0.00020
11	0.00061	0.00058	0.00056	0.00053	0.00051	0.00048	0.00046	0.00044	0.00042	0.00035	0.00029	0.00025	0.00022
12	0.00063	0.00060	0.00057	0.00055	0.00053	0.00050	0.00048	0.00046	0.00045	0.00037	0.00031	0.00027	0.00024
13	0.00066	0.00063	0.00060	0.00058	0.00055	0.00053	0.00051	0.00049	0.00047	0.00039	0.00033	0.00029	0.00026
14	0.00069	0.00066	0.00063	0.00061	0.00058	0.00056	0.00054	0.00052	0.00050	0.00042	0.00036	0.00032	0.00028
15	0.00072	0.00069	0.00067	0.00064	0.00062	0.00059	0.00057	0.00055	0.00053	0.00045	0.00039	0.00034	0.00031
16	0.00075	0.00072	0.00070	0.00067	0.00065	0.00062	0.00060	0.00058	0.00056	0.00048	0.00042	0.00037	0.00033
17	0.00078	0.00075	0.00072	0.00070	0.00067	0.00065	0.00063	0.00061	0.00059	0.00051	0.00044	0.00039	0.00036
18	0.00080	0.00077	0.00074	0.00072	0.00069	0.00067	0.00065	0.00063	0.00061	0.00053	0.00047	0.00042	0.00038
19	0.00081	0.00078	0.00076	0.00073	0.00071	0.00069	0.00067	0.00065	0.00063	0.00055	0.00048	0.00043	0.00040
20	0.00082	0.00079	0.00077	0.00075	0.00072	0.00070	0.00068	0.00066	0.00064	0.00056	0.00050	0.00045	0.00041
21	0.00083	0.00081	0.00078	0.00076	0.00074	0.00072	0.00070	0.00068	0.00066	0.00058	0.00052	0.00047	0.00043
22	0.00085	0.00082	0.00080	0.00078	0.00075	0.00073	0.00071	0.00069	0.00068	0.00060	0.00054	0.00049	0.00045
23	0.00087	0.00084	0.00082	0.00080	0.00078	0.00076	0.00074	0.00072	0.00070	0.00062	0.00056	0.00051	0.00047
24	0.00090	0.00087	0.00085	0.00083	0.00081	0.00079	0.00077	0.00075	0.00073	0.00065	0.00059	0.00054	0.00050
25	0.00093	0.00091	0.00089	0.00086	0.00084	0.00082	0.00080	0.00078	0.00077	0.00069	0.00063	0.00058	0.00054
26	0.00098	0.00095	0.00093	0.00091	0.00088	0.00086	0.00084	0.00083	0.00081	0.00073	0.00067	0.00061	0.00057
27	0.00102	0.00100	0.00097	0.00095	0.00093	0.00091	0.00089	0.00087	0.00085	0.00077	0.00071	0.00065	0.00061
28	0.00107	0.00104	0.00102	0.00100	0.00098	0.00096	0.00094	0.00092	0.00090	0.00082	0.00075	0.00070	0.00066
29	0.00112	0.00109	0.00107	0.00105	0.00103	0.00101	0.00099	0.00097	0.00095	0.00087	0.00080	0.00074	0.00070
30	0.00117	0.00115	0.00113	0.00110	0.00108	0.00106	0.00104	0.00102	0.00100	0.00092	0.00085	0.00079	0.00075
31	0.00124	0.00121	0.00119	0.00117	0.00115	0.00112	0.00110	0.00108	0.00107	0.00098	0.00091	0.00085	0.00081
32	0.00132	0.00129	0.00127	0.00125	0.00122	0.00120	0.00118	0.00116	0.00114	0.00105	0.00098	0.00092	0.00087
33	0.00141	0.00139	0.00136	0.00134	0.00131	0.00129	0.00127	0.00125	0.00123	0.00114	0.00106	0.00100	0.00095
34	0.00152	0.00149	0.00147	0.00144	0.00142	0.00140	0.00137	0.00135	0.00133	0.00124	0.00116	0.00110	0.00104
35	0.00164	0.00161	0.00158	0.00156	0.00153	0.00151	0.00149	0.00147	0.00144	0.00135	0.00127	0.00120	0.00115
36	0.00176	0.00173	0.00171	0.00168	0.00165	0.00163	0.00161	0.00158	0.00156	0.00146	0.00138	0.00131	0.00125
37	0.00188	0.00186	0.00183	0.00180	0.00178	0.00175	0.00173	0.00170	0.00168	0.00158	0.00149	0.00142	0.00136
38	0.00200	0.00198	0.00195	0.00192	0.00189	0.00187	0.00184	0.00182	0.00180	0.00169	0.00160	0.00153	0.00147
39	0.00212	0.00209	0.00206	0.00204	0.00201	0.00198	0.00196	0.00194	0.00191	0.00181	0.00172	0.00164	0.00158
40	0.00225	0.00222	0.00219	0.00216	0.00213	0.00211	0.00208	0.00206	0.00203	0.00193	0.00184	0.00176	0.00170
41	0.00239	0.00236	0.00233	0.00230	0.00227	0.00225	0.00222	0.00220	0.00217	0.00206	0.00197	0.00189	0.00183
42	0.00256	0.00253	0.00250	0.00247	0.00244	0.00242	0.00239	0.00237	0.00234	0.00223	0.00214	0.00206	0.00199
43	0.00277	0.00274	0.00271	0.00268	0.00265	0.00263	0.00260	0.00257	0.00255	0.00243	0.00234	0.00225	0.00219
44	0.00304	0.00300	0.00297	0.00294	0.00291	0.00289	0.00286	0.00283	0.00281	0.00269	0.00258	0.00250	0.00243
45	0.00336	0.00333	0.00329	0.00326	0.00323	0.00320	0.00317	0.00314	0.00312	0.00299	0.00289	0.00279	0.00272
46	0.00374	0.00371	0.00367	0.00364	0.00361	0.00358	0.00355	0.00352	0.00349	0.00336	0.00324	0.00315	0.00307
47	0.00418	0.00415	0.00411	0.00408	0.00404	0.00401	0.00398	0.00395	0.00392	0.00378	0.00366	0.00356	0.00347
48	0.00467	0.00463	0.00460	0.00456	0.00453	0.00449	0.00446	0.00443	0.00440	0.00425	0.00413	0.00402	0.00393
49	0.00520	0.00516	0.00512	0.00509	0.00505	0.00502	0.00498	0.00495	0.00491	0.00476	0.00463	0.00452	0.00443

Source: Derived by Author

Table 4.2.1.B.F : Female Projected Central Mortality Rates 1997-2025(Variant II)

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
50	0.00576	0.00572	0.00568	0.00564	0.00560	0.00557	0.00553	0.00550	0.00546	0.00531	0.00517	0.00506	0.00496
51	0.00632	0.00628	0.00624	0.00620	0.00617	0.00613	0.00609	0.00606	0.00602	0.00586	0.00573	0.00561	0.00551
52	0.00689	0.00685	0.00681	0.00677	0.00673	0.00669	0.00666	0.00662	0.00659	0.00643	0.00629	0.00617	0.00607
53	0.00745	0.00741	0.00737	0.00734	0.00730	0.00726	0.00723	0.00719	0.00716	0.00700	0.00686	0.00674	0.00664
54	0.00805	0.00801	0.00797	0.00794	0.00790	0.00786	0.00783	0.00779	0.00776	0.00761	0.00747	0.00735	0.00725
55	0.00864	0.00851	0.00839	0.00827	0.00816	0.00805	0.00794	0.00783	0.00772	0.00724	0.00682	0.00645	0.00613
56	0.00944	0.00931	0.00917	0.00904	0.00892	0.00879	0.00867	0.00856	0.00844	0.00792	0.00745	0.00705	0.00670
57	0.01045	0.01030	0.01015	0.01001	0.00987	0.00973	0.00960	0.00947	0.00935	0.00876	0.00825	0.00780	0.00741
58	0.01174	0.01157	0.01140	0.01124	0.01108	0.01093	0.01078	0.01064	0.01049	0.00984	0.00927	0.00876	0.00832
59	0.01332	0.01313	0.01294	0.01276	0.01258	0.01241	0.01224	0.01208	0.01192	0.01117	0.01052	0.00995	0.00945
60	0.01521	0.01499	0.01478	0.01457	0.01437	0.01417	0.01398	0.01379	0.01361	0.01276	0.01202	0.01137	0.01080
61	0.01731	0.01706	0.01681	0.01658	0.01635	0.01612	0.01590	0.01569	0.01548	0.01452	0.01367	0.01293	0.01228
62	0.01950	0.01922	0.01894	0.01868	0.01842	0.01816	0.01792	0.01768	0.01744	0.01636	0.01541	0.01458	0.01385
63	0.02175	0.02143	0.02113	0.02083	0.02054	0.02026	0.01998	0.01972	0.01946	0.01825	0.01719	0.01626	0.01545
64	0.02403	0.02369	0.02335	0.02302	0.02270	0.02239	0.02209	0.02179	0.02150	0.02017	0.01900	0.01797	0.01707
65	0.02645	0.02607	0.02570	0.02534	0.02499	0.02465	0.02431	0.02399	0.02367	0.02221	0.02092	0.01979	0.01880
66	0.02918	0.02876	0.02836	0.02796	0.02757	0.02719	0.02683	0.02647	0.02612	0.02450	0.02308	0.02184	0.02075
67	0.03238	0.03192	0.03146	0.03102	0.03059	0.03018	0.02977	0.02937	0.02898	0.02719	0.02562	0.02424	0.02303
68	0.03619	0.03568	0.03517	0.03468	0.03420	0.03373	0.03328	0.03284	0.03240	0.03040	0.02865	0.02711	0.02576
69	0.04067	0.04009	0.03953	0.03898	0.03844	0.03791	0.03740	0.03691	0.03642	0.03418	0.03221	0.03048	0.02896
70	0.04572	0.04507	0.04443	0.04381	0.04321	0.04262	0.04205	0.04149	0.04095	0.03843	0.03622	0.03428	0.03258
71	0.05115	0.05042	0.04972	0.04902	0.04835	0.04770	0.04706	0.04643	0.04583	0.04302	0.04055	0.03838	0.03648
72	0.05677	0.05597	0.05519	0.05442	0.05368	0.05295	0.05224	0.05155	0.05088	0.04777	0.04503	0.04262	0.04052
73	0.06261	0.06173	0.06086	0.06002	0.05920	0.05840	0.05763	0.05687	0.05613	0.05270	0.04968	0.04704	0.04472
74	0.06880	0.06783	0.06688	0.06596	0.06506	0.06419	0.06334	0.06250	0.06169	0.05793	0.05463	0.05172	0.04917
75	0.07539	0.07433	0.07330	0.07229	0.07131	0.07035	0.06942	0.06851	0.06762	0.06351	0.05990	0.05672	0.05393
76	0.08273	0.08158	0.08045	0.07934	0.07827	0.07722	0.07620	0.07521	0.07423	0.06974	0.06578	0.06229	0.05924
77	0.09077	0.08950	0.08827	0.08706	0.08589	0.08474	0.08362	0.08253	0.08147	0.07655	0.07221	0.06840	0.06506
78	0.09955	0.09816	0.09681	0.09550	0.09421	0.09296	0.09174	0.09055	0.08939	0.08400	0.07926	0.07509	0.07143
79	0.10914	0.10763	0.10615	0.10471	0.10331	0.10194	0.10061	0.09931	0.09804	0.09216	0.08697	0.08241	0.07840
80	0.11961	0.11796	0.11635	0.11478	0.11325	0.11176	0.11030	0.10888	0.10749	0.10106	0.09540	0.09041	0.08603
81	0.13103	0.12923	0.12748	0.12576	0.12409	0.12246	0.12088	0.11933	0.11781	0.11080	0.10461	0.09916	0.09437
82	0.14348	0.14152	0.13961	0.13774	0.13592	0.13414	0.13241	0.13072	0.12907	0.12142	0.11466	0.10871	0.10348
83	0.15704	0.15491	0.15282	0.15079	0.14881	0.14687	0.14498	0.14314	0.14135	0.13300	0.12564	0.11914	0.11344
84	0.17180	0.16948	0.16721	0.16500	0.16284	0.16074	0.15868	0.15667	0.15472	0.14563	0.13760	0.13052	0.12430
85	0.18786	0.18533	0.18286	0.18046	0.17811	0.17582	0.17358	0.17140	0.16927	0.15938	0.15064	0.14293	0.13614
86	0.20530	0.20255	0.19988	0.19726	0.19471	0.19222	0.18979	0.18742	0.18510	0.17435	0.16483	0.15644	0.14905
87	0.22424	0.22126	0.21835	0.21551	0.21274	0.21004	0.20740	0.20482	0.20231	0.19062	0.18028	0.17115	0.16311
88	0.24478	0.24155	0.23840	0.23532	0.23231	0.22938	0.22652	0.22372	0.22099	0.20830	0.19707	0.18714	0.17840
89	0.26704	0.26355	0.26013	0.25679	0.25354	0.25036	0.24725	0.24422	0.24126	0.22749	0.21530	0.20452	0.19502
90	0.29116	0.28737	0.28367	0.28006	0.27653	0.27309	0.26972	0.26644	0.26323	0.24831	0.23509	0.22340	0.21308
91	0.31725	0.31315	0.30915	0.30524	0.30142	0.29770	0.29406	0.29050	0.28703	0.27087	0.25654	0.24387	0.23268
92	0.34545	0.34103	0.33670	0.33248	0.32835	0.32432	0.32038	0.31654	0.31278	0.29530	0.27979	0.26606	0.25394
93	0.37593	0.37115	0.36647	0.36191	0.35745	0.35310	0.34884	0.34469	0.34063	0.32172	0.30495	0.29009	0.27696
94	0.40883	0.40367	0.39862	0.39370	0.38888	0.38418	0.37959	0.37510	0.37072	0.35029	0.33216	0.31609	0.30189
95	0.44433	0.43876	0.43332	0.42800	0.42281	0.41774	0.41278	0.40794	0.40321	0.38116	0.36157	0.34421	0.32886
96	0.48260	0.47660	0.47073	0.46500	0.45940	0.45393	0.44859	0.44336	0.43826	0.41447	0.39333	0.37458	0.35800
97	0.52385	0.51738	0.51106	0.50489	0.49885	0.49295	0.48719	0.48156	0.47606	0.45041	0.42760	0.40737	0.38948
98	0.56829	0.56132	0.55451	0.54786	0.54136	0.53501	0.52880	0.52273	0.51681	0.48916	0.46457	0.44276	0.42345
99	0.61614	0.60864	0.60131	0.59414	0.58714	0.58030	0.57362	0.56708	0.56070	0.53091	0.50442	0.48091	0.46009
100	0.66766	0.65959	0.65169	0.64398	0.63644	0.62908	0.62188	0.61484	0.60797	0.57590	0.54736	0.52203	0.49959

Source: Derived by Author

Table 4.2.2.A.M : Male Projected Life Expectancy (Low Mortality)

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
0	65.7	66.0	66.3	66.6	66.8	67.1	67.3	67.5	67.6	68.3	68.7	68.9	69.0
1	66.4	66.6	66.7	66.9	67.0	67.2	67.3	67.4	67.5	68.0	68.3	68.4	68.5
5	63.0	63.2	63.3	63.4	63.5	63.6	63.7	63.8	63.9	64.3	64.5	64.6	64.7
10	58.3	58.5	58.6	58.7	58.8	58.9	59.0	59.0	59.1	59.4	59.7	59.8	59.8
15	53.6	53.7	53.8	53.9	54.0	54.1	54.1	54.2	54.3	54.6	54.8	54.9	54.9
20	48.8	48.9	49.0	49.1	49.2	49.3	49.4	49.4	49.5	49.8	50.0	50.1	50.1
25	44.1	44.2	44.3	44.4	44.4	44.5	44.6	44.7	44.7	45.0	45.2	45.3	45.3
30	39.4	39.5	39.6	39.6	39.7	39.8	39.9	39.9	40.0	40.2	40.4	40.5	40.5
35	34.8	34.8	34.9	35.0	35.1	35.1	35.2	35.2	35.3	35.5	35.7	35.7	35.8
40	30.2	30.3	30.4	30.4	30.5	30.5	30.6	30.6	30.7	30.9	31.0	31.1	31.1
45	25.9	25.9	26.0	26.0	26.1	26.1	26.2	26.2	26.3	26.4	26.5	26.6	26.6
50	21.7	21.7	21.8	21.8	21.9	21.9	21.9	22.0	22.0	22.1	22.2	22.3	22.3
55	17.7	17.8	17.8	17.8	17.9	17.9	17.9	18.0	18.0	18.1	18.1	18.2	18.2
60	14.1	14.2	14.2	14.2	14.2	14.2	14.2	14.3	14.3	14.3	14.4	14.4	14.4
65	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1
70	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
75	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2	6.2
80	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
85	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
90	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
95	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
100	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8

Source: Derived by Author

Table 4.2.2.A.F : Female Projected Life Expectancy (Low Mortality)

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
0	69.5	69.7	70.0	70.2	70.4	70.6	70.8	70.9	71.1	71.6	71.9	72.0	72.1
1	70.2	70.4	70.5	70.6	70.7	70.8	70.9	70.9	71.0	71.3	71.5	71.5	71.6
5	67.0	67.0	67.1	67.2	67.2	67.3	67.3	67.4	67.4	67.6	67.7	67.7	67.8
10	62.2	62.3	62.3	62.4	62.4	62.4	62.5	62.5	62.6	62.7	62.8	62.9	62.9
15	57.4	57.4	57.5	57.5	57.6	57.6	57.6	57.7	57.7	57.8	57.9	58.0	58.0
20	52.6	52.7	52.7	52.7	52.8	52.8	52.8	52.8	52.9	53.0	53.0	53.1	53.1
25	47.8	47.9	47.9	47.9	47.9	48.0	48.0	48.0	48.0	48.1	48.2	48.2	48.2
30	43.1	43.1	43.1	43.1	43.2	43.2	43.2	43.2	43.2	43.3	43.4	43.4	43.4
35	38.3	38.4	38.4	38.4	38.4	38.4	38.4	38.5	38.5	38.5	38.6	38.6	38.6
40	33.7	33.7	33.7	33.7	33.7	33.7	33.8	33.8	33.8	33.8	33.9	33.9	33.9
45	29.1	29.1	29.1	29.1	29.1	29.1	29.1	29.2	29.2	29.2	29.2	29.2	29.3
50	24.6	24.6	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.7	24.8	24.8
55	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.4	20.5	20.5	20.5	20.5
60	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4	16.4
65	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.9
70	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7	9.7
75	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
80	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
85	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
90	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
95	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
100	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

Source: Derived by Author

Table 4.2.2.B.M : Male Projected Life Expectancy (Principle Mortality)

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
0	65.8	66.2	66.6	66.9	67.2	67.6	67.9	68.2	68.4	69.6	70.6	71.4	72.1
1	66.5	66.7	67.0	67.2	67.4	67.7	67.9	68.1	68.3	69.2	70.0	70.7	71.3
5	63.1	63.3	63.5	63.7	63.9	64.1	64.3	64.5	64.6	65.5	66.2	66.8	67.4
10	58.4	58.6	58.8	59.0	59.2	59.3	59.5	59.7	59.8	60.6	61.3	62.0	62.5
15	53.6	53.8	54.0	54.2	54.3	54.5	54.7	54.8	55.0	55.8	56.4	57.1	57.6
20	48.9	49.1	49.2	49.4	49.6	49.7	49.9	50.0	50.2	50.9	51.6	52.2	52.7
25	44.2	44.3	44.5	44.7	44.8	45.0	45.1	45.3	45.4	46.1	46.8	47.4	47.9
30	39.5	39.6	39.8	39.9	40.1	40.2	40.4	40.5	40.7	41.4	42.0	42.6	43.1
35	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	36.0	36.6	37.2	37.8	38.3
40	30.3	30.4	30.6	30.7	30.9	31.0	31.1	31.3	31.4	32.0	32.6	33.1	33.6
45	25.9	26.1	26.2	26.3	26.5	26.6	26.7	26.8	27.0	27.6	28.1	28.6	29.1
50	21.8	21.9	22.0	22.1	22.3	22.4	22.5	22.6	22.7	23.3	23.8	24.3	24.8
55	17.8	17.9	18.1	18.2	18.3	18.4	18.5	18.6	18.7	19.3	19.7	20.2	20.6
60	14.2	14.3	14.4	14.5	14.6	14.7	14.8	14.9	15.0	15.5	16.0	16.4	16.8
65	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.8	11.9	12.3	12.7	13.1	13.4
70	8.5	8.6	8.7	8.7	8.8	8.9	9.0	9.0	9.1	9.5	9.8	10.1	10.5
75	6.3	6.4	6.4	6.5	6.5	6.6	6.7	6.7	6.8	7.1	7.4	7.7	7.9
80	4.5	4.6	4.6	4.7	4.7	4.8	4.8	4.9	4.9	5.2	5.4	5.6	5.8
85	3.2	3.2	3.2	3.3	3.3	3.3	3.4	3.4	3.5	3.6	3.8	4.0	4.2
90	2.1	2.2	2.2	2.2	2.2	2.3	2.3	2.3	2.3	2.5	2.6	2.8	2.9
95	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5	1.6	1.7	1.8	1.9
100	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.1	1.1	1.2

Source: Derived by Author

Table 4.2.2.B.F : Female Projected Life Expectancy (Principle Mortality)

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
0	69.6	69.9	70.3	70.7	71.0	71.3	71.6	71.8	72.1	73.2	74.0	74.7	75.3
1	70.3	70.6	70.8	71.0	71.2	71.4	71.6	71.8	72.0	72.8	73.5	74.1	74.6
5	67.1	67.2	67.4	67.6	67.7	67.9	68.0	68.2	68.3	69.0	69.6	70.2	70.7
10	62.3	62.5	62.6	62.8	62.9	63.1	63.2	63.3	63.5	64.1	64.7	65.3	65.8
15	57.5	57.7	57.8	57.9	58.1	58.2	58.4	58.5	58.6	59.3	59.8	60.4	60.8
20	52.7	52.9	53.0	53.1	53.3	53.4	53.5	53.7	53.8	54.4	55.0	55.5	56.0
25	47.9	48.1	48.2	48.3	48.5	48.6	48.7	48.8	49.0	49.6	50.1	50.6	51.1
30	43.2	43.3	43.4	43.5	43.7	43.8	43.9	44.0	44.2	44.7	45.3	45.8	46.2
35	38.4	38.6	38.7	38.8	38.9	39.0	39.2	39.3	39.4	40.0	40.5	41.0	41.4
40	33.8	33.9	34.0	34.1	34.3	34.4	34.5	34.6	34.7	35.3	35.8	36.2	36.7
45	29.2	29.3	29.4	29.5	29.6	29.8	29.9	30.0	30.1	30.6	31.1	31.6	32.0
50	24.7	24.9	25.0	25.1	25.2	25.3	25.4	25.5	25.6	26.2	26.7	27.1	27.5
55	20.5	20.6	20.8	20.9	21.0	21.1	21.2	21.3	21.4	21.9	22.4	22.9	23.3
60	16.5	16.6	16.7	16.8	16.9	17.0	17.1	17.2	17.3	17.8	18.3	18.7	19.1
65	12.9	13.0	13.1	13.2	13.3	13.4	13.5	13.6	13.7	14.1	14.6	14.9	15.3
70	9.8	9.9	10.0	10.1	10.2	10.2	10.3	10.4	10.5	10.9	11.2	11.6	11.9
75	7.3	7.4	7.4	7.5	7.6	7.6	7.7	7.8	7.8	8.2	8.5	8.8	9.0
80	5.3	5.3	5.4	5.4	5.5	5.5	5.6	5.6	5.7	6.0	6.2	6.4	6.7
85	3.7	3.7	3.7	3.8	3.8	3.9	3.9	3.9	4.0	4.2	4.4	4.6	4.8
90	2.4	2.5	2.5	2.5	2.6	2.6	2.6	2.7	2.7	2.8	3.0	3.1	3.3
95	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.8	1.9	2.0	2.1	2.2
100	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.4

Source: Derived by Author

Table 4.2.2.C.M : Male Projected Life Expectancy (High Mortality)

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
0	65.9	66.4	66.8	67.3	67.8	68.2	68.6	69.0	69.4	71.3	72.9	74.5	76.0
1	66.5	66.9	67.2	67.6	67.9	68.2	68.6	68.9	69.2	70.8	72.3	73.7	75.1
5	63.2	63.5	63.8	64.1	64.4	64.7	65.0	65.3	65.6	67.0	68.4	69.8	71.2
10	58.5	58.8	59.1	59.3	59.6	59.9	60.2	60.5	60.7	62.1	63.5	64.9	66.3
15	53.7	54.0	54.3	54.5	54.8	55.1	55.4	55.6	55.9	57.3	58.6	60.0	61.3
20	49.0	49.2	49.5	49.8	50.0	50.3	50.6	50.8	51.1	52.4	53.8	55.1	56.4
25	44.3	44.5	44.8	45.0	45.3	45.6	45.8	46.1	46.3	47.6	48.9	50.2	51.6
30	39.6	39.8	40.1	40.3	40.6	40.8	41.1	41.3	41.6	42.9	44.1	45.4	46.7
35	34.9	35.2	35.4	35.7	35.9	36.2	36.4	36.6	36.9	38.1	39.4	40.7	41.9
40	30.4	30.6	30.9	31.1	31.3	31.6	31.8	32.1	32.3	33.5	34.7	36.0	37.2
45	26.0	26.3	26.5	26.7	26.9	27.2	27.4	27.6	27.9	29.0	30.2	31.4	32.6
50	21.9	22.1	22.3	22.5	22.7	22.9	23.2	23.4	23.6	24.7	25.8	27.0	28.1
55	17.9	18.1	18.3	18.5	18.7	18.9	19.1	19.3	19.5	20.6	21.6	22.7	23.8
60	14.3	14.5	14.7	14.8	15.0	15.2	15.4	15.6	15.8	16.7	17.7	18.7	19.8
65	11.2	11.4	11.5	11.7	11.8	12.0	12.2	12.3	12.5	13.4	14.2	15.2	16.1
70	8.6	8.7	8.8	9.0	9.1	9.2	9.4	9.5	9.7	10.4	11.2	12.0	12.8
75	6.3	6.4	6.6	6.7	6.8	6.9	7.0	7.1	7.3	7.9	8.5	9.2	9.9
80	4.6	4.6	4.7	4.8	4.9	5.0	5.1	5.2	5.3	5.8	6.3	6.9	7.5
85	3.2	3.2	3.3	3.4	3.5	3.5	3.6	3.7	3.7	4.1	4.5	5.0	5.5
90	2.1	2.2	2.2	2.3	2.3	2.4	2.5	2.5	2.6	2.9	3.2	3.5	3.9
95	1.4	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.7	1.9	2.1	2.4	2.6
100	0.8	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.2	1.3	1.5	1.6

Source: Derived by Author

Table 4.2.2.C.F : Female Projected Life Expectancy (High Mortality)

Age	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
0	69.7	70.2	70.6	71.1	71.5	72.0	72.4	72.8	73.1	74.9	76.5	77.9	79.3
1	70.4	70.8	71.1	71.4	71.8	72.1	72.4	72.7	73.0	74.4	75.8	77.1	78.5
5	67.2	67.4	67.7	68.0	68.2	68.5	68.8	69.1	69.3	70.6	71.9	73.2	74.5
10	62.4	62.7	62.9	63.2	63.4	63.7	64.0	64.2	64.5	65.7	67.0	68.3	69.5
15	57.6	57.9	58.1	58.4	58.6	58.9	59.1	59.4	59.6	60.9	62.1	63.4	64.6
20	52.8	53.1	53.3	53.5	53.8	54.0	54.3	54.5	54.8	56.0	57.2	58.4	59.7
25	48.0	48.3	48.5	48.7	49.0	49.2	49.5	49.7	49.9	51.1	52.4	53.6	54.8
30	43.3	43.5	43.7	44.0	44.2	44.4	44.7	44.9	45.1	46.3	47.5	48.7	49.9
35	38.5	38.8	39.0	39.2	39.5	39.7	39.9	40.2	40.4	41.5	42.7	43.9	45.1
40	33.9	34.1	34.3	34.6	34.8	35.0	35.2	35.5	35.7	36.8	38.0	39.2	40.4
45	29.3	29.5	29.7	29.9	30.2	30.4	30.6	30.8	31.0	32.2	33.3	34.4	35.6
50	24.8	25.0	25.3	25.5	25.7	25.9	26.1	26.3	26.5	27.6	28.7	29.8	30.9
55	20.6	20.8	21.0	21.2	21.4	21.6	21.8	22.0	22.2	23.2	24.3	25.3	26.4
60	16.6	16.8	17.0	17.1	17.3	17.5	17.7	17.9	18.1	19.0	20.0	21.0	22.1
65	13.0	13.2	13.3	13.5	13.7	13.8	14.0	14.2	14.4	15.2	16.1	17.1	18.0
70	9.9	10.0	10.2	10.3	10.5	10.6	10.8	10.9	11.1	11.8	12.6	13.5	14.3
75	7.3	7.5	7.6	7.7	7.8	8.0	8.1	8.2	8.3	9.0	9.7	10.4	11.2
80	5.3	5.4	5.5	5.6	5.7	5.8	5.9	6.0	6.1	6.6	7.2	7.8	8.4
85	3.7	3.8	3.8	3.9	4.0	4.1	4.1	4.2	4.3	4.7	5.2	5.7	6.2
90	2.5	2.5	2.6	2.6	2.7	2.8	2.8	2.9	2.9	3.2	3.6	4.0	4.4
95	1.6	1.6	1.7	1.7	1.7	1.8	1.8	1.9	1.9	2.2	2.4	2.7	3.0
100	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.4	1.5	1.7	1.9

Source: Derived by Author

Appendix 4

Table 4.3.A : Fertility Rates By Mother's Age

Year	Mother's Age							Total
	15-	20-	25-	30-	35-	40-	45-50	
1946	0.05	0.27	0.34	0.29	0.16	0.05	0.01	5.83
1947	0.05	0.28	0.36	0.30	0.17	0.05	0.02	6.17
1948	0.05	0.28	0.35	0.30	0.16	0.05	0.01	6.01
1949	0.05	0.27	0.35	0.29	0.16	0.05	0.01	5.86
1950	0.05	0.27	0.37	0.32	0.16	0.05	0.01	6.23
1951	0.05	0.28	0.38	0.32	0.16	0.05	0.01	6.28
1952	0.05	0.28	0.38	0.33	0.17	0.05	0.01	6.38
1953	0.04	0.27	0.36	0.31	0.16	0.05	0.01	6.01
1954	0.04	0.25	0.36	0.33	0.16	0.05	0.01	6.03
1955	0.04	0.24	0.34	0.32	0.15	0.04	0.01	5.70
1956	0.04	0.23	0.33	0.33	0.16	0.05	0.01	5.79
1957	0.03	0.20	0.31	0.32	0.15	0.05	0.01	5.40
1958	0.03	0.21	0.34	0.34	0.17	0.05	0.01	5.84
1959	0.03	0.22	0.35	0.36	0.18	0.06	0.02	6.10
1960	0.03	0.21	0.35	0.37	0.20	0.06	0.02	6.15
1961	0.03	0.22	0.34	0.38	0.22	0.06	0.02	6.33
1962	0.04	0.23	0.30	0.32	0.20	0.09	0.04	6.07
1963	0.04	0.22	0.32	0.33	0.22	0.10	0.04	6.30
1964	0.03	0.21	0.31	0.33	0.22	0.09	0.04	6.22
1965	0.03	0.20	0.31	0.33	0.22	0.09	0.04	6.16
1966	0.03	0.18	0.30	0.31	0.25	0.11	0.05	6.18
1967	0.03	0.18	0.28	0.29	0.24	0.10	0.06	5.94
1968	0.03	0.17	0.28	0.29	0.24	0.10	0.05	5.84
1969	0.02	0.17	0.27	0.28	0.24	0.10	0.05	5.69
1970	0.03	0.17	0.26	0.27	0.21	0.09	0.05	5.38
1971	0.03	0.17	0.27	0.26	0.21	0.09	0.05	5.37
1972	0.03	0.18	0.26	0.25	0.20	0.09	0.05	5.25
1973	0.03	0.18	0.28	0.26	0.21	0.09	0.05	5.47
1974	0.02	0.18	0.28	0.27	0.21	0.09	0.05	5.49
1975	0.02	0.19	0.31	0.28	0.21	0.09	0.05	5.82
1976	0.02	0.19	0.31	0.27	0.21	0.09	0.05	5.65
1977	0.02	0.19	0.31	0.27	0.20	0.08	0.05	5.59
1978	0.02	0.18	0.31	0.27	0.20	0.08	0.04	5.57
1979	0.02	0.19	0.34	0.30	0.22	0.09	0.05	5.98
1980	0.02	0.19	0.33	0.29	0.21	0.08	0.04	5.82
1981	0.03	0.18	0.32	0.27	0.18	0.07	0.04	5.43
1982	0.03	0.18	0.31	0.26	0.18	0.07	0.04	5.32
1983	0.02	0.18	0.32	0.26	0.18	0.07	0.03	5.35
1984	0.02	0.21	0.32	0.28	0.18	0.08	0.03	5.65
1985	0.02	0.22	0.33	0.28	0.19	0.09	0.04	5.82
1986	0.11	1.07	1.62	1.41	0.89	0.42	0.17	5.68
1987	0.02	0.20	0.32	0.27	0.19	0.08	0.03	5.54
1988	0.02	0.19	0.32	0.27	0.19	0.07	0.03	5.45
1989	0.02	0.18	0.31	0.24	0.16	0.05	0.02	4.87
1990	0.01	0.17	0.29	0.22	0.15	0.05	0.02	4.59
1991	0.01	0.17	0.29	0.20	0.13	0.04	0.02	4.35
1992	0.01	0.15	0.25	0.18	0.12	0.04	0.01	3.85
1993	0.01	0.16	0.26	0.19	0.12	0.04	0.01	3.98
1994	0.01	0.16	0.25	0.19	0.11	0.04	0.01	3.88
1995	0.01	0.16	0.25	0.18	0.11	0.03	0.01	3.76
1996	0.01	0.18	0.24	0.18	0.10	0.03	0.01	3.82

Source: CAPMAS Annual Reports 1946-1996

Table 4.3.B : Projected Age Specific Fertility Rates

Year	Mother's Age							TPFR
	14-	20-	25-	30-	35-	40-	45-50	
1996	0.07	0.92	1.22	0.92	0.49	0.16	0.05	3.82
1997	0.05	0.89	1.31	0.76	0.53	0.18	0.05	3.77
1998	0.05	0.90	1.31	0.74	0.51	0.16	0.04	3.71
1999	0.05	0.91	1.31	0.72	0.48	0.15	0.04	3.66
2000	0.05	0.93	1.30	0.70	0.46	0.14	0.03	3.60
2001	0.04	0.94	1.30	0.67	0.44	0.13	0.03	3.55
2002	0.04	0.95	1.30	0.65	0.41	0.12	0.02	3.50
2003	0.04	0.97	1.29	0.63	0.39	0.11	0.02	3.45
2004	0.04	0.98	1.28	0.60	0.37	0.10	0.02	3.40
2005	0.04	1.00	1.28	0.58	0.35	0.09	0.02	3.35
2006	0.04	1.01	1.27	0.56	0.33	0.08	0.01	3.30
2007	0.04	1.03	1.26	0.54	0.31	0.08	0.01	3.25
2008	0.04	1.04	1.25	0.51	0.29	0.07	0.01	3.21
2009	0.04	1.06	1.23	0.49	0.27	0.06	0.01	3.16
2010	0.04	1.08	1.22	0.47	0.25	0.05	0.01	3.11
2011	0.04	1.09	1.20	0.45	0.23	0.05	0.01	3.07
2012	0.04	1.11	1.19	0.42	0.21	0.04	0.01	3.02
2013	0.04	1.13	1.17	0.40	0.20	0.04	0.00	2.98
2014	0.04	1.14	1.15	0.38	0.18	0.03	0.00	2.94
2015	0.04	1.16	1.13	0.36	0.17	0.03	0.00	2.89
2016	0.04	1.18	1.11	0.34	0.15	0.03	0.00	2.85
2017	0.04	1.20	1.09	0.32	0.14	0.02	0.00	2.81
2018	0.04	1.21	1.07	0.30	0.13	0.02	0.00	2.77
2019	0.04	1.23	1.04	0.28	0.12	0.02	0.00	2.73
2020	0.04	1.24	1.02	0.27	0.11	0.02	0.00	2.69
2021	0.04	1.26	0.99	0.25	0.10	0.01	0.00	2.65
2022	0.04	1.28	0.97	0.23	0.09	0.01	0.00	2.61
2023	0.04	1.29	0.94	0.22	0.08	0.01	0.00	2.57
2024	0.04	1.31	0.91	0.20	0.07	0.01	0.00	2.54
2025	0.04	1.32	0.88	0.19	0.06	0.01	0.00	2.50

Source: Derived by Author

Appendix 4

Table 4.4.A.M :Male Population Projection (Scenario I)

Year	Age Groups																
	0 - 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75+
1996	919000	3380000	3950000	3787000	3219000	2807000	2439000	2102000	1804000	1538000	1297000	1066000	841000	637000	467000	309000	269000
1997	861601	3447878	3985176	3843342	3335898	2871720	2510069	2161497	1856083	1582331	1335223	1101133	871216	657044	476450	320392	262932
1998	870466	3447765	4034310	3876616	3460188	2938589	2582332	2222664	1909711	1628125	1374254	1136638	902549	678912	487371	328952	264730
1999	879317	3444567	4094395	3895768	3581313	3012966	2654020	2285919	1964846	1675397	1414267	1172517	934752	702546	499886	335726	271264
2000	888375	3438856	4160669	3911749	3688040	3099972	2723483	2351706	2021417	1724153	1455427	1208816	967617	727831	514002	341800	280312
2001	897925	3416737	4243188	3934503	3771498	3202551	2790004	2420262	2079355	1774411	1497873	1245621	1000988	754589	529701	348074	290392
2002	908339	3458716	4259077	3970260	3828180	3319392	2854803	2491240	2138691	1826188	1541699	1283054	1034764	782598	546947	355169	300628
2003	919760	3501601	4271320	4019878	3861856	3443585	2921730	2563398	2199677	1879483	1586950	1321267	1068897	811621	565717	363367	310632
2004	931940	3546470	4280006	4080372	3881437	3564621	2996117	2634980	2262726	1934261	1633641	1360426	1103389	841437	585965	372751	320311
2005	944417	3593932	4286012	4147001	3897828	3671317	3083057	2704347	2328280	1990450	1681779	1400690	1138282	871857	607593	383325	329725
2006	956545	3643855	4275833	4229790	3920941	3754838	3185483	2770784	2396572	2047982	1731379	1442192	1173655	902742	630451	395077	339004
2007	967586	3695095	4330111	4246151	3956986	3811684	3302091	2835505	2467259	2106886	1782459	1485021	1209622	933997	654354	407980	348312
2008	976836	3745629	4386083	4258819	4006822	3845606	3426008	2902336	2539107	2167412	1835018	1529219	1246325	965581	679103	422018	357800
2009	983755	3792974	4444599	4267895	4067475	3865471	3546778	2976574	2610377	2229969	1889018	1574801	1283920	997490	704512	437155	367615
2010	988066	3834557	4505836	4274261	4134225	3882140	3653270	3063282	2679441	2294989	1944391	1621772	1322554	1029762	730426	453313	377904
2011	989663	3868166	4569042	4264456	4217072	3905483	3736689	3165373	2745595	2362703	2001067	1670146	1362350	1062467	756725	470380	388808
2012	988833	3892203	4632363	4318912	4233648	3941687	3793549	3281549	2810042	2432768	2059077	1719940	1403393	1095703	783334	488217	400455
2013	986205	3906048	4693101	4375035	4246526	3991608	3827580	3404977	2876576	2503966	2118664	1771151	1445719	1129600	810213	506676	412946
2014	982379	3910236	4748254	4433677	4255809	4052288	3847604	3525263	2950451	2574578	2180226	1823741	1489341	1164294	837362	525619	426343
2015	977926	3906172	4794990	4495012	4262377	4119023	3864432	3631341	3036683	2642998	2244186	1877642	1534262	1199917	864810	544932	440669
2016	973865	3895930	4830998	4558292	4252814	4201785	3887888	3714467	3138158	2708532	2310767	1932786	1580493	1236578	892614	564528	455911
2017	968235	3882312	4854972	4621670	4307297	4218473	3924128	3771178	3253582	2772373	2379629	1989200	1628050	1274349	920858	584352	472024
2018	959505	3865553	4866916	4682452	4363427	4231466	3974008	3805182	3376174	2838269	2449576	2047118	1676924	1313259	949646	604377	488941
2019	949226	3843773	4867958	4737644	4422053	4240865	4034579	3825251	3495620	2911406	2518920	2106926	1727080	1353317	979094	624603	506583
2020	938075	3816070	4860064	4784418	4483351	4247547	4101161	3842132	3600948	2996733	2586089	2169030	1778447	1394521	1009309	645053	524866
2021	926689	3781203	4846315	4820469	4546572	4238150	4183687	3865589	3683487	3097089	2650407	2233640	1830959	1436880	1040379	665771	543710
2022	915490	3740504	4827569	4844492	4609874	4292539	4200380	3901740	3739811	3211181	2713049	2300421	1884640	1480403	1072360	686821	563043
2023	904665	3697237	4802549	4856492	4670571	4348553	4213381	3951430	3773605	3332299	2777692	2368208	1939711	1525079	1105273	708281	582807
2024	894304	3653312	4770923	4857593	4725673	4407037	4222793	4011727	3793572	3450254	2849417	2435362	1996536	1570867	1139121	730236	602958
2025	884586	3610062	4732460	4849757	4772360	4468165	4229491	4077976	3810368	3554214	2933058	2500363	2055495	1617700	1173901	752768	623469

Source: Derived by Author

Appendix 4

Table 4.4.A.F :Female Population Projection (Scenario I)

Year	Age Groups																
	0 - 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75+
1996	876000	3216000	3755000	3600000	3042000	2651000	2312000	2001000	1726000	1481000	1257000	1070000	876000	703000	532000	359000	315000
1997	812831	3281508	3789950	3654206	3157218	2713383	2378462	2056978	1775469	1524201	1295771	1100785	905563	723089	546677	376990	318115
1998	821194	3274002	3838135	3686479	3279518	2777755	2445988	2114424	1826252	1568483	1335184	1131614	935669	744672	562887	391953	328935
1999	829545	3263742	3896500	3705333	3398894	2849180	2512911	2173740	1878340	1613873	1375360	1162544	966098	767678	580734	405007	344896
2000	838090	3251663	3960054	3721194	3504695	2932498	2577666	2235355	1931680	1660410	1416412	1193649	996697	791966	600211	417373	363919
2001	847099	3222387	4040481	3743529	3588501	3030504	2639563	2299509	1986209	1708148	1458436	1225014	1027385	817320	621288	430086	384486
2002	856923	3262228	4048510	3778939	3642959	3145646	2701958	2365861	2042006	1757327	1501185	1263002	1057068	844911	638893	441853	404324
2003	867698	3302887	4052962	3827510	3675530	3267843	2766330	2433270	2099262	1807808	1545002	1301623	1086820	873049	657907	454925	424353
2004	879188	3345385	4054099	3886202	3694701	3387124	2837723	2500076	2158374	1859582	1589916	1340995	1116695	901540	678272	469386	444443
2005	890960	3390304	4053197	3950044	3710866	3492873	2920960	2564722	2219771	1912597	1635962	1381227	1146768	930252	699866	485233	464629
2006	902401	3437523	4035269	4030689	3733466	3576694	3018827	2626523	2283689	1966790	1683197	1422413	1177128	959117	722512	502446	485021
2007	912817	3485967	4086802	4039104	3769087	3631253	3133763	2688816	2349785	2022234	1731841	1464289	1213782	986807	746770	516414	503298
2008	921543	3533729	4139878	4043901	3817816	3663984	3255726	2753074	2416928	2079122	1781769	1507212	1251050	1014610	771575	531651	522118
2009	928071	3578470	4195313	4045354	3876625	3683343	3374779	2824320	2483469	2137849	1832973	1551208	1289047	1042587	796762	548122	541612
2010	932138	3617765	4253279	4044743	3940555	3699690	3480344	2907353	2547862	2198840	1885401	1596314	1327877	1070819	822219	565736	561930
2011	933644	3649527	4313074	4027117	4021240	3722440	3564051	3004947	2609423	2262327	1938992	1642584	1367632	1099394	847895	584349	583225
2012	932861	3672250	4372954	4078791	4029829	3758159	3618594	3119530	2671470	2327963	1993803	1690208	1408023	1133689	872212	603729	600414
2013	930382	3685350	4430376	4131989	4034797	3806934	3651376	3241101	2735470	2394633	2050038	1739086	1449424	1168569	896707	623644	619007
2014	926773	3689333	4482509	4187524	4036419	3865749	3670824	3359767	2806413	2460701	2108086	1789212	1491862	1204141	921437	643970	639082
2015	922571	3685524	4526683	4245571	4035973	3929659	3687262	3464992	2889070	2524634	2168366	1840532	1535370	1240507	946479	664629	660664
2016	918741	3675881	4560718	4305429	4018546	4010269	3710072	3548446	2986193	2585758	2231108	1892987	1580004	1277751	971921	685585	683727
2017	913429	3663050	4583384	4365357	4070239	4018953	3745798	3602857	3100195	2647356	2295952	1946610	1625909	1315530	1002210	704970	704277
2018	905194	3647251	4594685	4422818	4123442	4024018	3794527	3635597	3221125	2710890	2361808	2001622	1673021	1354261	1033035	724612	726298
2019	895497	3626713	4595688	4474986	4178966	4025738	3853249	3655054	3339150	2781304	2427059	2058404	1721332	1393970	1064490	744568	749695
2020	884976	3600584	4588250	4519192	4236985	4025386	3917038	3671510	3443795	2863325	2490193	2117365	1770791	1434693	1096666	764908	774369
2021	874235	3567694	4575282	4553263	4296799	4008094	3997468	3694302	3526785	2959678	2550551	2178727	1821341	1476482	1129638	785705	800220
2022	863670	3529299	4557593	4575968	4356673	4059716	4006167	3729946	3580904	3072751	2611367	2242111	1872983	1519394	1163005	810119	822852
2023	853457	3488478	4533980	4587311	4414070	4112833	4011253	3778526	3613477	3192669	2674095	2306469	1925958	1563439	1197230	834992	846668
2024	843683	3447036	4504131	4588359	4466171	4168254	4012999	3837042	3632848	3309678	2743615	2370217	1980635	1608609	1232339	860405	871607
2025	834515	3406230	4467827	4580963	4510315	4226150	4012677	3900588	3649234	3413396	2824588	2431882	2037407	1654857	1268363	886429	897621

Source: Derived by Author

Appendix 4

Table 4.4.B.M :Male Population Projection (Scenario II)

Year	Age Groups																
	0 - 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75+
1996	919000	3380000	3950000	3787000	3219000	2807000	2439000	2102000	1804000	1538000	1297000	1066000	841000	637000	467000	309000	269000
1997	866798	3447927	3985181	3843345	3335900	2871722	2510071	2161499	1856085	1582334	1335225	1101136	871237	657107	476721	320722	263648
1998	880999	3453020	4034331	3876626	3460198	2938597	2582339	2222672	1909718	1628134	1374264	1136650	902611	679095	488130	329932	266633
1999	895329	3460350	4094450	3895793	3581336	3012986	2654038	2285937	1964865	1675420	1414293	1172546	934874	702906	501304	337656	274797
2000	910015	3470648	4160788	3911799	3688086	3100012	2723520	2351742	2021456	1724199	1455481	1208875	967817	728424	516213	344958	285945
2001	925354	3470143	4243448	3934590	3771577	3202623	2790068	2420325	2079423	1774490	1497967	1245725	1001287	755471	532804	352728	298631
2002	941746	3534467	4264611	3970401	3828304	3319508	2854906	2491341	2138800	1826315	1541849	1283221	1035187	783823	551043	361553	312003
2003	959357	3600443	4287446	4020094	3862040	3443760	2921884	2563551	2199840	1879673	1587176	1321519	1069472	813244	570913	371691	325685
2004	977948	3669198	4312214	4080691	3881694	3564873	2996338	2635199	2262960	1934532	1633965	1360789	1104149	843515	592371	383208	339595
2005	997049	3741400	4339955	4147463	3898175	3671666	3083363	2704648	2328603	1990823	1682224	1401192	1139262	874449	615326	396092	353800
2006	1015980	3816953	4357304	4230480	3921397	3755302	3185896	2771186	2397003	2048480	1731974	1442864	1174897	905910	639632	410317	368433
2007	1033949	3894695	4440074	4252184	3957574	3812281	3302636	2836029	2467821	2107534	1783234	1485900	1211170	937810	665107	425870	383643
2008	1050182	3972507	4525530	4275507	4007572	3846355	3426713	2903004	2539827	2168239	1836007	1530345	1248229	970109	691555	442748	399567
2009	1064061	4047732	4614577	4300720	4068424	3866391	3547673	2977413	2611280	2231006	1890259	1576217	1286233	1002813	718790	460927	416343
2010	1075240	4117553	4707435	4328871	4135420	3883252	3654383	3064323	2680557	2296270	1945923	1623526	1325337	1035963	746659	480340	434115
2011	1083561	4179478	4803355	4346632	4218608	3906814	3738044	3166653	2746953	2364265	2002935	1672290	1365669	1069636	775045	500882	453034
2012	1089297	4231633	4900407	4429640	4240622	3943269	3795168	3283112	2811675	2434653	2061328	1722531	1407317	1103937	803874	522414	473242
2013	1093095	4273179	4995722	4515316	4264240	3993483	3829483	3406867	2878520	2506218	2121348	1774250	1450327	1139003	833114	544787	494865
2014	1095591	4304532	5086041	4604565	4289735	4054501	3849814	3527524	2952749	2577241	2183400	1827413	1494714	1174980	862768	567859	517996
2015	1097402	4327080	5168218	4697607	4318155	4121632	3866975	3634011	3039387	2646119	2247912	1881958	1540490	1212007	892872	591513	542694
2016	1099672	4342986	5239607	4793696	4336212	4204901	3890799	3717576	3141331	2712158	2315109	1937822	1587672	1250204	923491	615658	568979
2017	1100384	4355281	5298607	4890907	4419327	4227162	3927454	3774747	3257296	2776554	2384660	1995036	1636283	1289651	954718	640236	596844
2018	1098062	4364348	5345021	4986376	4505099	4251019	3977802	3809231	3380499	2843062	2455370	2053843	1686321	1330391	986670	665222	626252
2019	1094603	4368474	5379894	5076851	4594432	4276745	4038903	3829803	3500623	2916884	2525550	2114633	1737759	1372439	1019475	690619	657153
2020	1090856	4367221	5405223	5159190	4687545	4305381	4106088	3847219	3606679	3002983	2593631	2177823	1790533	1415807	1053254	716455	689487
2021	1087570	4359858	5424305	5230749	4783694	4323686	4189348	3871259	3689980	3104219	2658936	2243629	1844586	1460513	1088112	742784	723191
2022	1085205	4348401	5438167	5289930	4880959	4406835	4211797	3908058	3747082	3219312	2722642	2311727	1899948	1506579	1124119	769679	758209
2023	1083934	4336792	5445729	5336534	4976480	4492629	4235834	3958474	3781666	3341550	2788443	2380952	1956851	1554005	1161314	797237	794494
2024	1083811	4327261	5447170	5371603	5067012	4581972	4261731	4019581	3802444	3460726	2861446	2449665	2015672	1602764	1199710	825560	832009
2025	1084972	4321245	5442897	5397130	5149417	4675082	4290528	4086733	3820092	3565977	2946521	2516341	2076807	1652799	1239322	854749	870738

Source: Derived by Author

Appendix 4

Table 4.4.B.F :Female Population Projection (Scenario II)

Year	Age Groups																
	0 - 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75+
1996	827095	3155166	3730156	3514018	2941630	2586850	2245401	1943669	1674795	1434778	1219879	1031119	839965	665988	499337	317095	30041060
1997	854011	3207489	3752116	3597704	3039660	2648743	2309641	1998344	1722764	1477168	1251723	1062675	866716	689433	514701	339014	30685658
1998	799041	3273675	3787218	3651982	3154879	2711142	2376094	2054300	1772192	1520304	1290377	1093284	896168	709466	529373	356500	31357551
1999	813800	3271916	3835546	3684340	3277180	2775531	2443613	2111726	1822934	1564520	1329674	1123944	926229	731140	545771	371442	32051454
2000	828557	3272253	3894056	3703289	3396565	2846971	2510532	2171022	1874982	1609847	1369736	1154714	956662	754375	563990	384879	32764189
2001	843533	3275831	3957777	3719249	3502391	2930301	2575291	2232621	1928286	1656322	1410676	1185666	987301	779019	584018	397945	33493684
2002	859019	3267433	4038431	3741686	3586245	3028316	2637200	2296761	1982782	1704003	1452590	1216888	1018050	804852	605823	411606	34238968
2003	875395	3328739	4051571	3777200	3640777	3143464	2699614	2363103	2038551	1753126	1495232	1254684	1047800	832943	624377	424565	34998616
2004	892830	3391532	4066140	3825883	3673445	3265675	2764013	2430510	2095784	1803556	1538946	1293119	1077637	861680	644500	439023	35774065
2005	911112	3456882	4082567	3884705	3692729	3384986	2835436	2497323	2154881	1855286	1583761	1332309	1107617	890850	666132	455062	36565375
2006	929809	3525428	4102283	3948709	3709019	3490787	2918707	2561990	2216269	1908264	1629717	1372367	1137814	920303	689146	472683	37372173
2007	948295	3597087	4110437	4029592	3731753	3574689	3016610	2623825	2280186	1962430	1676869	1413386	1168316	949952	713361	491869	38193449
2008	965833	3670769	4188932	4043096	3767518	3629361	3131587	2686165	2346290	2017856	1725434	1455100	1205080	978468	739278	508060	39025113
2009	981702	3744484	4269901	4057997	3816405	3662231	3253604	2750484	2413455	2074738	1775295	1497869	1242479	1007147	765877	525711	39867362
2010	995325	3815730	4354209	4074731	3875395	3681751	3372735	2821799	2480034	2133471	1826443	1541722	1280627	1036044	792973	544784	40717643
2011	1006378	3881854	4442069	4094732	3939546	3698275	3478406	2904912	2544484	2194481	1878830	1586698	1319630	1065233	820438	565181	41573274
2012	1014712	3940508	4532781	4103182	4020535	3721217	3562255	3002594	2606126	2258002	1932395	1632851	1359580	1094798	848205	586756	42431850
2013	1020583	3989926	4624529	4181829	4034269	3757144	3616976	3117278	2668272	2323688	1987194	1680367	1400195	1130117	874716	609307	43286251
2014	1024600	4029319	4714611	4262939	4049391	3806151	3649968	3238970	2732393	2390429	2043435	1729155	1441845	1166075	901480	632575	44140636
2015	1027358	4059079	4799955	4347376	4066339	3865228	3669651	3357789	2803473	2456592	2101510	1779209	1484560	1202781	928550	656416	44994305
2016	1029439	4080515	4877594	4435353	4086543	3929446	3686346	3463206	2886282	2520649	2161838	1830479	1528375	1240334	955997	680729	45847589
2017	1031920	4095669	4945032	4526172	4095219	4010459	3709434	3546893	2983574	2581929	2224649	1882908	1573346	1278822	983902	705457	46698856
2018	1032909	4107401	5000762	4618021	4173931	4024366	3745461	3601581	3097767	2643712	2289584	1936526	1619629	1317917	1016840	728786	47540905
2019	1031024	4116075	5044600	4708200	4255099	4039655	3794522	3634633	3218922	2707460	2355561	1991562	1667157	1358028	1050415	752485	48376644
2020	1028045	4120077	5077531	4793642	4339584	4056761	3853616	3654434	3337214	2778115	2420970	2048396	1715923	1399183	1084725	776604	49205559
2021	1024772	4118994	5101445	4871383	4427600	4077114	3917832	3671260	3442178	2860404	2484305	2107439	1765880	1441420	1119861	801201	50027828
2022	1021910	4112137	5119454	4938930	4518451	4085967	3998795	3694452	3525538	2957054	2544908	2168915	1816973	1484790	1155903	826344	50844060
2023	1019894	4101409	5132528	4994775	4610326	4164679	4012819	3730528	3580079	3070461	2606011	2232445	1869217	1529381	1192476	855515	51650344
2024	1018890	4090528	5139652	5038735	4700531	4245839	4028224	3779580	3613118	3190761	2669067	2296992	1922845	1575185	1230025	885307	52452277
2025	1018948	4081600	5140994	5071794	4786003	4330308	4045443	3838621	3632990	3308210	2738955	2360982	1978229	1622198	1268579	915805	53250834

Source: Derived by Author

Appendix 4

Table 4.4.C.M :Male Population Projection (Scenario III)

Year	Age Groups																
	0 - 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75+
1996	919000	3380000	3950000	3787000	3219000	2807000	2439000	2102000	1804000	1538000	1297000	1066000	841000	637000	467000	309000	269000
1997	871245	3447977	3985186	3843347	3335903	2871724	2510072	2161501	1856087	1582362	1335290	1101239	871377	657289	476933	320946	264133
1998	890063	3457544	4034352	3876636	3460207	2938605	2582346	2222679	1909726	1628214	1374453	1136954	903028	679635	488758	330599	267934
1999	909182	3473967	4094505	3895819	3581359	3013006	2654056	2285955	1964884	1675569	1414664	1173147	935703	703978	502548	338972	277228
2000	928836	3498165	4160906	3911848	3688131	3100052	2723556	2351778	2021495	1724432	1456088	1209864	969194	730198	518271	347121	289853
2001	949339	3516523	4243706	3934676	3771656	3202694	2790132	2420388	2079491	1774819	1498862	1247190	1003344	758117	535878	355931	304401
2002	971113	3600553	4269416	3970540	3828428	3319622	2855007	2491442	2138908	1826754	1543077	1285247	1038052	787513	555336	365992	320047
2003	994350	3687096	4301416	4020307	3862221	3443933	2922036	2563702	2200002	1880239	1588776	1324189	1073271	818151	576633	377571	336446
2004	1018820	3777328	4340166	4081004	3881946	3565122	2996556	2635415	2263191	1935242	1635974	1364182	1109004	849809	599731	390744	353543
2005	1044049	3871974	4386902	4147914	3898514	3672008	3083664	2704945	2328921	1991699	1684676	1405387	1145292	882303	624544	405511	371433
2006	1069331	3970977	4428423	4231153	3921841	3755755	3186301	2771582	2397428	2049544	1734900	1447937	1182218	915492	650931	421860	390280
2007	1093828	4073169	4536468	4257470	3958145	3812863	3303169	2836542	2468374	2108813	1786669	1491923	1219896	949285	678714	439789	410263
2008	1116701	4176351	4648328	4290018	4008297	3847081	3427400	2903656	2540532	2169759	1839988	1537386	1258473	983641	707698	459309	431556
2009	1137264	4277716	4764966	4329268	4069335	3867277	3548540	2978228	2612161	2232796	1894825	1584342	1298108	1018560	737700	480410	454332
2010	1155109	4374231	4886647	4376463	4136560	3884318	3655456	3065330	2681641	2298364	1951118	1632799	1338955	1054082	768564	503037	478780
2011	1170013	4463153	5012631	4418439	4220069	3908083	3739344	3167887	2748268	2366698	2008803	1682774	1381143	1090282	800170	527093	505097
2012	1182216	4542339	5140930	4526781	4246777	3944768	3796713	3284610	2813248	2437464	2067916	1734293	1424758	1127267	832443	552447	533484
2013	1192383	4610714	5268528	4638927	4279695	3995246	3831288	3408670	2880384	2509447	2128709	1787359	1469844	1165173	865344	578952	564126
2014	1201177	4668548	5391942	4755837	4319293	4056569	3851896	3529669	2954941	2580928	2191588	1841946	1516415	1204148	898877	606466	597185
2015	1209257	4717175	5507742	4877779	4366816	4124054	3869355	3636529	3041953	2650305	2256986	1897991	1564484	1244337	933077	634869	632788
2016	1217880	4758812	5612960	5004014	4409135	4207777	3893504	3720490	3144325	2716881	2325135	1955435	1614067	1285863	968009	664068	671033
2017	1224587	4796692	5705695	5132559	4517655	4234840	3930521	3778071	3260779	2781853	2395706	2014315	1665193	1328807	1003770	694001	711988
2018	1227365	4830941	5785528	5260402	4629974	4268094	3981274	3812975	3384531	2848982	2467504	2074875	1717866	1373212	1040483	724640	755695
2019	1228091	4859021	5853384	5384064	4747050	4308011	4042831	3833981	3505256	2923482	2538836	2137516	1772061	1419097	1078283	755989	802179
2020	1227585	4879608	5911252	5500117	4869151	4355831	4110526	3851852	3611950	3010337	2608125	2202661	1827720	1466473	1117301	788079	851456
2021	1226655	4890945	5962595	5605599	4995540	4398464	4194411	3876382	3695908	3112422	2674684	2270538	1884787	1515361	1157650	820966	903539
2022	1225847	4894526	6008201	5698605	5124237	4507118	4221793	3913718	3753671	3228471	2739697	2340826	1943299	1565791	1199409	854736	958447
2023	1225417	4894397	6046192	5778716	5252234	4619566	4255349	3964728	3788914	3351769	2806872	2412353	2003496	1617769	1242619	889494	1016205
2024	1225499	4892989	6075905	5846854	5376057	4736767	4295551	4026492	3810355	3472086	2881351	2483464	2065766	1671273	1287300	925361	1076853
2025	1226349	4892051	6096837	5905002	5492284	4858987	4343634	4094369	3828687	3578520	2968051	2552611	2130524	1726251	1333470	962452	1140446

Source: Derived by Author

Appendix 4

Table 4.4.C.F :Female Population Projection (Scenario III)

Year	Age Groups																
	0 - 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 - 44	45 - 49	50 - 54	55 - 59	60 - 64	65 - 69	70 - 74	75+
1996	827095	3155166	3730156	3514018	2941630	2586850	2245401	1943669	1674795	1434778	1219879	1031119	839965	665988	499337	317095	30041060
1997	854048	3207504	3752119	3597706	3039661	2648745	2309642	1998344	1722765	1477217	1251807	1062812	866810	689569	514873	339211	30691663
1998	803234	3273767	3787232	3651989	3154886	2711147	2376098	2054304	1772195	1520442	1290624	1093688	896462	709868	529883	357098	31375423
1999	822347	3276255	3835581	3684358	3277196	2775543	2443623	2111735	1822943	1564777	1330157	1124740	926843	731933	546782	372639	32087222
2000	841647	3285198	3894133	3703325	3396597	2846995	2510553	2171041	1875001	1610246	1370524	1156015	957729	755678	565662	386865	32824144
2001	861358	3301918	3957927	3719312	3502447	2930344	2575327	2232654	1928318	1656877	1411833	1187578	988965	780947	586512	400900	33584420
2002	881778	3311346	4038730	3741786	3586334	3028387	2637259	2296815	1982834	1704722	1454177	1219506	1020464	807513	609300	415711	34367398
2003	903308	3391284	4056177	3777351	3640909	3143572	2699703	2363185	2038630	1754020	1497302	1258121	1051104	836483	628983	429996	35171974
2004	926136	3473523	4079413	3826103	3673630	3265832	2764141	2430627	2095899	1804636	1541542	1297469	1081972	866240	650388	445970	35999934
2005	950056	3559182	4109056	3885018	3692979	3385206	2835614	2497486	2155039	1856564	1586920	1337663	1113111	896583	673449	463723	36851669
2006	974632	3648948	4146720	3949151	3709345	3491083	2918946	2562209	2216482	1909753	1633466	1378809	1144589	927368	698038	483265	37727111
2007	999210	3742775	4177707	4030247	3732171	3575075	3016927	2624112	2280466	1964143	1681231	1421000	1176484	958514	723967	504587	38625507
2008	1023006	3839567	4280077	4048107	3768045	3629850	3131999	2686532	2346650	2019810	1730438	1463964	1214799	988702	751823	523070	39542866
2009	1045239	3937257	4385985	4071721	3817064	3662835	3254130	2750946	2413910	2076951	1780965	1508052	1253867	1019204	780537	543215	40479580
2010	1065262	4033200	4496346	4101713	3876216	3682482	3373395	2822374	2480600	2135961	1832808	1553285	1293797	1050067	809932	564983	41433161
2011	1082693	4124540	4611417	4139698	3940568	3699149	3479218	2905618	2545177	2197268	1885917	1599693	1334694	1081356	839882	588276	42400938
2012	1097320	4208690	4730505	4171011	4021848	3722252	3563236	3003455	2606964	2261109	1940233	1647327	1376647	1113143	870320	612942	43380487
2013	1109368	4283631	4851740	4273578	4040000	3758363	3618138	3118322	2669274	2327143	1995821	1696386	1419370	1150935	899722	638940	44364338
2014	1119461	4348350	4972279	4379675	4063892	3807581	3651324	3240227	2733578	2394257	2052886	1746771	1463224	1189514	929554	665887	45356957
2015	1128222	4403103	5088839	4490216	4094147	3866904	3671213	3359285	2804868	2460819	2111820	1798478	1508232	1228983	959858	693640	46357729
2016	1136273	4449148	5198184	4605460	4132380	3931413	3688131	3464964	2887918	2525298	2173048	1851458	1554426	1269443	990694	722095	47367179
2017	1144797	4488579	5297518	4724715	4163954	4012813	3711464	3548931	2985487	2587020	2236804	1905654	1601855	1310981	1022133	751193	48383467
2018	1151487	4524447	5385048	4846112	4266641	4031212	3747765	3603908	3100000	2649273	2302738	1961114	1650691	1353271	1059023	779176	49398293
2019	1154449	4556873	5460383	4966813	4372855	4055337	3797135	3637258	3221516	2713518	2369761	2018057	1700859	1396709	1096744	807745	50414167
2020	1155450	4583465	5524397	5083537	4483510	4085812	3856579	3657369	3340206	2784710	2436253	2076869	1752356	1441319	1135395	836939	51429838
2021	1155263	4602976	5578969	5193050	4598861	4124248	3921195	3674523	3445596	2867593	2500699	2137969	1805136	1487132	1175070	866809	52444810
2022	1154649	4613750	5627371	5292558	4718221	4156043	4002664	3698070	3529400	2964909	2562433	2201588	1859145	1534199	1215850	897417	53459111
2023	1154126	4617195	5670349	5380268	4839721	4258801	4021270	3734539	3584386	3079072	2624707	2267368	1914409	1582636	1257372	932731	54467745
2024	1153937	4617130	5706134	5455787	4960528	4365084	4045593	3784029	3617872	3200212	2688978	2334246	1971163	1632418	1300065	968941	55476369
2025	1154210	4615850	5734102	5519988	5077363	4475804	4076254	3843557	3638201	3318566	2760159	2400627	2029786	1683543	1343954	1006135	56485641

Source: Derived by Author

Appendix 4

Life Tables

Age	Table A49-52	a55 49-52		A24-29		ELT11	
	Male	Male	Female	Male	Female	Male	Female
0	0.00111			0 07186	0 05455	0 03266	0 0251
1	0 00111			0 0153	0 01345	0 00241	0 00213
2	0 00111			0 00657	0 00603	0 00141	0 00118
3	0 00111			0.00441	0 00497	0 00102	0 00086
4	0.00111			0 00359	0 00336	0 00084	0 00066
5	0.00111			0 00313	0 00298	0.00081	0 00058
6	0 00111			0 00259	0 00233	0 00075	0.00053
7	0.00111			0 00218	0 00192	0 00063	0 00044
8	0 00111			0 00185	0 00162	0 00058	0.0004
9	0 00111			0 00166	0 00143	0 00055	0 00037
10	0.00111	0.00118	0.00117	0 00159	0 00134	0.00052	0 00035
11	0 00111	0 0012	0 00118	0 00166	0 00133	0 00052	0 00035
12	0 00111	0.00123	0 00119	0 00176	0 0014	0 00052	0 00037
13	0.00112	0 00124	0.0012	0 00186	0 00152	0 00056	0 0004
14	0.00112	0 00126	0 00121	0 00196	0 0017	0 00064	0 00045
15	0.00112	0 00128	0.00123	0 00206	0 00191	0 00073	0 0005
16	0 00113	0 00129	0 00124	0 00216	0.00215	0 00082	0.00058
17	0.00113	0 00131	0 00126	0 00225	0 00235	0 00091	0 00064
18	0 00114	0 00133	0.00128	0 00231	0 0025	0.00106	0 00072
19	0.00115	0.00136	0 0013	0 00234	0 0026	0 0012	0.00076
20	0 00116	0 00139	0 00132	0 00235	0 00268	0 00129	0 00083
21	0 00118	0 00143	0 00135	0 00235	0 00275	0 00135	0.00087
22	0 0012	0.00148	0 00138	0 00235	0 00282	0 00136	0 00093
23	0 00123	0 00153	0.00142	0 00235	0 00288	0.00137	0 00095
24	0.00127	0 0016	0 00147	0 00235	0 00293	0 00139	0 001
25	0 00132	0 00168	0 00153	0 00235	0.00298	0 00141	0 00106
26	0.00139	0 00177	0 00158	0.00235	0 00301	0 00143	0 0011
27	0.00147	0 00187	0 00165	0 00235	0 00306	0 00146	0 00116
28	0.00158	0 002	0 00173	0 00236	0 00311	0 00149	0 00119
29	0 00171	0 00214	0.00182	0.00238	0 00315	0.00152	0 00123
30	0.00188	0 0023	0 00191	0 00241	0 00319	0 00157	0 00127
31	0 00208	0 00249	0 00203	0 00246	0.00325	0 00162	0 00132
32	0 00231	0.00269	0 00216	0 00253	0.00332	0.00169	0.00138
33	0 00259	0 00292	0 00229	0 00262	0 00341	0 00177	0.00145
34	0.00292	0 00319	0 00245	0 00273	0 00352	0 00186	0 00153
35	0 0033	0 00349	0.00261	0.00286	0 00364	0 00197	0 00162
36	0 00372	0 00381	0 0028	0 0032	0 00377	0 0021	0 00172
37	0 0042	0.00417	0 00302	0 0032	0 00392	0 00226	0 00183
38	0.00474	0 00455	0 00324	0 00341	0 00407	0 00244	0 00196
39	0 00534	0 005	0 00348	0.00364	0 00423	0 00265	0 00211
40	0.00599	0 00547	0 00376	0 00388	0 0044	0 0029	0 00227
41	0 00671	0 006	0.00405	0.00413	0 00461	0 00318	0 00246
42	0 0075	0 00659	0 00437	0 00439	0 00486	0 00352	0 00266
43	0.00837	0.00724	0 00472	0 0046	0 00515	0 00391	0 00289
44	0 00931	0.00793	0 0051	0 00495	0 00548	0 00435	0 00314
45	0 01035	0 0087	0.00553	0 00527	0 00584	0 00486	0 00341
46	0.01148	0 00955	0 006	0 00563	0 00624	0 00543	0 00371
47	0.01272	0 0105	0 00653	0.00604	0 00668	0 00607	0 00404
48	0 01408	0 01155	0.00713	0 00651	0 00714	0.0068	0 00441
49	0.01557	0 01272	0 00779	0 00704	0 00763	0 0076	0 00481
50	0.0172	0 01402	0.00855	0 00764	0 00816	0 0085	0 00524
51	0.01899	0 01546	0 00939	0.00831	0 00875	0 00949	0 00571
52	0 02096	0 01706	0 01032	0 00906	0 00942	0 01059	0 00623
53	0 02312	0 01883	0 01137	0.0099	0.01013	0 0118	0.0068
54	0.02549	0 0208	0 01254	0 01084	0.0109	0 01311	0 00741
55	0 0281	0 02297	0 01385	0.0119	0 01174	0 01455	0 00809
56	0 03095	0 02538	0 01531	0 01311	0 01269	0.01611	0 00884
57	0 03409	0 02803	0 01695	0 0145	0 013377	0 01779	0 00966
58	0.03753	0.03096	0 01877	0 01608	0 01497	0.01962	0 01057
59	0 0413	0 0342	0 0208	0 01783	0 01627	0 02157	0 01158
60	0 04543	0.03776	0 02307	0 01973	0 0177	0 02369	0 01271
61	0 04995	0 0417	0.02559	0 02176	0 0193	0.02595	0 01397
62	0 05489	0 04602	0 02839	0 02394	0 0211	0 02839	0 01538
63	0 06028	0 05075	0 03151	0 02631	0 02307	0 03101	0 01696
64	0 06616	0 05595	0 03498	0 02893	0 0252	0 03384	0 01873
65	0 07257	0 06164	0 03881	0 03188	0 02755	0 03689	0 02074
66	0.07953	0 06786	0 04306	0.03524	0 03019	0 04019	0 023
67	0 08709	0.07463	0 04776	0 03903	0 03321	0 04375	0 02555
68	0 09528	0 08199	0 05295	0 04338	0 0366	0 04764	0 02843
69	0.10414	0.08998	0.05866	0 04812	0 04035	0 05188	0 03167
70	0 11369	0.09861	0 06495	0 05327	0 04451	0 05651	0 03532
71	0.12397	0 10795	0 07184	0 05881	0 04916	0 06157	0 03945
72	0.135	0.11798	0 07938	0 06473	0 05435	0 06714	0 04406
73	0.14681	0.12874	0 0876	0 07104	0 06024	0 07325	0 04923
74	0 15942	0 14023	0 09656	0 07777	0 06686	0 07998	0 055
75	0 17282	0.15246	0 10628	0.08497	0 07414	0 08738	0 06143
76	0 18704	0 16541	0 11678	0 09268	0 08197	0 09551	0 06856
77	0.20205	0.1791	0 12808	0.10093	0 09025	0 10442	0 07641
78	0 21785	0 19346	0 14021	0 10974	0 09903	0 11416	0 08503
79	0 2344	0 20849	0.15316	0 11913	0 10848	0.12478	0 09444
80	0 25168	0 22413	0 16694	0 1291	0 11858	0 13629	0.10466
81	0 26963	0 24032	0 18151	0 13962	0 12931	0 14871	0 11567
82	0.28819	0 25699	0.19684	0 15066	0.14065	0 16204	0 12746
83	0.3073	0 27405	0 21289	0 16221	0 15275	0 17623	0 14
84	0 32688	0 29143	0 2296	0.17425	0 16571	0 19124	0 15323
85	0 34683	0 30903	0 24688	0 18676	0 17942	0 20699	0 16705
86	0 36706	0 32673	0 26465	0 19973	0 19373	0 22337	0 1814
87	0.38747	0 34445	0 2828	0 21315	0.20844	0 24027	0 19614
88	0.40795	0 36209	0 30124	0 22702	0 22178	0 25753	0 21116
89	0 4284	0 37952	0 31983	0 24134	0 23583	0 27501	0 22631
90		0.39668	0 33846	0 25611	0 25061	0 29255	0 24146
91		0 414	0 357	0 27133	0 26615	0 30997	0 25647
92		0 432	0 376	0 287	0 28247	0.32712	0 27121
93		0.45	0 396	0 30312	0 29956	0 34384	0 28554
94		0 469	0.417	0.31969	0 31746	0.36002	0.29937
95				0 33676	0 33612	0 37552	0 31259
96				0 35427	0.35559	0 39025	0 32512
97				0 37232	0 37585	0 40416	0 33692
98				0 39086	0 39086	0 41716	0 34795
99				0 41204	0 41661	0 42927	0 35819
100				0 4324	0 44107	0 44045	0 36764
101				0 45626	0 4641	0 45072	0 3763
102				0 48033	0 48764	0.46011	0 3842
103				0 49379	0 51003	0 46864	0 39138
104				0 51786	0.53764	0.47636	0 39787
105				0 55093	0 56223		0 40372
106				0 59794	0 60772		0 40896
107							0 41365
108							0 41783
109							0 42155

Source.Institute of Actuaries

Appendix 4

1. The Logarithmic Method

This method assumes that the death rate for a given age x, (m_x), declines exponentially into the future at a constant rate and the curve representing mortality with time is[1]:

$$m_{x,t} = \alpha_x . \beta_x^t \qquad (5.11)$$

where; $m_{x,t}$ is the mortality rate in time period t,

α_x is the initial level of mortality,

β_x is the annual rate of decline of the mortality rate.

This leads to the linear extrapolation formula:

$$Ln(m_{x,t}) = \ln(\alpha_x) + \ln(\beta_x).t \qquad (5.12)$$

The parameters α_x and β_x can be fitted using, for example, least squares over the longest possible justified period to give future rates. This method is simple to apply but the difficulty lies in selecting the period over which linearity is to be identified for extension into the future. This simplicity may lead to insensible projected rates. It may also lead to an implausible profile of mortality rates by age in the long term, as in practice the logarithmic decrement of m_x does not remain the same for indefinite periods of time but tends to change. Some subjectivity is required in assessing the period of base data and in setting variants. It may ignore the relationship between the rates at different ages and this may result in not smooth progression of future rates.

2. The Logit Method[2]

This method assumes linearity between the transformed logit curves, which is then projected forward, as it was noted that there was a certain similarity about the shape of the logit progression with age, at different periods of observation (Brass, 1969). The logit function of a proportion p, which can take a value between 0 and 1, is defined as:

$$\text{Logit}(p) = 0.5\ \text{Ln}(p/[1-p]) \qquad (5.13)$$

---

[1] Benjamin et. el. (1993) tested these methods by comparing actual experience of England and Wales over 1961-1981 with projections based on data up to 1960. They indicate that the most successful method was the logarithmic method. However, the GAD (2001) concludes that the method does not appear suited to producing mortality rates for UK population.

[2] The logit is one of a number of transformations of curves that are widely used to convert a finite range of numbers into an infinite range such that they are almost a collection of lines.

The logit method uses the function $1-l_x$, taking $l_0 = 1$ i.e. the proportion who have died to age x is then defined as:

$$\text{Logit}\,(1-l_x) = 0.5\,\text{Ln}\,[(1-l_x)/\,l_x]) \qquad (5.14)$$

Regression can then be used to express each transformed l(x) curve in terms of that for a base year and the l(x) curves can be imagined to progress over time (or year of birth) in a fairly steady manner which gives a family of transformed curves. These curves are then assumed to relate to one another with a linear relationship. Hence, if $Y_{x,t}$ is the curve for future year t, α and β are found such that:

$$Y_{x,t} = \alpha_t + \beta_t \times Y_{x,T} \qquad (5.15)$$

for some base year T. α_t and β_t are projected as linear trends to give future life tables and hence future mortality rates.

The method is simple, objective and rates projected can be reasonable. Over short projection horizons the method can be satisfactory (GAD, 2001). The method produces rates of improvement by age, which vary over future time, as opposed to other methods. However, the transformation is effectively a function of the probability of living from age 0 to each age x, which depends on the mortality rates for all ages below x. This means that the logit function is not sensitive to mortality at any particular age. This can cause difficulties in reconstructing q_x values particularly if rates of improvement vary dramatically between ages or are negative[3]. It is difficult to set explicable variants according to this method.

3. Mathematical Curves[4]

There have been many attempts to fit mathematical curves to the age progression of death rates[5] and one of the earliest attempts were those of Gompertz (1825) and Makeham (1862). Parametric methods involve fitting a parameterised curve to data for previous years and then projecting these parameters forward. Heligman and

[3] Benjamin et al.(1993), found that extrapolations for males in England and Wales from 1901 to 1961 data to 1981 produced higher rates of mortality improvement than those observed for most ages and the GAD (2001) found that this still appears to be the case for females but not for males.

[4] This is meant to be a very brief review, which is by no means complete, of some of the mathematical functions that have been used in mortality. The interested reader should refer to Benjamin and Pollard (1980), Forfar, McCutcheon and Wilkie (1988), Benjamin et al. (1993) and many others.

[5] ELTs 11 & 12 were the first ELTs to be graduated by a mathematical formula and ELTs 7- 10 were graduated by King's method and ELTs 13-15 used the method of splines.

Pollard (1980)[6], for example, obtained good results over the whole life span of more than a hundred ages of the UK population data with the following law:

$$q_x / p_x = A^{(x+B)c} + D \exp(-E(\mathrm{Ln}(x / F))^2) + GH^x \qquad (5.16)$$

Other mathematical curves have been used in studies by Forfar and Smith (1987) using data from ELTs and McNown and Rogers (1989) on American mortality data. The method used involves estimating parameters of mathematical functions using curve fitting techniques. Thatcher (1994) fitted values of parameters by the methods of minimum chi-squared and maximum likelihood. There has also been considerable interest in finding a mathematical form to describe the progression of the curve of death (d_x). Benjamin (1982) suggested that if a curve form applicable to successive life tables could be identified, then the progression of the parameters could be extended, as a mean of projection of the curve of deaths. Attempts have been made to find a suitable function for the curve of deaths such as Pearson (1948) and Clark (1986) and at the suggestion of Wilkie (1988) an inverse log-normal is used.

Projections using parameters of functions ensure that future rates at various ages are consistent with each other. However, such methods are not easy to explain, which can make it difficult for others to judge how cautious or aggressive they are (Willets, 1999). It might prove difficult to find a suitable curve that is flexible enough to describe mortality over all ages and also the shape of the curve may not continue to describe mortality satisfactorily in the future. Those curves that might suffice generally have several parameters. Problems can arise in fitting the data to derive initial values for the parameters, and in projecting these values forward which might prove difficult to establish a trend in the parameters. Most of the models are only designed to project the mortality experience at older ages.

4. Lee-Carter Method

Lee and Carter (1992) proposed modelling and projecting mortality rates using stochastic time-series models using a log-linear relationship. Projection using this method involves applying ARIMA time series models by fitting the same age

---

[6] Australia used this model of mortality projection in 1998 national population projection. Belgium, France and Luxembourg use age-specific mathematical functions describing past changes. Italy followed this approach, but extrapolated various parameters using an age-period-cohort model.

dependent model to each of the calendar years and then using time series analysis to model the estimated age dependent parameters.

This method is relatively easy and produces reasonably close expectation of life to actual values[7]. It projects constant rates of improvement for a given age for all future years and produces measures of uncertainty and allows for a range of outcomes to be produced. The parameters in the principal projection could then be altered to produce this range between the high and low expectation of life variants. In this case, the population projections will consist of a large number of simulations and a range of outcomes. However, this is only useful to the extent that the basic underlying model reflects actual experience and is suitable for projecting future mortality rates.

5.5.6. Projection by Reference to Model Life Tables

Various systems have been developed[8] for estimating complete life tables or abridged life tables from limited mortality data and for projecting mortality. A system of model life tables, which it is believed, represents and will continue to represent the mortality of the population of interest, is normally chosen. It may involve several parameters, however a one-parameter system is usually used. The parameter of the system (e.g. expectation of life) is measured in the population at each of several epochs and any trend in the parameter is extrapolated, in many cases by using the logistic method, to provide estimates of the parameter at future epochs (Arriaga, 1984)[9]. Projected age-specific mortality rates are obtained by entering the model life table system for the various projected values of the parameter.

This approach is commonly employed for projecting population mortality of developing countries, when a long series of data is not available. For best results, the standard life table needs to be chosen carefully. Even if the model life table system fits the age-specific mortality pattern of the population reasonably well under current conditions, the extrapolation procedure assumes essentially that the population will

---

[7] The suitability of the method was tested by fitting historical data for England and Wales over 1941-70 and 1961-91 and then projecting over 1971-99. Accurate results were obtained for some ages and not for some others for males and females (GAD, 2001).

[8] Brass, 1971; coale and Demeny, 1966; Ledermann, 1969; Organisation for Economic Co-operation and Development (OECD), 1980; United Nations, 1955 and 1982.

[9] Canada, the Census Bureau of USA in the latest projections (1999-2100) and UN use this approach through some techniques such as linear regression, Brass logit model, and Lee-Carter model. They use standard life tables to calculate age- and sex-specific survival ratios that are consistent with the assumed life-expectancy and national patterns of mortality.

adopt, as times goes by, the mortality already experienced by other more advanced populations. In the case of a one-parameter system, a clear trend in that parameter will usually be evident, but when two or more parameters are available, complications may arise. The method takes no direct account of collateral information which may be available to the forecaster, e.g. trends in population smoking habits, discernible trends in mortality by certain causes, and known reasons for these trends.

5.5.7. The CMI Projection Basis

The CMI mortality projection method for pensioners assumes that mortality rates at a given age decrease exponentially to a limiting value. The speed of convergence depends on age. The limiting mortality rate for a given age is expressed as a percentage of the base rate, which also varies by age. Linear interpolation is used for the intermediate ages. The CMI most recent adopted formula to produce future projected mortality rates (1999), takes the following form:

$$q_{x,t} = q_{x,0} * RF(x, t) \text{ and} \quad (5.17)$$

$$RF(x,t) = \alpha(x) + [1 - \alpha(x)](1-\beta(x))^{t/20} \quad (5.18)$$

where:

$q_{x,t}$ = the rate of mortality for a life attaining exact age x during the base year + t;

$q_{x,0}$ = the rate of mortality in the appropriate base table, corresponding to lives attaining exact age x, on average halfway through the base year;

RF(x,t) = the time reduction factor applicable to a life attaining exact age x during calendar year 1996 + t;

$\alpha(x)$ = limiting mortality rate for age x as a % of the base year rate; and

$\beta(x)$=% of the total reduction in mortality rate for age x occurring in the first 20 years.

This method is easy to use and has a certain similarities in approach to that of the GAD methodology in the use of targets[10] together with a form of exponential interpolation from the current levels to the target level (GAD, 2001). There may be problems in determining the limiting rates of mortality and the method has been used only for people aged 60 and over who receive pension rather than the national population at all ages. Thus, different parameters would be needed to apply the methodology to the national population as a whole.

---

[10] Austria, Germany, Netherlands and Sweden used methodologies based on setting targets which involve considering feasible gains in life expectancy or improvements in age-specific mortality rats of more 'advanced' populations combining these with the most recent national life table.

Appendix 5

Table 5.1.A :Labour Force Construction in Egypt

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Male (,000)	7618.5	7780.5	8178.5	8182.8	8506.2	8645.7	8717 0	8782.1	8944 0	9244.8	9477.2	9561.4	9719.1	10163.8	10220.0	10409.0	10607.0	10813.0	11327.0	11423.8	11553.5	11663.8	12000.2	12718 6	13107.3	13393.0	13685.0
Female (,000)	623.7	625.1	638.1	529.6	569.7	618.4	684 0	712.2	858.5	778.7	857.8	956 5	1001.7	2174.9	2354.6	2509.0	2586.0	3276.0	3782.0	4609.8	4154.3	3626.4	3814.3	3785 4	4011 5	3868 1	3979.0
TOTAL	8242.2	8405.6	8816.6	8712.4	9075.9	9264.1	9401.0	9494.3	9802.5	10023.5	10335.0	10517.9	10720.8	12338.7	12574 6	12918.0	13193.0	14089.0	15109.0	16033.6	15707 8	15290.2	15814.5	16504 0	17118 8	17261.1	17664.0
% Male	92.4	92.6	92.8	93.9	93.7	93 3	92.7	92.5	91.2	92.2	91.7	90.9	90.7	82.4	81.3	80.6	80.4	76.7	75.0	71.2	73 6	76.3	75.9	77.1	76.6	77.6	77.5
%Female	7.6	7.4	7.2	6.1	6.3	6.7	7.3	7.5	8 8	7.8	8.3	9.1	9.3	17.6	18.7	19.4	19 6	23.3	25.0	28.8	26.4	23.7	24.1	22 9	23.4	22.4	22.5
% Labour force of Total population	25 5	25.5	26.2	25.3	25.8	25.8	25.7	25.2	25.4	25.2	25.3	25.1	24 8	27.8	27.6	27.5	27.3	28.6	30.0	31.1	29.8	28.4	28.7	29.2	29.5	29.1	29.8
% Male labour force of male population	46.8	46.8	48.0	47.0	47.8	47.4	46.7	45.8	45.4	45.6	45.5	44 6	44.1	44.8	43 8	43.4	42.9	42 8	44.0	43.4	43.0	42.5	42.8	44.3	44.5	44.3	N/A
% Female labour force of Female population	3 9	3.8	3.8	3.1	3.3	3.5	3.8	3.9	4.5	4 0	4 3	4.7	4.7	10.0	10.6	11.0	11.0	13.6	15.3	18.3	16.1	13.7	14.1	13 7	14.1	13.3	N/A
% Labour force of population aged (15-64)	46.6	46.5	47.7	46.1	47.0	46.9	46.5	45.9	46.2	45.9	46.1	45.7	45.3	50.8	50.4	50.3	50.0	52 0	54.4	56.3	53 9	51.1	51.6	52 5	53.1	51.8	51.8
% Male labour force of male aged (15-64)	85.3	84.9	86.9	84.7	85 8	84 9	83 4	81.8	81.0	81.5	81.3	79.8	78.9	80.3	78.5	77.8	77.1	76.7	78.5	77.2	76.2	75.0	75.3	77.8	76 8	77.6	77.6
% Female labour force of Female aged (15-64)	6.8	6.7	6.7	5.5	5.8	6.2	6.7	6 8	8.0	7.0	7.5	8.2	8.4	17.7	18 6	19.3	19.4	24.0	27.0	32.1	28.2	24.0	24.6	23.8	24 6	23.2	23.2

Source. ILO (Cairo Branch) 1970-1996

Appendix 5

Table 5.1.B :Age Specific Activity Rates

Age	Male			Female			Total		
	1976	1986	1996	1976	1986	1996	1976	1986	1996
6-	20.8	4.9	3.5	9.7	1.3	0.0	15.4	3.1	-
10-	23.6	7.9	4.9	5.3	1.4	0.0	14.9	4.8	-
12-	34.0	34.6	25.3	5.6	6.7	8.7	20.6	18.5	16.8
15-	49.9	41.1	39.4	5.1	7.3	6.7	29.1	25.5	21.0
20-	71.7	69.9	68.4	12.4	20.5	14.1	41.6	52.1	40.2
25-	92.8	85.4	83.8	10.8	17.6	13.3	51.1	55.6	45.5
30-	97.0	96.7	98.1	7.8	14.8	18.3	51.2	55.9	55.7
35-	98.3	97.3	98.4	5.5	9.8	17.4	51.7	53.5	57.4
40-	97.9	95.2	97.3	4.4	8.3	15.0	50.8	51.5	56.7
45-	98.2	94.2	96.1	3.5	6.0	11.1	52.5	49.6	55.4
50-	96.8	96.3	93.6	3.1	4.3	7.9	49.2	45.2	49.9
55-	95.0	98.8	90.8	2.8	3.4	6.0	52.5	47.3	50.5
60-	76.7	78.3	54.4	2.2	2.0	2.0	39.0	33.5	28.5
65-	49.6	42.0	27.0	2.1	1.8	1.3	26.7	18.3	19.8
70-	39.7	23.4	18.4	1.0	0.7	0.9	18.9	11.9	12.2
75+	28.4	15.3	11.2	0.8	0.5	0.6	13.6	8.0	8.1

Source: ILO (Cairo Branch) 1976-1996

Appendix 5

Table 5.2.A :Total Labour Force Participation

Year	Male	Female
1997	76.8	23.5
1998	76.5	23.8
1999	76.2	24.1
2000	75.9	24.4
2001	75.6	24.7
2002	75.3	25.1
2003	75.0	25.4
2004	74.7	25.7
2005	74.4	26.0
2006	74.1	26.3
2007	73.8	26.7
2008	73.5	27.0
2009	73.2	27.3
2010	72.9	27.7
2011	72.6	28.0
2012	72.3	28.4
2013	72.0	28.7
2014	71.7	29.1
2015	71.5	29.5
2016	71.2	29.8
2017	70.9	30.2
2018	70.6	30.6
2019	70.3	31.0
2020	70.0	31.4
2021	69.8	31.8
2022	69.5	32.2
2023	69.2	32.6
2024	68.9	33.0
2025	68.7	33.4

Source: Derived by Author

Table 5.2.B :Projected Total Labour Force Participation

Demographic Scenarios		1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
LFPN (,000) for Male														
Variant I	Scenario I	14223.6	14652.8	15092.1	15535.5	15977.9	16416.3	16850.3	17281.7	17713.4	19936.9	22105.2	24273.6	26466.9
	Scenario II	14223.6	14653.1	15092.6	15536.4	15979.3	16418.3	16853.2	17285.6	17718.5	19951.8	22179.7	24533.2	27059.1
	Scenario III	14224.1	14654.3	15095.0	15540.4	15985.3	16426.7	16864.3	17300.0	17736.4	19993.5	22291.9	24829.6	27676.5
Variant II	Scenario I	14039.1	14405.0	14777.6	15151.0	15520.3	15882.5	16237.3	16586.6	16933.0	18681.2	20302.8	21852.9	23355.7
	Scenario II	14039.1	14405.3	14778.1	15151.9	15521.7	15884.5	16240.1	16590.3	16937.9	18695.1	20371.2	22086.6	23878.2
	Scenario III	14039.5	14406.5	14780.5	15155.8	15527.5	15892.6	16250.8	16604.1	16955.0	18734.2	20474.2	22353.4	24423.1
LFPN (,000) for Female														
Variant I	Scenario I	4098.0	4220.9	4346.2	4472.2	4597.6	4723.5	4847.7	4971.0	5094.0	5730.6	6349.2	6966.2	7591.5
	Scenario II	4098.0	4221.0	4346.5	4472.8	4598.4	4724.5	4849.1	4972.7	5096.1	5735.4	6369.6	7036.3	7750.9
	Scenario III	4098.2	4221.4	4347.1	4473.9	4600.0	4726.8	4852.1	4976.6	5101.0	5746.6	6399.9	7117.0	7919.6
Variant II	Scenario I	4149.5	4327.7	4512.2	4701.5	4894.2	5091.3	5291.0	5493.8	5700.5	6826.6	8051.3	9403.4	10908.3
	Scenario II	4149.6	4327.9	4512.6	4702.1	4895.0	5092.5	5292.5	5495.7	5703.0	6832.3	8077.2	9498.0	11137.3
	Scenario III	4149.7	4328.2	4513.3	4703.2	4896.7	5094.9	5295.8	5500.0	5708.4	6845.6	8115.5	9607.0	11379.8
LFPN (,000) for the Total														
Variant I	Scenario I	18321.6	18873.7	19438.2	20007.7	20575.5	21139.7	21698.0	22252.7	22807.4	25667.5	28454.4	31239.8	34058.4
	Scenario II	18321.7	18874.1	19439.1	20009.1	20577.7	21142.9	21702.3	22258.3	22814.6	25687.2	28549.3	31569.5	34809.9
	Scenario III	18322.2	18875.7	19442.2	20014.2	20585.4	21153.5	21716.5	22276.5	22837.4	25740.1	28691.8	31946.6	35596.1
Variant II	Scenario I	18188.6	18732.7	19289.8	19852.6	20414.5	20973.8	21528.3	22080.3	22633.6	25507.7	28354.0	31256.3	34264.0
	Scenario II	18188.7	18733.1	19290.7	19854.0	20416.7	20977.0	21532.6	22086.0	22640.8	25527.4	28448.4	31584.6	35015.5
	Scenario III	18189.2	18734.7	19293.7	19859.1	20424.3	20987.5	21546.7	22104.0	22663.3	25579.8	28589.8	31960.4	35802.8

Source: Derived by Author

Appendix 5

Table 5.3 :Historical Development of the Number of Employment and Unemployment Over 1970-1996

YEAR	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Employment																											
Male (,000)	7529.5	7714.5	8106.5	8100.8	8362.2	8482.7	8531.0	8572.3	8704.7	8928 2	9106.3	9168.7	9318.4	9581.4	9732.9	9865.5	10037.4	10221.5	10715.4	10808.0	10951.2	10971.7	11232.1	11762.8	12144 0	12395 8	12864.0
Female (,000)	514.7	538.0	575.5	466.5	505.1	548.0	605.0	625 9	743.3	637.1	692.8	777 0	796.2	1944 6	2085.7	2191.5	2171.6	2824 9	3319.3	4117.7	3410.2	2855.1	3166.7	2940.6	3097.4	2948.4	3075.0
TOTAL	8044.2	8252.5	8682.0	8567.3	8867.3	9030.7	9136.0	9198.2	9448 0	9565.3	9799.1	9945.7	10114.6	11526 0	11818 6	12057.0	12209.0	13046.4	14034.7	14925.7	14361.4	13826.8	14398 8	14703 4	15241.4	15344.2	15939.0
Unemployment																											
MEN	89.0	66 0	72.0	82.0	144 0	163.0	186.0	209.8	239.3	316 6	370.9	392.7	400.7	582.4	487.1	543.5	569 6	591.5	611.6	615 8	602.3	692.1	768.1	955 8	963.3	997.2	821.0
WOMEN	109.0	87.1	62.6	63.1	64 6	70.4	79.0	86 3	115.2	141.6	165.0	179 5	205.5	230.3	268.9	317.5	414.4	451.1	462.7	492.1	744.1	771.3	647.6	844 8	914.1	919.7	904.0
TOTAL	198.0	153.1	134 6	145.1	208 6	233 4	265.0	296.1	354.5	458.2	535.9	572.2	606.2	812.7	756.0	861.0	984 0	1042.6	1074.3	1107.9	1346 4	1463.4	1415.7	1800.6	1877.4	1916.9	1725.0
% Male Unemployment of Total Labour Force	1.1	0.8	0.8	0.9	1.6	1.8	2.0	2.2	2 4	3.2	3.6	3.7	3.7	4.7	3.9	4.2	4.3	4.2	4.0	3.8	3.8	4 5	4 9	5.8	5.6	5.8	4.6
% Female Unemployment of Total Labour Force	1.3	1.0	0.7	0.7	0.7	0 8	0.8	0.9	1.2	1.4	1.6	1.7	1.9	1.9	2.1	2.5	3.1	3.2	3 1	3.1	4.7	5.0	4.1	5.1	5.3	5.3	5.1
% Male Unemployment of Total Unemployment	44.9	43.1	53.5	56.5	69.0	69 8	70.2	70.9	67.5	69.1	69.2	68.6	66.1	71.7	64 4	63.1	57.9	56.7	56.9	55.6	44.7	47.3	54.3	53.1	51.3	52.0	47.6
% Female Unemployment of Total Unemployment	55.1	56.9	46.5	43.5	31.0	30 2	29.8	29.1	32.5	30.9	30 8	31.4	33.9	28.3	35 6	36 9	42.1	43.3	43.1	44.4	55.3	52.7	45.7	46.9	48.7	48.0	52.4

Unemployment Between Men and Women

% Male Unemployment of Male Labour Force	1.2	0.8	0.9	1.0	1.7	1.9	2.1	2.4	2.7	3.4	3 9	4.1	4.1	5.7	4.8	5.2	5 4	5.5	5.4	5.4	5.2	5.9	6 4	7.5	7.3	7.4	6.0
% Female Unemployment of Female Labour Force	17.5	13.9	9.8	11.9	11.3	11.4	11.5	12.1	13.4	18.2	19.2	18 8	20.5	10.6	11.4	12.7	16.0	13.8	12.2	10.7	17.9	21.3	17.0	22.3	22.8	23 8	22 7
% TOTAL Unemployment	2.4	1.8	1.5	1.7	2.3	2 5	2.8	3.1	3.6	4.6	5.2	5.4	5.7	6.6	6.0	6.7	7.5	7.4	7.1	6.9	8.6	9.6	9 0	10.9	11.0	11.1	9.8

Source. ILO (Cairo Branch) 1970-1996

Table 5.4.A.M :Projected Number of Male Unemployment Over 1997-2025

YEAR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Low Cost Scenario													
15-19	164.6	161.1	162.8	163.5	165.1	163.4	160.5	159.2	157.7	156.5	157.1	162.8	170.6
20-24	362.8	350.4	350.9	352.5	360.0	363.9	367.7	375.2	380.8	375.1	388.4	393.1	408.5
25-29	243.6	236.5	237.2	237.4	240.0	239.3	238.6	241.6	245.5	272.0	278.7	292.2	295.4
30-34	109.0	105.8	106.2	106.6	108.4	108.8	109.0	110.5	111.7	118.7	136.8	140.9	148.2
35-39	14.9	14.5	14.6	14.6	14.9	14.9	14.9	15.1	15.4	16.5	18.3	21.3	21.8
40-44	6.8	6.6	6.7	6.7	6.8	6.8	6.8	6.9	7.0	7.6	8.5	9.5	11.1
45-49	5.7	5.5	5.6	5.6	5.7	5.7	5.7	5.8	5.9	6.4	7.2	8.1	9.1
50-54	4.6	4.5	4.5	4.5	4.6	4.6	4.6	4.7	4.8	5.2	5.8	6.6	7.5
55-59	3.5	3.4	3.5	3.5	3.6	3.6	3.6	3.7	3.8	4.1	4.6	5.3	6.0
60-65	0.8	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	1.0	1.2	1.4
TOTAL	916.3	889.2	892.7	895.8	909.8	911.8	912.3	923.6	933.4	962.9	1006.5	1041.0	1079.6
Medium Cost Scenario													
15-19	165.5	171.7	177.7	179.3	181.2	182.5	182.0	180.9	180.4	186.4	193.4	209.9	229.2
20-24	404.2	413.7	424.3	428.1	437.5	450.0	461.4	472.3	482.5	495.3	523.4	545.7	590.3
25-29	276.0	283.9	291.7	293.1	296.7	301.1	304.6	309.3	316.4	364.8	381.5	406.4	420.9
30-34	77.8	80.0	82.3	83.0	84.4	86.2	87.6	89.0	90.5	100.4	117.8	122.2	130.5
35-39	8.1	8.4	8.6	8.7	8.8	9.0	9.2	9.3	9.5	10.7	12.0	14.3	15.0
40-44	6.9	7.1	7.3	7.3	7.5	7.6	7.7	7.9	8.1	9.1	10.4	11.8	13.9
45-49	5.7	5.9	6.1	6.1	6.2	6.4	6.5	6.6	6.7	7.6	8.7	10.0	11.3
50-54	4.6	4.7	4.9	4.9	5.0	5.2	5.2	5.3	5.5	6.2	7.1	8.2	9.4
55-59	3.5	3.7	3.8	3.8	3.9	4.0	4.1	4.2	4.3	4.9	5.6	6.6	7.6
60-65	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0	1.1	1.3	1.5	1.7
TOTAL	953.1	979.7	1007.4	1015.2	1032.3	1052.8	1069.3	1085.8	1104.9	1186.3	1261.2	1336.6	1429.8
High Cost Scenario													
15-19	180.8	187.7	198.5	201.2	204.8	207.2	206.9	206.0	205.0	209.8	214.4	232.2	251.4
20-24	441.7	452.4	474.2	480.5	494.4	511.0	524.7	537.8	548.3	557.7	574.0	588.3	631.3
25-29	301.6	310.5	325.9	329.0	335.3	341.9	346.4	352.2	359.5	410.7	418.4	433.1	438.7
30-34	85.0	87.5	91.9	93.1	95.4	97.9	99.6	101.3	102.9	113.1	129.2	130.2	134.5
35-39	8.9	9.2	9.6	9.8	10.0	10.2	10.4	10.6	10.8	12.0	13.2	15.2	15.5
40-44	7.5	7.7	8.1	8.2	8.4	8.7	8.8	9.0	9.2	10.2	11.4	12.6	14.3
45-49	6.3	6.4	6.8	6.9	7.0	7.2	7.4	7.5	7.7	8.6	9.6	10.8	11.7
50-54	5.0	5.2	5.5	5.6	5.7	5.9	6.0	6.1	6.2	7.0	7.8	8.8	9.8
55-59	3.9	4.0	4.2	4.3	4.5	4.6	4.7	4.8	4.9	5.6	6.3	7.1	8.0
60-65	0 8	0.9	0.9	0.9	1.0	1 0	1.0	1.1	1.1	1.3	1.4	1.7	1.9
TOTAL	1041.5	1071.5	1125.7	1139.5	1166 6	1195.7	1215.9	1236.4	1255.6	1336.0	1385.7	1440.0	1517.1

Source: Derived by Author

Table 5.4.B.F :Projected Number of Female unemployment Over 1997-2025

YEAR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Low Cost Scenario													
15-19	66.2	64.9	66.4	66.4	66.3	66.0	64.9	63.9	62.9	61.8	59.8	59.9	62.2
20-24	283.4	273.7	277.4	276.8	278.9	284.0	287.3	291.8	294.7	289.0	289.8	283.6	290.2
25-29	210.0	203.8	206.8	205.7	205.4	206.2	205.6	206.7	208.4	229.9	229.6	233.2	232.6
30-34	168.7	163.6	166.1	165.7	166.2	167.7	167.9	169.1	169.9	178.3	200.6	202.8	210.2
35-39	111.4	108.1	109.9	109.6	109.9	110.8	110.9	111.7	112.5	119.6	128.1	145.8	150.2
40-44	26.5	25.8	26.2	26.1	26.2	26.5	26.5	26.7	26.9	28.6	31.0	33.7	39.1
45-49	6.6	6.4	6.5	6.5	6.5	6.6	6.6	6.6	6.7	7.1	7.7	8.5	9.4
50-54	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3
55-59	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
60-65	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
TOTAL	873.2	846.6	859.8	857.3	859.8	868.1	870.1	876.9	882.4	914.8	947.2	967.9	994.6
Medium Cost Scenario													
15-19	67.0	69.5	72.1	72.8	73.7	74.2	74.0	73.6	73.4	75.9	78.3	84.8	92.6
20-24	285.3	292.0	299.5	302.1	308.6	317.7	326.3	334.6	342.6	353.5	373.2	387.2	417.0
25-29	212.4	218.4	224.4	225.5	228.3	231.8	234.6	238.1	243.4	282.4	297.0	315.9	325.5
30-34	170.6	175.3	180.2	181.6	184.7	188.5	191.6	194.8	198.4	219.1	259.5	274.6	290.4
35-39	112.7	115.9	119.2	120.1	122.1	124.5	126.5	128.7	131.4	146.9	165.6	197.5	207.6
40-44	26.8	27.6	28.4	28.7	29.1	29.7	30.2	30.8	31.4	35.2	40.1	45.6	54.0
45-49	6.6	6.8	7.0	7.1	7.2	7.4	7.5	7.6	7.8	8.8	10.0	11.5	13.0
50-54	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5
55-59	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
60-65	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
TOTAL	881.8	906.1	931.4	938.4	954.3	974.4	991.2	1008.8	1029.0	1122.2	1224.4	1317.9	1400.9
High Cost Scenario													
15-19	65.6	78.6	84.7	87.4	90.6	93.0	94.5	95.7	96.8	108.1	119.8	141.5	167.2
20-24	279.3	330.2	351.9	362.5	379.2	398.1	416.6	434.8	451.7	503.2	565.0	629.3	733.9
25-29	208.0	246.9	263.6	270.6	280.5	290.4	299.5	309.4	320.9	402.0	449.7	508.0	558.1
30-34	167.0	198.2	211.7	217.9	227.0	236.2	244.7	253.1	261.5	311.9	392.9	441.7	492.6
35-39	110.3	131.0	140.0	144.1	150.0	156.0	161.6	167.2	173.3	209.1	250.8	317.6	352.1
40-44	26.3	31.2	33.4	34.4	35.8	37.3	38.6	40.0	41.4	50.1	60.8	73.4	91.7
45-49	6.5	7.7	8.3	8.5	8.9	9.3	9.6	9.9	10.3	12.5	15.2	18.5	22.2
50-54	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.7	0.8
55-59	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4
60-65	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3
TOTAL	863.5	1024.5	1094.2	1126.1	1172.5	1220.7	1265.8	1310.8	1356.5	1597.6	1855.3	2131.3	2419.5

Source: Derived by Author

Table 5.4.C.M :Projected Number of Male Employment Over 1997-2025

YEAR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Low Cost Scenario													
15-19	968.6	1014.3	1053.8	1089.3	1116.0	1137.0	1151.3	1159.3	1166.4	1247.9	1290.8	1360.2	1450.6
20-24	1482.3	1537.6	1584.9	1639.2	1697.7	1768.9	1844.8	1915.0	1978.1	2119.2	2258.0	2335.9	2462.3
25-29	1770.5	1835.5	1892.4	1947.9	1998.7	2051.4	2105.8	2162.5	2228.3	2659.4	2822.1	2998.6	3098.3
30-34	1902.7	1962.8	2021.3	2082.1	2144.1	2209.8	2276.8	2341.9	2405.2	2732.3	3242.9	3435.0	3647.1
35-39	1806.1	1859.1	1913.1	1968.6	2025.2	2083.4	2143.2	2204.8	2268.9	2612.3	2961.0	3511.6	3716.5
40-44	1528.0	1572.6	1618.5	1665.7	1714.4	1764.6	1816.3	1869.3	1923.7	2218.5	2555.2	2897.3	3436.5
45-49	1274.2	1311.8	1350.2	1389.6	1430.2	1472.2	1515.5	1560.2	1606.3	1857.5	2144.1	2470.9	2802.6
50-54	1023.2	1056.5	1089.9	1123.8	1158.1	1193.0	1228.6	1265.1	1302.6	1508.6	1746.8	2017.9	2326.3
55-59	785.6	814.1	843.2	873.0	903.1	933.7	964.6	995.8	1027.3	1193.9	1385.1	1605.6	1855.9
60-65	621.0	640.6	661.3	683.1	706.0	730.0	755.1	781.2	808.4	957.6	1125.2	1313.6	1527.1
TOTAL	13162.3	13605.1	14028.6	14462.3	14893.4	15343.9	15802.0	16255.1	16715.1	19107.2	21531.2	23946.7	26323.2
Medium Cost Scenario													
15-19	967.7	1003.8	1038.9	1073.6	1100.0	1118.0	1130.0	1137.7	1143.8	1218.4	1273.5	1382.4	1520.1
20-24	1440.9	1474.4	1511.5	1563.7	1620.2	1682.8	1751.2	1818.1	1876.5	1999.7	2124.8	2220.5	2413.5
25-29	1738.1	1788.2	1837.9	1892.2	1942.0	1989.7	2039.9	2094.9	2157.7	2567.5	2721.3	2888.4	3021.9
30-34	1933.9	1988.7	2045.3	2105.8	2168.2	2232.5	2298.3	2363.6	2426.7	2751.5	3264.4	3458.5	3673.0
35-39	1812.9	1865.2	1919.1	1974.6	2031.3	2089.4	2149.1	2210.9	2275.1	2619.2	2969.9	3524.2	3732.8
40-44	1528.0	1572.2	1617.9	1665.1	1713.8	1763.9	1815.5	1868.6	1923.0	2218.3	2556.4	2901.1	3445.1
45-49	1274.2	1311.5	1349.7	1389.1	1429.7	1471.7	1515.0	1559.7	1605.8	1857.8	2146.1	2476.2	2813.2
50-54	1023.2	1056.2	1089.6	1123.4	1157.7	1192.6	1228.3	1264.8	1302.4	1509.2	1749.5	2024.6	2339.3
55-59	785.6	813.9	843.0	872.8	903.0	933.6	964.6	995.9	1027.6	1195.6	1389.7	1615.3	1873.6
60-65	621.2	641.3	662.6	685.3	709.2	734.3	760.7	788.3	817.1	976.7	1159.2	1368.0	1608.7
TOTAL	13125.8	13515.3	13915.5	14345.5	14775.1	15208.4	15652.6	16102.6	16555.9	18914.1	21354.8	23859.1	26441.3
High Cost Scenario													
15-19	949.2	980.4	1006.2	1034.5	1053.1	1062.9	1067.0	1066.4	1064.6	1096.1	1121.4	1220.2	1353.5
20-24	1398.2	1423.9	1442.8	1484.0	1525.8	1572.0	1623.7	1672.4	1713.5	1761.7	1811.9	1869.1	2054.0
25-29	1706.8	1748.7	1782.9	1826.4	1862.7	1895.4	1930.1	1967.8	2012.6	2315.2	2377.2	2463.0	2559.3
30-34	1921.0	1968.3	2014.8	2065.7	2116.2	2166.7	2217.0	2265.3	2310.7	2538.3	2918.4	3017.6	3143.3
35-39	1806.9	1852.8	1899.3	1946.4	1993.0	2039.2	2085.3	2131.8	2179.7	2433.1	2674.1	3096.3	3215.6
40-44	1523.0	1561.8	1601.3	1641.6	1681.8	1721.9	1762.0	1802.3	1843.0	2061.7	2303.5	2551.4	2971.5
45-49	1270.1	1302.9	1336.1	1369.8	1403.6	1437.4	1471.4	1505.7	1540.6	1729.7	1938.6	2184.5	2435.6
50-54	1020.0	1049.4	1078.8	1108.3	1137.2	1165.8	1194.1	1222.5	1251.4	1409.4	1587.4	1796.4	2039.6
55-59	783.2	808.9	835.0	861.5	887.8	913.7	939.2	964.5	989.6	1121.6	1269.7	1446.6	1652.0
60-65	619.6	637.9	657.5	678.2	699.7	722.1	745.1	769.0	793.7	931.5	1086.4	1268.4	1481.5
TOTAL	12998.1	13334.9	13654.7	14016.3	14360.9	14696.9	15034.9	15367.7	15699.4	17398.2	19088.5	20913.4	22905.9

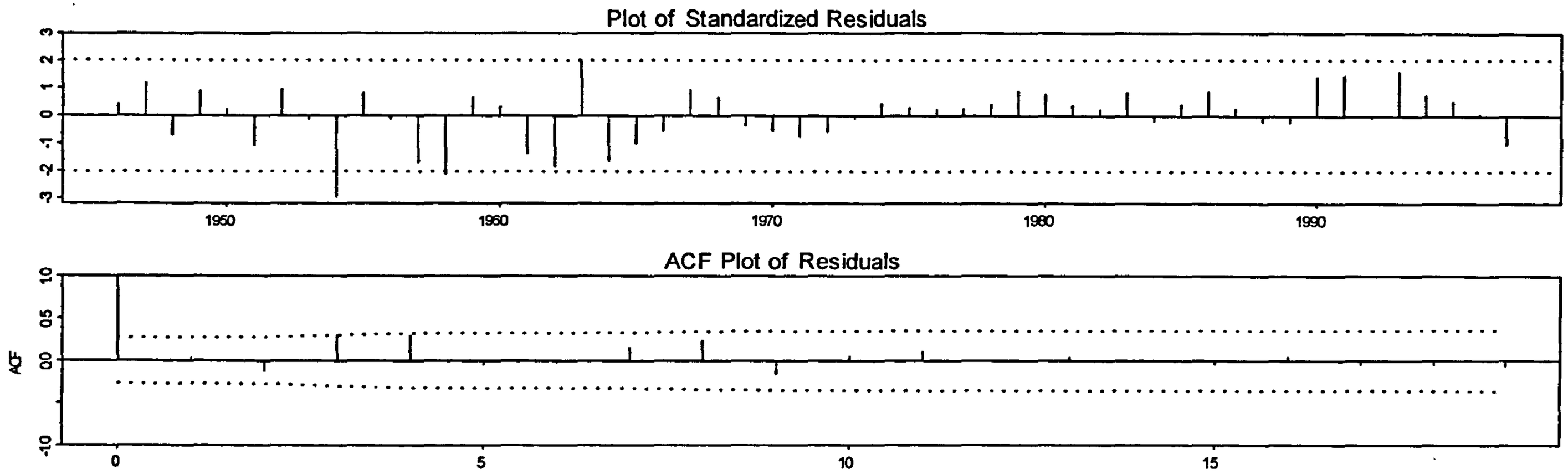
Source: Derived by Author

Table 5.4.D.F :Projected Number of Female Employment Over 1997-2025

YEAR	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Low Cost Scenario													
15-19	290.0	305.2	317.1	329.0	338.6	345.0	349.8	353.0	355.8	382.8	395.6	418.1	446.7
20-24	397.9	423.7	437.9	459.4	481.9	505.8	533.2	558.6	582.2	639.8	696.8	727.0	770.8
25-29	448.1	473.1	488.5	507.6	525.0	541.5	559.9	578.6	599.9	733.2	790.7	850.7	877.8
30-34	444.9	467.2	482.3	501.1	519.8	538.0	557.9	576.7	595.2	688.9	833.0	892.5	953.4
35-39	382.7	400.1	412.9	428.0	442.9	457.5	473.3	489.0	505.2	589.5	676.0	812.6	865.4
40-44	398.2	411.3	423.5	436.5	449.7	463.2	477.2	491.5	506.0	584.1	672.5	764.2	912.0
45-49	322.5	332.7	342.8	353.2	363.9	374.7	385.8	397.1	408.8	471.7	542.9	623.9	707.9
50-54	269.7	277.3	284.9	292.5	300.2	309.5	319.0	328.6	338.5	391.2	451.1	519.0	596.1
55-59	129.4	133.7	138.0	142.4	146.8	151.0	155.3	159.5	163.8	189.7	219.4	253.0	291.1
60-65	137.5	142.0	146.7	151.6	156.7	161.8	167.1	172.5	178.0	206.0	238.7	276.2	318.8
TOTAL	3220.9	3366.2	3474.6	3601.4	3725.5	3848.1	3978.5	4105.1	4233.5	4876.9	5516.5	6137.2	6739.9
Medium Cost Scenario													
15-19	289.3	300.5	311.4	322.6	331.2	336.8	340.7	343.3	345.3	368.8	383.0	415.0	456.4
20-24	395.9	405.3	415.8	434.1	452.2	472.0	494.2	515.8	534.3	575.6	613.9	636.9	692.8
25-29	445.7	458.4	471.0	487.8	502.1	515.9	530.9	547.2	564.9	680.9	723.8	769.0	800.3
30-34	443.0	455.4	468.2	485.2	501.2	517.2	534.2	551.0	566.7	648.4	774.6	821.5	874.8
35-39	381.4	392.4	403.6	417.5	430.7	443.8	457.7	472.0	486.4	562.4	638.8	761.8	809.6
40-44	397.9	409.4	421.3	434.0	446.8	459.9	473.5	487.4	501.6	577.7	663.8	753.1	898.7
45-49	322.4	332.2	342.2	352.6	363.1	373.9	384.9	396.1	407.7	470.2	541.0	621.7	705.7
50-54	269.7	277.3	284.9	292.5	300.2	309.5	319.0	328.6	338.5	391.3	451.4	519.6	597.4
55-59	129.4	133.7	138.1	142.5	146.9	151.1	155.4	159.7	164.1	190.2	220.2	254.3	293.0
60-65	137.6	142.2	147.0	152.1	157.4	162.8	168.3	174.0	179.9	209.9	245.3	286.1	332.6
TOTAL	3212.4	3306.8	3403.3	3520.8	3631.8	3743.0	3858.9	3975.2	4089.4	4675.3	5255.6	5838.8	6461.3
High Cost Scenario													
15-19	295.5	301.5	314.6	329.6	341.6	350.8	358.1	364.1	369.8	416.2	462.2	549.4	665.8
20-24	411.1	386.2	392.8	413.8	432.9	454.5	478.7	503.0	525.6	592.0	667.0	749.5	906.8
25-29	459.1	448.4	460.3	481.5	499.1	516.8	535.8	556.6	579.9	733.5	824.5	937.2	1062.9
30-34	454.9	449.7	463.3	485.2	505.2	525.7	547.4	569.3	591.1	710.7	897.9	1018.6	1167.6
35-39	390.5	391.1	404.2	422.7	440.0	457.5	476.0	495.2	515.2	627.0	753.4	960.4	1097.2
40-44	404.2	417.8	434.8	453.6	472.3	491.5	511.3	531.7	552.7	672.8	818.6	991.7	1267.4
45-49	327.0	340.6	355.4	370.9	386.7	402.7	419.1	435.9	453.4	553.6	675.1	828.7	1007.2
50-54	273.4	284.9	296.7	308.7	320.8	334.7	348.9	363.4	378.4	464.1	568.4	699.9	862.2
55-59	131.1	137.4	143.8	150.4	157.0	163.5	170.1	176.8	183.7	226.4	278.8	345.2	427.1
60-65	139.5	146.1	153.2	160.7	168.5	176.4	184.7	193.2	202.1	251.6	314.4	395.2	496.0
TOTAL	3286.3	3303.8	3419.1	3577.2	3724.2	3874.2	4030.0	4189.2	4351.9	5248.0	6260.2	7475.6	8960.3

Source: Derived by Author

ARIMA Model Diagnostics: Unemployment



ARIMA(1,0,2) Model with Mean 0

Source: Derived by Author

Appendix 5

Descriptive Statistics of the Unemployment ARIMA Model

Column1	
Mean	5.86635
Standard Error	0.39528
Median	6.00395
Mode	N/A
Standard Deviation	2.85041
Sample Variance	8.12483
Kurtosis	-1.28843
Skewness	0.12855
Range	9.30004
Minimum	1.72707
Maximum	11.02711
Sum	305.05013
Count	52.00000
Confidence Level(95.0%)	0.79356

Source: Derived by Author

Appendix 6

Table 6.1.A.1 :Number of Old Age Pensioners for GSF on 30/06/1996

Age	Male			Female		
	Number	Salary (L.E.)		Number	Salary (L.E.)	
		Basic	Variable		Basic	Variable
>= 40	109	1,588	453	85	2233	670
41-45	970	31,214	4,914	1123	49996	7165
46-50	4,062	126,258	10,368	2349	113759	8438
51-55	8,021	336,387	30,620	3142	193284	15606
56-60	20,601	2,312,464	886,175	5834	693408	185716
61-65	101,047	12,798,062	5,815,974	20115	2987302	1011650
66-70	92,094	9,092,691	3,441,491	10859	1107291	238420
71-75	60,092	4,982,215	744,786	5397	477198	20637
76-80	32,392	2,154,106	12,721	2644	180520	131
81-85	13,494	603,844	302	1143	50320	37
86-90	4,226	138,720	205	413	13306	0
91-96	804	19,329	288	63	1673	0
unknown	44	1,053	0	4	86	0
Total	337,956	32,597,931	10,948,297	53171	5870376	1488470

Source: MISAs Annual Report

Appendix 6

Table 6.1.A.2 :Number of Total Invalidity Pensioners for GSF on 30/06/1996

Age	Male			Female		
	Number	Salary (L.E.)		Number	Salary (L.E.)	
		Basic	Variable		Basic	Variable
>= 40	137	7,469	5,835	23	1491	780
41-45	262	15,217	9,168	36	2706	1208
46-50	431	27,122	13,549	48	4185	2317
51-55	620	43,485	18,876	58	6563	2639
56-60	719	56,946	24,389	74	8736	2863
61-65	687	54,484	18,834	82	8329	1583
66-70	514	27,977	5,391	29	2142	420
71-75	330	14,585	952	23	1055	10
76-80	155	6,151	15	14	678	0
81-85	60	1,483	44	3	57	0
>=86	23	319	0	0	0	0
unknown	13	84	0	0	0	0
Total	3,951	255,322	97,053	390	35942	11820

Source: MISAs Annual Report

Appendix 6

Table 6.1.A.3 :Number of Partial Invalidity Pensioners for GSF on 30/6/1996

Age	Male			Female		
	Number	Salary (L.E.)		Number	Salary (L.E.)	
		Basic	Variable		Basic	Variable
>= 40	276	13,435	12,287	88	5422	3531
41-45	821	40,950	25,581	104	8197	4356
46-50	1,156	59,147	32,657	149	13489	6681
51-55	1,345	71,585	34,912	186	20374	9067
56-60	1,316	74,584	34,420	199	21698	8069
61-65	680	34,900	13,548	104	9739	2903
66-70	490	15,990	4,226	42	2844	338
71-75	293	5,870	110	13	283	0
76-80	157	2,399	0	9	345	0
81-85	58	857	0	4	125	0
>=86	26	303	0	0	0	0
unknown	5	122	28	0	0	0
Total	6,623	320,142	157,769	898	82516	34945

Source: MISAs Annual Report

Appendix 6

Table 6.1.A.4 :Number of Partial Invalidity for active members for GSF on 30/06/1996

Age	Male			Female		
	Number	Salary (L.E.)		Number	Salary (L.E.)	
		Basic	Variable		Basic	Variable
>= 40	509	12,421	12,914	54	1339	889
41-45	441	12,761	9,018	56	1602	830
46-50	574	16,776	10,003	44	1492	629
51-55	510	15,839	7,877	59	1933	1012
56-60	396	14,225	7,251	13	307	154
61-65	101	3,528	1,763	0	0	0
>=66	11	229	82	0	0	0
unknown	216	5,021	1,753	0	0	0
Total	337,956	32,597,931	10,948,297	226	6673	3514

Source: MISAs Annual Report

Appendix 6

Table 6.1.A.5 :Number of Death Pension (survivaros) for GSF on 30/06/1996

Age	Widows (Females)			Widowers (Males)		
	Number	Salary (L.E.)		Number	Salary (L.E.)	
		Basic	Variable		Basic	Variable
>= 40	31,202	875,192	477,460	12	276	105
41-45	28,939	949,549	431,182	5	207	92
46-50	42,809	1,550,676	615,448	6	244	72
51-55	45,998	1,814,849	607,360	6	149	47
56-60	54,244	2,132,106	537,924	20	724	161
61-65	59,398	2,265,438	382,878	36	1403	460
66-70	57,297	1,900,584	171,872	27	997	250
71-75	41,978	1,158,677	48,807	25	736	100
76-80	21,149	465,153	10,274	20	711	43
81-85	8,302	149,511	2,426	10	417	0
>=86	2,520	37,548	1,098	4	93	12
Total	393,836	13,299,285	3,286,729	170	5956	1344

Source: MISAs Annual Report

Appendix 6

Table 6.1.A.6 :Number of Death Pension (survivaros) for GSF on 30/06/1996

Age	Sons			Daughters		
	Number	Salary (L.E.)		Number	Salary (L.E.)	
		Basic	Variable		Basic	Variable
<= 5	8,497	117,393	82,224	8907	119724	81347
6-	31,923	377,705	221,817	32870	387085	216630
11--15	62,532	790,281	363,378	62937	787962	350529
16-20	89,067	1,334,894	505,801	72488	1129112	420648
21-25	44,452	949,212	312,360	43358	828462	266340
26-30	2,088	51,274	12,427	19814	382729	90939
31-35	1,288	31,853	4,205	14984	284398	46230
36-40	1,227	30,206	2,928	13611	233218	25910
41-45	1,140	25,263	1,273	14316	224727	16125
>=46	2,104	32,750	659	46759	511763	11131
Total	244,318	3,740,832	1,507,072	330044	4889181	1525831

Source: MISAs Annual Report

Appendix 6

Table 6.1.A.7 :Number of Death Pension (survivaros) for GSF on 30/06/1996

Age	Brothers			Sisters		
	Number	Salary (L.E.)		Number	Salary (L.E.)	
		Basic	Variable		Basic	Variable
<= 5	25	146	130	28	237	151
6-	114	462	364	151	796	473
11--15	404	1,629	1,203	494	2335	1292
16-20	989	4,803	2,978	919	5538	2858
21-25	594	4,325	2,329	1051	9093	3769
26-30	42	383	101	943	10709	2313
31-35	35	518	181	1324	17995	2910
36-40	27	455	150	1986	28017	3723
41-45	35	641	251	503	7440	2313
>=46	348	7,370	1,397	10292	190168	28638
Total	2,613	20,733	9,085	17691	272328	48439

Source: MISAs Annual Report

Appendix 6

Table 6.1.A.8 :Number of Death Pension (survivaros) for GSF on 30/06/1996

Age	Fathers			Mothers		
	Number	Salary (L.E.)		Number	Salary (L.E.)	
		Basic	Variable		Basic	Variable
>= 40	0	0	0	11	166	240
41-45	14	126	78	193	3236	3177
46-50	58	567	477	778	11582	10674
51-55	188	1,674	1,298	1871	22618	18257
56-60	683	5,488	4,481	4037	43692	28356
61-65	1,425	10,334	6,292	6910	102915	37815
66-70	2,546	18,776	10,550	9978	70906	48531
71-75	2,852	21,992	11,205	10661	114383	50591
76-80	2,248	17,906	7,941	8280	95349	38342
81-85	1,332	12,416	5,599	5230	67071	25941
>=86	765	8,604	3,500	2765	39579	11824
Total	12,110	97,882	51,421	50715	571497	273747

Source: MISAs Annual Report

Appendix 6

Table 6.1.A.9: Number of Covered Members in the GSF on 30/06/1996

Age	Male			Female		
	Number	Salary (L.E.)		Number	Salary (L.E.)	
		Basic	Variable		Basic	Variable
>=20	6,547	519,122	522,421	9571	752879	566470
21-25	87,117	7,810,162	8,005,755	93659	8542685	8030128
26-30	214,752	20,951,976	24,087,352	166312	16854285	17954412
31-35	413,505	42,410,872	45,029,781	256338	27780128	27965065
36-40	448,926	55,746,672	56,903,834	234557	32281299	32025980
40-45	345,639	55,099,535	54,815,700	152527	27666719	27449556
46-50	270,768	50,484,975	48,125,596	82386	18109440	17871846
51-55	195,994	40,879,302	37,166,898	42537	10940345	10111576
56-60	128,015	30,432,268	30,036,427	23591	6664129	6436906
60-65	21,657	5,208,076	5,040,069	1641	384396	302655
Total	2,132,920	309,542,960	309,733,833	1063119	149976305	148714594

Source: MISAs Annual Report

Table 6.1.B.1 :Number of insured workers, salary and contribution period by age and sex (workers in public enterprises)

Age	Male					Female					Both sexes				
	Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period	
		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable
17	367	54.7	14.5	15.6	7.2	20	64.3	25.3	11.7	4.5	387	55.2	15.1	15.4	0.1
18	590	58.6	18.6	18.1	8.6	108	63.7	19.0	12.9	6.0	698	59.4	18.7	17.3	0.1
19	872	62.4	24.5	24.7	11.4	266	59.7	18.4	17.3	7.8	1,138	61.8	23.1	23.0	0.2
20	925	64 0	29.2	29.2	13.5	347	59.0	23.3	21.2	10.7	1,272	62.6	27.6	27.0	0.2
21	1,589	63.5	40.1	34.6	21.2	644	60.3	36.1	28.4	19.3	2,233	62.6	39.0	32.8	0.3
22	2,575	59.9	47.0	44.0	31.0	1,075	58.6	48.0	38.0	28.8	3,650	59.2	47.3	42.2	0.5
23	3,659	59.9	53.4	50.5	36.8	1,267	59.9	50.7	43.8	30.4	4,926	59.9	52.7	48.8	0.6
24	5,615	61.8	57.3	53.3	40.5	1,538	59.5	54.2	50.4	42.4	7,153	61.3	56.7	52.7	0.7
25	6,773	63.1	58.7	54.0	41.5	1,709	59.7	63.4	58.8	44.3	8,482	62.4	59.7	55.0	0.7
26	8,542	63.9	65.6	57.4	43.7	2,321	58.6	72.0	68.5	54.6	10,863	62.8	67.0	59.8	0.7
27	10,427	64.8	78.5	83.6	49.2	2,792	58.1	79.4	78.4	64.9	13,219	63.4	78.7	66.7	0.8
28	13,157	65.7	88.7	72.5	58.0	3,312	59.7	87.1	87.1	75.7	16,469	84.5	88.4	75.5	1.0
29	16,045	65.6	97.8	80.7	65.3	3,646	61.5	95.4	94.8	83.2	19,691	64.8	97.4	83.3	1.1
30	19,010	66.2	110.0	90.7	75.8	3,922	63.7	101.6	105.7	94.8	22,932	65.8	108.6	93.3	1.2
31	22,317	67.3	116.5	100.2	85.1	4,499	64.9	99.2	116.9	106.3	26,816	66.9	113.6	103.0	1.3
32	23,742	69.2	128.9	107.4	93.1	4,606	68.2	108.4	127.8	114.8	28,348	69.0	125.5	110.7	1.4
33	25,473	71.0	137.6	116.1	100.9	4,797	72.7	123.9	137.1	122.2	30,270	71.3	135.5	119.5	1.5
34	26,890	74.7	151.0	124.4	107.7	4,609	74.7	124.5	144.9	126.2	31,499	74.7	147.1	127.4	1.5
35	27,587	78.2	158.2	132.7	114.5	4,554	81.5	141.4	153.7	131.5	32,141	78.6	155.8	135.7	1.5
36	28,698	81.5	166.0	140.5	120.8	4,552	86.3	147.4	162.7	134.5	33,250	82.2	163.5	143.5	1.5
37	29,379	85.9	173.9	150.1	127.2	4,424	93.0	158.7	174.2	140.4	33,803	86.9	171.9	153.2	1.5
38	30,813	90.2	178.6	161.1	133.0	4,568	100.0	167.9	186.4	143.7	35,381	81.5	177.2	164.3	1.5
39	32,039	95.5	185.1	172.2	137.9	4,503	107.0	182.0	196.6	146.7	36,542	97.0	184.7	175.2	1.4
40	33,726	101.4	193.6	184.8	141.8	4,580	114.5	194.6	206.2	147.5	38,306	103.0	193.7	187.4	1.4
41	37,009	107.0	202.8	197.8	157.2	4,718	120.4	207.7	218.8	150.3	41,727	108.5	203.3	200.2	1.3
42	37,262	111.3	206.4	209.2	147.2	4,607	127.3	217.6	230.7	153.0	41,869	113.1	207.6	211.6	1.3
43	37,937	111.6	211.2	220.9	149.1	5,060	153.2	232.4	245 0	155.8	42,997	117.9	213.7	223.8	1.3
44	36,903	118.3	214.6	232.0	150.8	4,886	139.5	238.0	257.8	156.8	41,789	120.7	217.3	235.0	1.3
45	35,808	120.0	215.3	241.2	152.2	4,478	145.9	252.5	269.3	159.3	40,286	122.8	219.4	244.3	1.2
46	34,158	122.2	218.8	250.0	153.1	4,136	148.7	258.6	279.6	162.0	38,294	125.0	223.1	253.2	1.2
47	33,589	125.1	220.8	261.5	154.1	3,778	153.8	268.0	290 6	163.5	37,367	128.0	225.6	264.5	1.2
48	28,391	132.3	231.0	277.4	155.3	3,295	160.2	273.3	299.1	163.1	31,686	135.2	235.4	279.6	1.2
49	27,739	136.0	233.7	290.8	156.0	2,983	165.0	277.2	311.8	163.1	30,722	138.8	237.9	292.8	1.1
50	25,663	141.4	242.1	303.2	157.0	2,773	170.1	287.5	327.4	162.8	28,436	144.2	246.5	305.6	1.1
51	23,252	149.6	254.5	317.9	157.4	2,480	172.6	291.2	344.8	158.8	25,732	151.8	258.0	320.5	1.0
52	23,622	151.7	259.3	330.8	157.8	2,228	176.0	289.2	356.1	157.8	25,850	153.8	261.9	333.0	1.0
53	20,321	159.1	264.3	345.4	158.0	1,920	180.0	293.9	367.7	157.3	22,241	160.9	266.9	347.3	1.0
54	19,492	160.1	263.6	356.7	157.6	1,568	185.7	293.0	379.2	155.3	21,060	192.0	265.8	358.3	1.0
55	18,033	163.3	265.6	365.1	157.2	1,282	185.3	305.5	387.5	153.6	19,315	146.8	268.2	366.6	1.0
56	17,539	165.1	271.5	373.4	157.5	1,191	192.7	308.4	395.7	153.7	18,730	166.8	273.9	374.8	0.9
57	16,952	165.3	272.3	375.3	157.2	994	192.2	306.0	401.7	154.1	17,946	166.8	294.2	376.8	0.9
58	15,676	167.6	277.0	387.1	157.3	978	192.9	307.5	412.5	156.1	16,654	169.1	278.2	388.6	0.9
59	14,183	175.2	286.7	397.8	157.3	661	205.9	315.0	422.6	157.1	14,844	176.6	288.0	398.9	0.9
60	1,461	187.1	292.4	397.6	160.5	47	197.2	324.1	410.3	157.0	1,508	187.4	293.4	397.5	0.9
61	701	170.7	281.4	415.2	155.2	20	149.0	245.1	378.4	158.4	721	172.0	280.4	414.2	0.9
62	599	176.7	268.4	410.2	152.3	12	171.4	277.5	371.8	149.8	611	167.8	268.6	409.5	0.9
63	569	170.8	263.3	430.0	157.1	9	116.2	181.6	392.9	151.7	578	169.9	262.0	429.5	0.9
64	517	167.7	264.8	436.1	165.5	6	177.9	294.0	487.7	167.7	523	167.8	265.2	436.7	1.0
65	637	113.5	149.9	394.2	148.9	16	107.9	158.1	367.8	145.7	653	113.3	150.1	393.6	1.3
Total	878,823	111.1	195.8	216.3	132.2	122,785	111.1	182.6	203.4	130.4	1,001,608	111.1	194.2	214.7	1.2

Source: MISAs Annual Report

Table 6.1.C.1 : Number of insured workers, salary and contribution period by age and sex (Regular workers in private sector)

Age	Male					Female					Both sexes				
	Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period	
		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable
17	2	45.0	0.0	7.5	0.0	0	0.0	0.0	0.0	0.0	2	45.0	0.0	7.5	0.0
18	6,954	55.7	3.7	3.3	0.5	4,516	85.3	3.9	3.2	0.6	11,470	56.7	3.8	3.3	0.0
19	17,773	61.0	6.3	9.2	1.6	12,422	62.3	7.2	8.7	2.3	30,195	61.5	6.7	9.0	0.0
20	15,058	64.1	7.6	15.4	2.9	12,272	65.1	9.5	13.6	4.2	27,330	64.5	8.5	14.6	0.1
21	15,659	72.2	13.4	19.2	4.6	12,499	68.4	12.0	18.2	6.2	28,158	70.5	12.8	18.8	0.1
22	18,018	79.9	18.8	23.6	6.4	13,006	75.1	17.2	22.5	8.3	31,024	77.9	18.1	23.1	0.1
23	23,544	92.7	25.1	23.1	7.2	13,800	88.1	26.0	25.5	10.3	37,344	91.0	25.5	24.0	0.1
24	31,919	100.4	31.3	22.7	7.7	14,011	95.4	32.4	28.5	12.2	45,930	98.9	31.7	24.5	0.1
25	36,420	108.8	38.8	25.7	9.8	12,798	103.0	39.9	32.7	14.7	49,218	106.8	39.1	27.5	0.1
26	40,227	113.3	44.2	30.4	12.6	12,286	108.6	45.7	38.6	18.1	52,513	112.2	44.6	32.4	0.1
27	41,581	117.3	49.8	36 0	15.6	11,088	113.0	51.7	45.4	22.4	52,669	116.4	50.2	38.0	0.1
28	43,132	123.4	55.6	41.8	19.1	10,703	114.8	52.4	51.2	26.5	53,835	121.7	55.0	43.7	0.2
29	43,192	128.6	58.9	47.9	22.2	9,959	116.9	57.3	57.7	31.0	53,151	126.0	58.6	49.8	0.2
30	41,845	130.3	62.0	55.1	26.3	8,989	122.1	61.3	64.1	35.3	50,834	128 8	61.9	56.7	0.2
31	41,176	135.9	67.9	61.8	30.1	8,298	125.7	67.2	70.7	40.9	49,474	134.2	67.8	63.3	0.2
32	38,183	141.3	75.3	69.6	34.7	7,213	130.6	72.3	75.1	43.8	45,396	139.6	74.8	70.5	0.3
33	35,728	149.6	38.8	77.9	39.6	6,443	136.8	79.9	81.6	49.1	42,171	147.6	83.2	78.5	0.3
34	33,169	155.3	91.8	85.8	45.0	5,936	146.4	90.8	88.7	55.3	39,105	153.9	91.7	86.3	0.3
35	31,189	163.2	101.9	94.3	50.8	5,446	158.6	101.2	95.2	58.5	36,635	162.5	101.8	94.4	0.3
36	30,228	168.2	108.6	102.6	56.2	5,039	161.3	108.5	100.5	61.9	35,267	167.2	108.6	102.3	0.3
37	28,950	171.7	115.3	110.3	61.1	4,673	164.6	114.6	106.3	65.1	33,623	170.7	115.2	109.8	0.4
38	27,601	178.2	122.3	111.1	65.8	4,303	167.0	114.8	110.7	66.2	31,904	176.7	121.3	117.9	0.4
39	26,398	182.5	129.4	126.6	69.4	4,248	169.2	120.8	113.8	67.2	30,646	180.7	128.2	124.8	0.4
40	24,763	188.2	135.8	134.0	72.9	3,850	165.8	120.1	120.8	68.4	28,613	185.2	133.7	132.2	0.4
41	24,390	190.5	138.4	140.1	73.7	3,857	164.0	116.7	125.2	68.6	28,247	186.9	135.4	138.1	0.4
42	22,799	195.6	144.7	147.0	75.8	3,717	168.9	124.7	131.8	71.2	26,516	191.9	141.9	144.8	0.4
43	22,108	197.6	148.5	152.9	76.4	3,611	166.7	123.8	136.7	70.8	25,719	193.6	145.1	150.7	0.4
44	20,086	198.9	149.5	158.4	78.0	3,250	170.3	127.8	143.5	72.1	23,336	194.9	146.5	156.4	0.4
45	18,455	196.6	147.2	164.3	78.6	3,092	171.6	124.5	147.9	71.7	21,547	193.0	143.9	161.9	0.4
46	17,659	197.1	151.1	170.5	79.8	2,949	172.6	128.0	157.1	76.2	20,608	193.6	147.8	168.6	0.4
47	16,499	197.4	151.4	177.5	80.1	2,780	164.0	115.2	155.6	73.4	19,279	192.6	146.2	174.3	0.4
48	13,628	206.8	160.1	187.7	83.2	2,472	168.1	119.1	170.0	75.2	16,100	220.8	153.8	185.0	0.4
49	12,960	202.8	155.6	193.4	81.1	2,338	165.9	113.4	176.2	77.2	15,298	197.1	149.2	190.8	0 4
50	12,232	202.3	154.0	201.6	82.5	2,049	176.0	124.3	181.6	78.4	14,281	198.6	149.8	198.7	0.4
51	10,600	211.3	167.6	211.6	86.2	1,813	179.8	131.1	189.9	81.8	12,413	206.7	162.3	208.4	0.4
52	9,480	213.3	171.1	220.2	87.1	1,652	171.2	116.3	186.1	75.6	11,132	207.0	163.0	215.2	0.4
53	8,394	214.0	174.2	227.3	88.5	1,380	184.5	163.5	209.3	84.1	9,774	209.8	168.8	224.8	0.4
54	7,261	211.4	172.7	236.8	89.3	1,176	176.7	126.1	207.6	79.4	8,437	206.5	166.2	232.7	0.4
55	6,639	207.1	167.9	241.3	87.9	1,054	173.6	121.0	212.7	82.6	7,693	202.5	161.4	237.4	0.4
56	6,720	204.0	165.0	245.8	87.5	985	180.6	129.2	216.8	82.0	7,705	201.0	160.4	242.0	0.4
57	6,940	194.1	148.3	242.1	81.8	954	169.6	114.5	223.4	81.7	7,894	191.1	144.2	239.8	0.4
58	6,430	195.9	153.1	251.9	83.3	868	179.2	122.3	234.1	84.7	7,298	193.9	149.5	249.8	0.4
59	5,340	190.7	146.3	255.1	82.8	660	162.1	106.8	230.6	78.2	6,000	187.5	142.0	252.4	0.4
60	1,262	129.3	67.9	154.7	41.6	187	111.1	45.2	129.9	34.6	1,449	127.0	65.0	151.5	0.3
61	723	103.9	27.4	100.0	21.2	111	93.9	28.2	88.8	24.1	834	102.6	27.5	98.5	0.2
62	613	113.9	27.8	90.1	21.3	107	81.3	19.5	89.1	25.4	720	106.0	26.6	89.9	0.2
63	540	120.4	34.2	93.8	20.7	81	93.4	22.4	97.5	25.8	621	116.9	32.7	94.3	0.2
64	511	118.2	30.1	93.2	22.4	87	84.2	17.7	74.5	21.5	598	113.3	28.3	90.5	0.2
65	6,700	110.6	19 8	118.5	22.7	631	83.4	12 2	84.4	14.4	7,331	108.2	19.1	115.6	0.2
Total	951,678	149.2	89.5	93.7	43.4	245,659	117.7	61.0	67.5	33.8	1,197,337	142.7	83.7	88.3	0.3

Source: MISAs Annual Report

Table 6.1.C.2 :Number of insured workers, salary and contribution period by age and sex (Non-regular private workers, contractor workers)

Age	Male					Female					Both sexes				
	Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period	
		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable
17	300	58.0	0.0	6.4	0.0	4	52.5	0.0	5.8	0.0	304	57.9	0.0	6.3	0.0
18	892	58.6	0.0	5.0	0.0	9	51.7	0.0	5.2	0.0	901	58.6	0.0	6.1	0.0
19	1,231	57.1	0.0	7.2	0.0	4	45.0	0.0	3.8	0.0	1,235	57.1	0.0	7.4	0.0
20	1,811	58.0	0.0	10.6	0.1	22	54.5	0.0	6.7	0.0	1,833	58.0	0.0	10.7	0.0
21	2,212	56.6	0.0	17.1	0.1	16	48.8	0.0	15.9	0.0	2,228	56.5	0.0	17.3	0.0
22	2,980	57.3	0.0	22.0	0.2	21	49.3	0.0	23.3	0.0	3,001	57.3	0.0	22.2	0.0
23	3,324	57.2	0.0	24.9	0.3	31	50.8	0.0	24.3	0.0	3,355	57.2	0.0	25.2	0.0
24	3,781	57.1	0.0	29.1	0.3	31	49.8	0.0	33.8	0.5	3,812	57.0	0.0	29.4	0.0
25	4,439	57.5	0.0	35.9	0.3	37	58.8	0.0	46.2	0.0	4,476	57.5	0.0	36.0	0.0
26	4,826	57.2	0.0	40.8	0.5	37	55.5	0.0	57.1	0.0	4,863	57.2	0.0	40.9	0.0
27	5,158	57.9	0.0	44.7	0.5	36	50.8	0.0	48.2	0.5	5,194	57.9	0.0	44.9	0.0
28	5,263	58.5	0.0	48.9	0.6	35	53.6	0.0	58.9	0.0	5,298	58.5	0.0	49.0	0.0
29	6,029	58.3	0.0	57.6	0.5	37	54.7	0.0	66.5	0.1	6,066	58.2	0.0	57.8	0.0
30	6,462	59.1	0.0	61.7	0.7	33	51.4	0.0	80.9	0.1	6,495	59.0	0.0	61.8	0.0
31	6,760	60.3	0.0	66.7	0.6	42	48.6	0.0	75.8	0.4	6,802	60.2	0.0	66.6	0.0
32	6,699	60.3	0.0	71.7	0.6	32	48.8	0.0	79.5	0.2	6,731	60.3	0.0	71.6	0.0
33	6,629	60.6	0.0	78.1	0.5	26	48.5	0.0	83.8	0.0	6,655	60.5	0.0	78.1	0.0
34	6,333	61.6	0.0	81.7	0.7	19	56.1	0.0	81.7	0.0	6,352	61.6	0.0	81.7	0 0
35	5,886	62.8	0.0	86.0	0.5	15	53.0	0.0	104.4	0.0	5,901	62.8	0.0	86.0	0.0
36	6,108	62.7	0.0	90.9	0.6	18	56.7	0.0	91.1	2.0	6,126	62.7	0.0	90.9	0.0
37	5,917	63.4	0.0	93.9	0.7	21	56.4	0.0	71.2	0.2	5,938	63.4	0.0	93.8	0.0
38	5,411	64.3	0.0	93.6	0.7	24	56.3	0.0	65.9	0.5	5,435	64.2	0.0	93.4	0.0
39	5,026	64.8	0.0	94.9	0.4	27	51.7	0.0	66.9	0.3	5,053	64.7	0.0	94.7	0.0
40	4,673	64.7	0.0	94.0	0.6	20	55.5	0 0	63.2	0.0	4,693	64.7	0.0	93.9	0.0
41	4,433	64.3	0.0	95.0	0.5	20	51.0	0.0	81.5	0.0	4,453	64.3	0.0	94.9	0.0
42	4,182	63.9	0.0	95.7	0.6	17	52.1	0.0	70.8	0.1	4,199	63.8	0.0	95.7	0.0
43	4,027	64.4	0.0	94.2	0.5	17	52.1	0.0	74.6	0.0	4,044	64.3	0.0	94.1	0.0
44	3,643	64.7	0.0	98.5	0.6	18	51.7	0.0	82.9	0.0	3,661	64.6	0.0	98.3	0.0
45	3,376	64.9	0.0	95.8	0.8	18	51.7	0.0	66.4	0.0	3,394	64.8	0.0	95.5	0.0
46	3,137	65.3	0.0	99.2	0.6	12	45.0	0.0	69.6	0.0	3,149	65.2	0.0	99.0	0.0
47	3,092	65.5	0.0	97.7	0.6	10	48.0	0.0	79.3	0.0	3,102	65.5	0.0	97.6	0.0
48	2,381	65.7	0.0	97.1	0.4	12	52.5	0.0	52.9	0.0	2,393	65.6	0.0	96.8	0.0
49	2,317	64.6	0.0	100.8	0.5	12	47.5	0.0	63.2	0.0	2,329	65.5	0.0	100.7	0.0
50	2,267	63.6	0.0	99.3	0.3	7	49.3	0.0	86.1	0.0	2,274	63.6	0.0	99.2	0.0
51	1,807	64.0	0.0	97.6	0.7	11	50.5	0.0	77.2	0.0	1,818	63.9	0.0	97.1	0.0
52	1,639	64.1	0.0	97.5	0.5	13	54.2	0.0	42.1	0.0	1,652	64.0	0.0	97.0	0.0
53	1,371	62.7	0.0	98.6	0.4	4	60.0	0.0	66.5	0.0	1,375	62.7	0.0	89.5	0.0
54	1,185	63.7	0.0	98.4	0.4	5	45.0	0.0	100.2	0.0	1,190	63.7	0.0	89.4	0.0
55	1,082	63.5	0.0	101.4	0.6	2	45.0	0.0	121.0	0.0	1,084	63.5	0.0	102.0	0.0
56	1,140	62.8	0 0	98.4	0.1	5	57.0	0.0	96.6	0.0	1,145	62.8	0.0	98.8	0.0
57	1,475	61.9	0.0	102.7	0.4	7	49.3	0.0	129.0	0.0	1,482	61.8	0.0	102.3	0.0
58	1,200	91.3	0.0	104.9	0.3	11	50.5	0.0	83.0	0.0	1,211	61.2	0.0	104.2	0.0
59	1,123	61.8	0.0	104.5	0.2	1	75.0	0.0	164.0	0.0	1,124	61.8	0.0	104.7	0.0
60	900	63.5	0.0	110.4	0.1	2	45.0	0.0	165.0	0.0	902	63.5	0.0	110.3	0.0
61	786	62.4	0.0	115.2	0.1	4	75.0	0.0	95.0	0.0	790	62.4	0.0	115.2	0.0
62	601	61.6	0.0	121.4	0.0	1	45.0	0.0	78.0	0.0	602	61.5	0.0	121.9	0.0
63	547	61.5	0.0	129.1	0.1	3	75.0	0.0	147.3	0.0	550	61.5	0.0	130.5	0.0
64	509	62.9	0.0	132.5	0.2	3	45.0	0.0	139.3	0.0	512	62.8	0.0	234.4	0.0
65	1,782	62.0	0.0	144.1	0.0	11	66.8	0.0	103.4	0.0	1,793	0 0	0.0	0.0	0.0
Total	158,152	61.5	0.0	75.7	0.5	823	52.5	0.0	63.7	0.2	158,975	62.1	0.0	76.8	0.0

Source: MISAs Annual Report

Table 6.1.C.3 :Number of insured workers, salary and contribution period by age and sex (Non-regular private workers, transportation)

Age	Male					Female					Both sexes				
	Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period	
		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable
17	8	65.0	0.0	8.4	0.0	0	0.0	0.0	0.0	0.0	8	65.0	0.0	8.4	0.0
18	112	65.3	0.0	4.7	0.0	1	65.0	0.0	11.0	0.0	113	65.3	0.0	4.8	0.0
19	268	65.3	0.0	6.5	0.0	0	0.0	0.0	0.0	0.0	268	65.3	0.0	6.5	0.0
20	736	65.2	0.0	10.3	0.0	2	65.0	0.0	8.5	0.0	738	65.2	0.0	10.3	0.0
21	2,339	66.6	0.0	9.0	0.1	3	65.0	0.0	3.7	0.0	2,342	66.6	0.0	9.0	0.0
22	5,095	69.1	0.0	10.6	0.1	14	75.0	0.0	11.4	0.3	5,109	69.1	0.0	10.6	0.0
23	9,371	76.0	0.0	12.1	0.3	18	78.6	0.0	18.6	0.2	9,389	76.0	0.0	12.1	0.0
24	12,776	77.9	0.0	16.0	0.3	28	75.7	0.0	15.3	0.2	12,804	77.9	0.0	16.0	0.0
25	14,401	78.4	0.0	23.6	0.4	18	74.7	0.0	30.0	0.3	14,419	78.4	0.0	23.6	0.0
26	15,177	77.6	0.0	30.7	0.4	26	82.9	0.0	27.7	1.0	15,203	77.6	0.0	30.7	0.0
27	16,264	77.4	0.0	38.2	0.5	18	81.7	0.0	35.8	0.0	16,282	77.4	0.0	38.2	0.0
28	17,187	77.6	0.0	46.6	0.5	23	74.1	0.0	46.6	2.6	17,210	77.6	0.0	46.6	0.0
29	17,964	80.9	0.0	55.6	0.7	19	81.6	0.0	53.2	0.0	17,983	80.9	0.0	55.6	0.0
30	17,536	83.9	0.0	63.6	1.0	25	82.0	0.0	56.3	0.3	17,561	83.9	0.0	63.6	0.0
31	19,241	85.4	0.0	71.5	0.9	17	83.8	0.0	63 4	2.9	19,258	85.3	0.0	71.5	0.0
32	19,680	85.9	0.0	79.5	0.9	12	78.3	0.0	48.7	0.0	19,692	85.9	0.0	79.5	0.0
33	19,533	86.2	0.0	88.5	0.9	16	78.1	0.0	57.0	0.0	19,549	86.2	0.0	88.4	0.0
34	19,876	86.9	0.0	96.5	0.8	14	81.8	0.0	80.2	0.0	19,890	86.9	0.0	96.5	0.0
35	16,996	85.7	0.0	102.5	0.9	13	78.5	0.0	82.8	0.1	17,009	85.7	0.0	102.5	0.0
36	15,133	85.4	0.0	106.5	1.0	22	77.3	0.0	79.1	0.0	15,155	85.4	0.0	106.5	0.0
37	13,792	85.5	0.0	111.5	1.2	15	84.0	0.0	95.1	0.0	13,807	85.5	0.0	111.5	0.0
38	12,914	86.9	0.0	116.6	1.2	15	89.0	0.0	99.9	0.0	12,929	86.9	0.0	116.6	0.0
39	11,650	86.9	0.0	120.2	1.6	14	86.8	0.0	98.5	0.0	11,664	86.9	0.0	120.2	0.0
40	10,889	87.6	0.0	121.8	1.4	12	80.0	0 0	103.4	1.5	10,901	87.6	0.0	121.7	0.0
41	10,230	87.6	0.0	123.7	1.5	17	65.0	0.0	83.2	0.0	10,247	87.5	0.0	123.6	0.0
42	9,153	87.4	0.0	125.2	1.6	10	79.5	0.0	133.4	0.0	9,163	87.4	0.0	125.2	0.0
43	8,224	88.5	0.0	124.8	1.4	17	83.2	0.0	94.2	1.4	8,241	88.5	0.0	124.7	0.0
44	7,481	87.9	0.0	125.8	1.4	7	70.0	0.0	176.1	0.0	7,488	87.9	0.0	125.9	0.0
45	6,683	88.6	0.0	128.5	1.3	13	77.7	0.0	112.6	0.0	6,696	88.6	0.0	128.5	0.0
46	6,300	89.0	0.0	129.9	1.4	20	79.5	0.0	129.6	0.0	6,320	89.0	0.0	129.9	0.0
47	5,463	88.2	0.0	131.3	1.3	12	90.8	0.0	124.7	0.8	5,475	88.2	0.0	131.3	0.0
48	4,772	90.9	0.0	146.5	1.5	8	85.6	0.0	162.9	0.0	4,780	90.9	0.0	146.5	0.0
49	4,230	90.6	0.0	135.4	1.4	3	65.0	0.0	165.3	0.0	4,233	90.5	0.0	135.4	0.0
50	3,848	90.6	0.0	138.0	1.3	8	83.1	0.0	113.1	0.0	3,856	90.6	0.0	137.9	0.0
51	3,176	92.3	0.0	139.4	1.4	9	83.3	0.0	126.8	0.0	3,185	92.3	0.0	139.3	0.0
52	2,739	92.1	0.0	141.3	1.5	8	87.5	0.0	130.8	0.0	2,747	92.1	0.0	141.3	0.0
53	2,282	92.1	0.0	140.9	1.0	5	87.0	0.0	161.6	0.0	2,287	92.1	0.0	140.9	0.0
54	1,874	92.6	0.0	144.4	1.5	2	92.5	0.0	194.0	0.0	1,876	92.6	0.0	144.4	0.0
55	1,695	93.2	0.0	143.6	0.9	4	82.5	0.0	114.8	0.0	1,699	93.2	0.0	143.5	0.0
56	1,494	90.1	0.0	145.4	0.8	3	95.0	0.0	80.7	0.0	1,497	90.1	0.0	145.3	0.0
57	1,607	87.9	0.0	142.0	0.6	2	82.5	0.0	113.5	0.0	1,609	87.9	0.0	142.0	0.0
58	1,379	87.7	0 0	147.4	0.8	4	105.0	0.0	67.0	5.8	1,383	87.8	0.0	147.2	0.0
59	1,325	89.7	0.0	149.9	1.1	2	120.0	0.0	163.5	0.0	1,327	89.7	0.0	150.0	0.0
60	661	84.9	0.0	148.2	0.7	1	40.0	0.0	283.0	0.0	662	84.9	0.0	148.4	0.0
61	417	80.2	0.0	138.9	0.1	0	0.0	0.0	0.0	0.0	417	80.2	0.0	138.5	0.0
62	331	80.5	0.0	139.7	0.3	5	79.0	0.0	110.0	0.0	336	80.5	0.0	139.3	0.0
63	283	83.1	0.0	139.2	0.0	1	65.0	0.0	97.0	0.0	284	83.1	0.0	139.1	0.0
64	242	84.3	0.0	141.0	0.0	1	65.0	0.0	39.0	0.0	243	84.2	0.0	140.6	0.0
65	1,071	91.8	0.0	157.0	0.1	11	88.2	0.0	72.3	0.0	1,082	91.8	0.0	156.1	0.0
Total	375,898	84.1	0.0	85.1	0.9	518	80.3	0.0	75.2	0.5	376,416	84.1	0.0	85.1	0.0

Source: MISAs Annual Report

Table 6.1.C.4 :Number of insured workers, salary and contribution period by age and sex (Non-regular private workers, bakery)

Age	Male					Female					Both sexes				
	Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period	
		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable
17	1	75.0	0.0	2.0	0.0	0	0.0	0.0	0.0	0.0	1	75.0	0.0	2.0	0.0
18	31	59.7	0.0	2.9	0.0	3	55.0	0.0	2.0	0.0	34	59.3	0.0	2.9	0.0
19	182	56.5	0.0	8.3	0.0	11	61.4	0.0	6.8	0.0	193	56.8	0.0	8.2	0.0
20	269	57.3	0.0	14.7	0.0	12	55.0	0.0	12.4	0.0	281	57.2	0.0	14.6	0.0
21	365	56.4	0.0	21.3	0.0	17	52.9	0.0	17.7	0.0	382	56.2	0.0	21.1	0.0
22	446	58.1	0.0	29.0	0.0	15	58.0	0.0	33.1	0.6	461	58.1	0.0	29.1	0.0
23	533	57.2	0.0	37.4	0.1	27	58.9	0.0	36.2	0.0	560	57.3	0.0	37.3	0.0
24	742	56.3	0.0	47.2	0.0	35	56.4	0.0	37.5	0.3	777	56.3	0.0	46.8	0.0
25	746	57.8	0.0	51.1	0.0	34	54.7	0.0	50.8	0.3	780	57.7	0.0	51.1	0.0
26	840	58.1	0.0	54.0	0.1	32	53.7	0.0	53.7	0.0	872	58.0	0.0	54.0	0.0
27	963	58.9	0.0	59.8	0.2	42	55.7	0.0	67.3	1.4	1,005	58.8	0.0	60.1	0.0
28	1,073	60.6	0.0	63.6	0.1	31	55.6	0.0	73.3	0.0	1,104	60.4	0.0	63.9	0.0
29	1,116	61.0	0.0	67.9	0.1	42	53.4	0.0	60.2	0.3	1,158	60.7	0.0	67.6	0.0
30	1,123	61.1	0.0	71.5	0.2	35	56.3	0.0	59.9	0.0	1,158	61.0	0.0	71.2	0.0
31	1,201	62.2	0.0	77.8	0.3	46	57.1	0.0	70.5	0.4	1,247	62.0	0.0	77.5	0.0
32	1,278	62.7	0.0	79.9	0.2	40	55.9	0.0	65.8	0.6	1,318	62.5	0.0	79.5	0.0
33	1,199	63.1	0.0	86.7	0.4	30	55.5	0.0	70.0	0.0	1,229	62.9	0.0	86.3	0.0
34	1,179	63.2	0.0	92.0	0.3	30	56.0	0.0	65.4	0.0	1,209	63.0	0.0	91.4	0.0
35	1,119	64.4	0.0	94.0	0.0	31	54.8	0.0	65.4	0.9	1,150	64.1	0.0	93.2	0.0
36	1,013	64.8	0.0	102.9	0.3	28	58.9	0.0	62.4	0.0	1,041	64.6	0.0	101.9	0.0
37	1,043	64.9	0.0	100.7	0.3	42	58.9	0.0	61.8	0.0	1,085	64.7	0.0	99.2	0.0
38	972	65.1	0.0	107.8	0.5	47	57.4	0.0	68.3	0.0	1,019	64.8	0.0	105.9	0.0
39	903	65.4	0.0	106.6	0.8	33	56.8	0.0	66.8	0.0	936	65.1	0.0	105.2	0.0
40	851	65.4	0.0	108.5	0.8	34	56.9	0.0	77.3	0.0	885	65.1	0.0	107.3	0.0
41	843	65.7	0.0	110.0	0.4	32	60.5	0.0	89.7	0.3	875	65.5	0.0	109.3	0.0
42	763	66.0	0.0	114.3	1.0	29	55.6	0.0	72.9	0.0	792	65.6	0.0	112.8	0.0
43	807	65.7	0.0	117.8	0.5	43	58.0	0.0	82.5	0.0	850	65.3	0.0	116.0	0.0
44	790	56.3	0.0	117.0	0.2	38	58.6	0.0	79.5	0.0	828	65.0	0.0	115.3	0.0
45	691	65.6	0.0	118.1	0.6	28	57.3	0.0	78.5	0.0	719	65.2	0.0	116.5	0.0
46	637	64.6	0.0	118.8	0.4	28	57.2	0.0	76.0	0.0	665	64.3	0.0	117.0	0.0
47	615	65.3	0.0	119.7	0.7	32	55.5	0.0	84.5	0.0	647	64.8	0.0	118.0	0.0
48	446	65.7	0.0	129.0	0.0	34	56.0	0.0	101.4	0.0	480	65.0	0.0	127.0	0.0
49	432	65.2	0.0	132.0	0.1	36	58.3	0.0	82.8	0.0	468	64.7	0.0	128.2	0.0
50	406	64.3	0.0	123.8	0.0	34	56.5	0.0	85.1	0.0	440	63.7	0.0	120.8	0.0
51	329	64.1	0.0	133.2	0.7	20	51.8	0.0	75.1	1.3	349	63.4	0.0	129.9	0.0
52	295	63.0	0.0	127.4	0.6	16	57.2	0.0	106.6	0.0	311	62.7	0.0	126.4	0.0
53	252	63.0	0.0	127.9	0.2	14	54.6	0.0	84.1	0.0	266	62.6	0.0	125.6	0.0
54	213	61.9	0.0	124.0	0.1	19	63.2	0.0	95.7	0.0	232	62.0	0.0	121.7	0.0
55	212	63.3	0.0	121.6	0.4	7	60.0	0.0	151.9	0.0	219	63.2	0.0	122.6	0.0
56	254	63.4	0.0	134.4	0.6	15	52.0	0.0	120.7	0.0	269	62.8	0.0	133.6	0.0
57	277	64.5	0.0	137.6	1.0	14	55.7	0.0	107.4	0.0	291	64.1	0.0	136.1	0.0
58	238	62.6	0.0	137.4	0.3	15	60.0	0.0	148.3	0.0	253	62.4	0.0	138.1	0.0
59	211	62.8	0.0	136.3	0.3	11	57.3	0.0	132.2	0.0	222	62.5	0.0	136.1	0.0
60	74	59.1	0.0	119.1	0.0	8	56.3	0.0	127.6	0.0	82	58.5	0.0	120.0	0.0
61	41	62.2	0.0	101.3	0.0	2	60.0	0.0	53.0	0.0	43	62.1	0.0	99.0	0.0
62	39	59.2	0.0	93.3	0.0	1	45.0	0.0	76.0	0.0	40	58.9	0.0	92.9	0.0
63	29	62.1	0.0	115.8	0.0	1	75.0	0.0	90.0	0.0	30	62.5	0.0	114.9	0.0
64	18	63.3	0.0	105.1	0.0	2	75.0	0.0	124.0	0.0	20	64.5	0.0	107.0	0.0
65	62	61.5	0.0	135.0	0.0	8	60 0	0.0	108.0	0.0	70	0.0	0.0	0.0	0.0
Total	28,162	62.7	0.0	90.7	0.3	1,184	56.7	0.0	72.1	0.2	29,346	62.5	0.0	90.2	0.0

Source: MISAs Annual Report

Appendix 6

Table 6.1.D.1 :Total Number of the Insured on 30/06/1996 covered by Law 112

Age	Male	Female
18-20	193568	6193
25-	541991	17339
30-	989633	32001
35-	1122363	36250
40-	741065	23742
45-	519566	16934
50-	342892	10970
55-	276526	8847
60-	642540	19524
65-	160385	5131
Total	5530529	176931

Source: MISAs Annual Report

Table 6.1.E.1 :Number of insured workers, salary and contribution period by age and sex (Egyptians working abroad)

Age	Male					Female					Both sexes				
	Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period		Number	Salary (L.E.)		Period	
		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable
19	7	50.0	0.0	8.6	0.0						7	50.0	0.0	8.6	0.0
20	16	50.0	0.0	13.8	0.0						16	50.0	0.0	13.8	0.0
21	31	50.0	0.0	12.5	0.0						31	50.0	0.0	12.5	0.0
22	36	50 0	0.0	20.4	0.0	1	50.0	0.0	19.0	0.0	37	50.0	0.0	20.3	0.0
23	88	50.0	0.0	19.4	0.0						88	50.0	0 0	19.4	0.0
24	137	51.1	0.0	23.2	0.1	1	50.0	0.0	34.0	0.0	138	51.1	0.0	23.3	0.0
25	258	51.6	0.0	25.6	0.4	5	130.0	0.0	29.0	7.4	263	53.1	0.0	25.7	0.0
26	342	52.3	0.0	29.4	0.5	3	50.0	0.0	26.0	0.0	345	52.3	0.0	29.3	0.0
27	462	53.5	0.0	33.2	1.0	5	60.0	0.0	43.2	0.0	467	53.5	0.0	33.3	0.0
28	482	54.1	0.0	35.9	0.9	7	50.0	0.0	35.1	0.0	489	54.1	0.0	35.9	0.0
29	487	57.3	0.0	38.5	1.3	6	50.0	0.0	48.0	0.0	493	57.2	0.0	38.6	0.0
30	468	62.2	0.0	41.1	2.8	6	141.7	0.0	66.8	0.0	474	63.2	0.0	41.4	0.0
31	405	66.2	0.0	44.6	4.2	7	50.0	0.0	50.3	1.0	412	66.0	0.0	44.7	0.1
32	374	71.5	0.0	50.0	3.9	12	75.0	0.0	58.6	12.2	386	71.6	0.0	50.3	0.1
33	363	87.1	0.0	54.9	5.7	11	68.2	0.0	77.1	0.0	374	86.5	0.0	55.5	0.1
34	336	101.8	0.0	60.3	8.8	9	177.8	0.0	90.9	0.0	345	103.8	0.0	61.1	0.1
35	292	105.9	0.0	65.7	11.0	10	160.0	0.0	73.6	0.0	302	107.7	0.0	66.0	0.1
36	371	126.4	0.0	66.9	11.5	21	139.8	0.0	62.9	9.9	392	127.2	0.0	66.7	0.1
37	354	133.7	0.0	73.9	10.4	17	201.5	0.0	57.4	0.0	371	136.8	0.0	73.1	0.1
38	333	145.7	0.0	83.8	13.8	20	192.0	0.0	75.0	6.8	353	148.3	0.0	83.3	0.1
39	405	166.4	0.0	91.3	16.9	19	118.4	0.0	90.4	6.0	424	164.3	0.0	91.2	0.1
40	401	184.3	0.0	90.0	14.3	19	262.6	0.0	81.8	26.0	420	187.9	0.0	89.6	0.1
41	432	212.3	0.0	100.0	17.7	27	251.9	0.0	86.0	5.9	459	214.6	0.0	99.2	0.1
42	400	220.6	0.0	106.2	18.7	24	225.0	0.0	84.8	4.5	424	220.9	0.0	105.0	0.1
43	450	237.8	0.0	115.4	17.7	33	213.0	0.0	73.7	0.8	483	236.1	0.0	112.5	0.1
44	456	222.3	0.0	115.1	14.6	38	206.6	0.0	128.2	1.1	494	221.1	0.0	116.1	0.1
45	423	220.1	0.0	117.0	12.1	29	209.3	0.0	120.9	0.0	452	219.4	0.0	117.3	0.1
46	391	235.1	0.0	127.3	13.0	26	218.1	0.0	10.2	3.2	417	234.1	0.0	120.0	0.1
47	416	213.6	0.0	131.5	10.6	25	256.8	0.0	109.6	4.8	441	216.1	0.0	130.3	0.0
48	370	252.1	0.0	134.1	12.6	18	188.9	0.0	115.7	13.4	388	249.1	0.0	133.2	0.1
49	374	235.3	0.0	141.6	8.4	32	210.5	0.0	103.7	0.0	406	233.4	0.0	138.6	0.0
50	361	215.1	0.0	150.7	8.4	25	193.6	0.0	129.0	4.6	386	213.7	0.0	149.3	0.0
51	363	239.8	0.0	158.0	6.2	28	212.0	0.0	129.9	1.5	391	237.8	0.0	156.0	0.0
52	359	213.5	0.0	157.3	4.6	22	183.0	0.0	145.0	0.0	381	211.8	0.0	156.6	0.0
53	290	221.6	0.0	145.5	6.3	18	168.9	0.0	155.2	5.5	308	218.6	0.0	154.6	0.0
54	268	234.9	0.0	158.2	3.2	10	102.0	0.0	176.9	0.0	278	230.1	0.0	158.9	0.0
55	238	212.9	0.0	167.8	3.5	9	111.1	0.0	141.4	0.0	247	209.2	0.0	166.9	0.0
56	208	205.5	0.0	166.6	3.3	10	150.0	0.0	105.5	0.0	218	203.0	0.0	163.8	0.0
57	200	220.6	0.0	165.0	3.4	7	140.7	0.0	125.7	0.0	207	217.9	0.0	163.7	0.0
58	175	211.0	0.0	185.7	3.6	5	170.0	0.0	82.6	0.0	180	209.9	0.0	182.8	0.0
59	157	191.9	0.0	178.9	3.3	6	86.7	0.0	229.7	0.0	163	188.0	0.0	180.7	0.0
60	48	153.2	0.0	176.0	0.0	2	275.0	0.0	125.0	0.0	50	158.1	0.0	173.9	0.0
61	39	150.8	0.0	152.0	0.0						39	150.8	0.0	152.0	0.0
62	29	155.5	0.0	138.4	0.6						29	155.5	0.0	138.4	0.0
63	23	174.8	0 0	152.4	0.6						23	174.8	0.0	152.4	0.0
64	14	194.6	0 0	135.9	0.0						14	194.6	0.0	135.9	0.0
65	66	136.6	0.0	176.9	0.0	3	100.0	0.0	150.0	0.0	69	135.0	0.0	175.7	0.0
Total	12,998	156.9	0.0	96.0	8.1	576	182.8		96.9	3.8	13,574	158.0	0.0	96.0	0.0

Source: MISAs Annual Report

Appendix 6

Table 6.1.F.1 :Number of insured workers, salary and contribution period by age and sex

Age	Male					Female					Both sexes				
	Number	Salary (L.E.)		Period (m)		Number	Salary (L.E.)		Period (m)		Number	Salary (L.E.)		Period (m)	
		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable		Basic	Variable	Basic	Variable
20-24	21,519	64.4	0.0	15.9	0.1	5,436	59.2	0.0	15.5	0.1	26,955	63.3	0.0	15.8	0.1
25-29	83,965	63.7	0.0	38.5	0.4	19,021	57.7	0.0	34.2	0.2	102,986	62.6	0.0	37.7	0.4
30-34	133,516	67.0	0.0	68.3	1.0	29,413	57.9	0.0	54.0	0.5	162,929	65.3	0.0	65.7	0.9
35-39	155,019	68.9	0.0	102.0	1.6	32,604	58.5	0.0	71.6	0.5	187,623	67.1	0.0	96.8	1.4
40-44	167,062	69.0	0.0	132.3	1.4	38,692	57.7	0.0	89.3	0.3	205,754	66.9	0.0	124.2	1.2
45-49	143,656	70.3	0.0	160.2	0.9	40,548	57.2	0.0	107.0	0.2	184,204	67.4	0.0	148.5	0.8
50-54	96,573	73.1	0.0	184.3	0.6	32,840	56.5	0.0	120.5	0.1	129,413	68.9	0.0	168.1	0.4
55-59	74,218	66.9	0.0	198.4	0.2	25,269	54.8	0.0	126.5	0.0	99,487	63.8	0.0	180.1	0.2
60-64	60,855	57.9	0.0	214.5	0.1	18,545	52.3	0.0	144.5	0.0	79,400	56.6	0.0	198.2	0.1
65+	4,308	55.8	0.0	171.0	0.1	2,867	51.6	0.0	119.7	0.0	7,175	54.2	0.0	150.5	0.0
Total	940,691	67.8	0.0	127.5	0.9	245,235	56.8	0.0	92.3	0.2	1,185,926	65.5	0.0	120.2	0.0

Source: MISAs Annual Report

Table 6.1.F.2 :Number of pension in payment, Average Pension by Age and Sex (Death)

Age	Number	Amount of Pension			
		Basic	Variable	increment	Total
18	9	95.0	0.0	702.0	796.0
19	16	135.0	0.0	1,078.0	1,213.0
20	9	75.0	0.0	665.0	740.0
21	11	116.0	0.0	792.0	908.0
22	1	9.0	0.0	82.0	91.0
23	7	164.0	0.0	572.0	735.0
24	9	111.6	0.0	440.0	551.7
25	5	81.0	0.0	63.0	144.0
26	17	257.0	0.0	478.0	735.0
27	20	459.0	0.0	369.0	828.0
28	34	723.0	0.0	824.0	1,547.0
29	49	1,067.0	0.0	1,070.0	2,138.0
30	63	1,484.0	0.0	1,511.0	2,995.0
31	87	2,029.0	0.0	2,560.0	4,589.0
32	126	2,980.0	42.0	4,180.0	7,202.0
33	168	4,251.0	0.0	5,534.0	9,785.0
34	181	4,480.0	0.0	7,131.0	11,610.0
35	227	5,619.0	0.0	8,795.0	14,414.0
36	283	7,335.0	0.0	12,514.0	19,849.0
37	328	7,952.0	3.0	14,864.0	22,819.0
38	431	11,174.0	0.0	20,673.0	31,847.0
39	499	13,144.0	0.0	24,537.0	37,680.0
40	585	14,587.0	4.0	30,646.0	45,237.0
41	679	16,622.0	0.0	34,365.0	50,987.0
42	805	19,550.0	11.0	41,645.0	61,206.0
43	963	23,280.0	33.0	50,703.0	74,016.0
44	990	24,664.0	0.0	53,585.0	78,250.0
45	1,115	26,587.0	0.0	60,125.0	86,712.0
46	1,234	29,238.0	0.0	65,028.0	94,266.0
47	1,336	32,237.0	7.0	69,264.0	101,508.0
48	1,371	33,247.0	48.0	72,549.0	105,844.0
49	1,488	34,657.0	23.0	78,825.0	113,506.0
50	1,691	38,796.0	1.0	90,380.0	129,177.0
51	1,574	36,913.0	4.0	84,006.0	120,923.0
52	1,553	35,381.0	1.0	81,260.0	116,641.0
53	1,539	35,614.0	0.0	82,207.0	117,822.0
54	1,688	37,051.0	52.0	87,145.0	124,248.0
55	1,631	35,349.0	27.0	87,990.0	123,366.0
56	1,872	39,872.0	1.0	97,615.0	137,489.0
57	2,246	48,452.0	65.0	117,113.0	165,630.0
58	2,326	46,772.0	0.0	120,169.0	166,941.0
59	2,509	49,376.0	1.0	132,597.0	181,975.0
60	2,782	55,548.0	0.0	141,184.0	196,732.0
61	2,925	56,141.0	0.0	146,295.0	202,436.0
62	2,849	53,735.0	0.0	146,178.0	199,913.0
63	3,186	59,966.0	0.0	163,055.0	223,021.0
64	3,650	65,172.0	2.0	187,213.0	252,386.0
65	3,872	68,024.0	0.0	195,121.0	263,145.0
66	3,805	64,355.0	0.0	196,903.0	261,259.0
67	3,902	63,980.0	8.0	211,001.0	274,989.0
68	3,424	53,801.0	0.0	194,032.0	247,833.0
69	3,034	45,454.0	0.0	180,199.0	225,653.0
70	2,774	39,453.0	0.0	172,720.0	212,173.0
71	2,577	35,011.0	0.0	167,048.0	202,059.0
72	2,406	30,669.0	0.0	160,356.0	191,025.0
73	1,957	24,735.0	0.0	134,080.0	158,815.0
74	1,866	21,239.0	0.0	128,295.0	149,535.0
75	1,702	18,339.0	0.0	118,152.0	136,491.0
76	1,294	13,469.0	0.0	90,916.0	104,385.0
77	1,309	12,462.0	0.0	90,820.0	103,283.0
78	921	8,417.0	0.0	63,700.0	72,117.0
79	897	7,815.0	0.0	62,847.0	70,662.0
80+	7,302	487.0	0.0	2,634.0	3,121.0

Source: MISAs Annual Report

Appendix 6

Table 6.1.F.1 :Number of pensions in payment, average pension by age, sex and category of work (Disability)

Age	Number	Amount of Pension			
		Basic	Variable	Increments	Total
15-19	5	39.0		405.0	444.0
20-24	2	19.0		167.0	186.0
25-29	5	149.0		177.0	326.0
30-34	40	1,073.0		1,964.0	3,037.0
35-39	164	4,211.0		7,543.0	11,754.0
40-44	501	11,915.0	3.0	27,193.0	39,111.0
45-49	1,017	22,488.0		54,632.0	77,120.0
50-54	1,432	28,813.0		78,443.0	107,256.0
55-59	2,050	40,550.0		111,922.0	152,472.0
60-64	3,572	65,004.0		192,927.0	257,931.0
65-69	4,095	63,928.0		244,305.0	308,233.0
70-74	3,006	37,457.0		211,322.0	248,779.0
75-79	1,728	15,900.0		122,191.0	138,091.0
80+	1,368	12,290.0		100,983.0	113,273.0
Total	18,985	303,835.0		1,154,177.0	1,458,015.0

Source: MISAs Annual Report

Appendix 6

Table 6.1.F.4 :Number of pensions in payment, average pension by age, sex and category of work (Employment Injury)

Age	Number	Amount of Pension			
		Basic	Variable	Increments	Total
15-19					
20-24					
25-29					
30-34					
35-39	3	95.0		334.0	429.0
40-44					
45-49	4	65.0		242.0	307.0
50-54	5	142.0		477.0	619.0
55-59	4	57.0		261.0	318.0
60-64	3	34.0		234.0	268.0
65-69	3	48.0		237.0	285.0
70-74	7	149.0		624.0	773.0
75-79	1	9.0		80.0	89.0
80+	5				0.0
Total	35	599.0		2,489.0	3,088.0

Source: MISAs Annual Report

Table 6.1.F.5 : Number of pensions in payment, average pension by age, sex and category of work (Old Age)

Age	Number	Amount of Pension			
		Basic	Variable	Increments	Total
15-19	3	17.0		169.0	186.0
20-24	1	9.0		80.0	89.0
25-29	1	7.0		60.0	67.0
30-34	5	34.0		252.0	286.0
35-39	5	79.0		343.0	422.0
40-44	20	432.0		1,357.0	1,789.0
45-49	29	593.0		2,041.0	2,634.0
50-54	57	1,367.0		4,228.0	5,595.0
55-59	91	1,466.0		6,837.0	8,303.0
60-64	176	2,812.0		13,543.0	16,355.0
65-69	47,488	665,242.0	15.0	1,380,693.0	2,045,949.0
70-74	48,550	452,222.0	0.0	2,506,194.0	2,958,416.0
75-79	31,626	206,230.0		2,523,624.0	2,729,854.0
80+	11,465	71,177.0	11.0	881,690.0	952,877.0
Total	139,517	1,401,686.0	25.0	7,321,111.0	8,722,822.0

Source: MISAs Annual Report

Appendix 6

Table 6.1.F.6 :Number of pensions in payment, average pension by age, sex (Early Retirement)

Age	Number	Amount of Pension			
		Basic	Variable	Increments	Total
30-34	0	0.0	0.0	0.0	0.0
35-39	1	20.0	0.0	63.0	83.0
40-44	23	563.0	0.0	490.0	1,053.0
45-49	188	3,445.0	0.0	3,896.0	7,341.0
50-54	375	6,767.0	2.0	8,737.0	15,506.0
55-59	619	11,255.0	18.0	15,890.0	27,163.0
60-64	681	13,157.0	0.0	17,777.0	30,934.0
65-69	258	4,771.0	8.0	9,992.0	14,771.0
70-74	64	823.0	0.0	3,851.0	4,674.0
75-79	19	210.0	0.0	1,314.0	1,524.0
80+	19	272.0	8.0	1,406.0	1,686.0
Total	2,247	41,283.0	35.0	63,416.0	104,733.0

Source: MISAs Annual Report

Appendix 6

Table 6.1.F.7 : Number of survivors' pensions in payment, average pension by age,sex and category of work (Siblings)

Age	Male		Female		Total	
	Number	Amount of Pension	Number	Amount of Pension	Number	Amount of Pension
0-4	1	2.4	1	1.7	2	4.1
5-9	8	20.8	4	12	12	32.8
10-14	11	86.9	8	24.8	19	111.7
15-19	24	280.8	30	300	54	580.8
20-24	20	174	32	294.4	52	468.4
25-29	4	54.8	26	449.8	30	504.6
30-34			19	324.9	19	324.9
35-39			16	300.8	16	300.8
40-44			12	350.4	12	350.4
45-49			28	736.4	28	736.4
50-54	1	26.5	30	810	31	836.5
55-59			46	1025.8	46	1025.8
60-64	3	88.5	71	1980.9	74	2069.4
65-69			67	1835.8	67	1835.8
70-74			60	1782	60	1782
75-79			39	1267.5	39	1267.5
80-84			16	553.6	16	553.6
85-89			5	194.5	5	194.5
90+			2	65.8	2	65.8
Total	72	734.7	512	12311.1	584	13045.8

Source: MISAs Annual Report

Appendix 6

Table 6.1.F.8 : Number of survivors' pensions in payment, average pension by age, sex and category of work (Orphans)

Age	Male		Female		Total	
	Number	Amount of Pension	Number	Amount of Pension	Number	Amount of Pension
0-4	1171	11358.7	1105	10387	2276	21745.7
5-9	6671	66710	6283	62201.7	12954	128911.7
10-14	14031	147325.5	13274	139377	27305	286702.5
15-19	19351	241887.5	16014	195370.8	35365	437258.3
20-24	12823	198756.5	11804	169977.6	24627	368734.1
25-29	833	14827.4	5775	99907.5	6608	114734.9
30-34	70	1806	2845	61736.5	2915	63542.5
35-39	61	2086.2	1560	42276	1621	44362.2
40-44	41	1385.8	1064	34899.2	1105	36285
45-49	28	1072.4	879	31819.8	907	32892.2
50-54	4	170.8	442	18431.4	446	18602.2
55-59	3	178.2	180	7956	183	8134.2
60-64	1	59.4	44	1993.2	45	2052.6
65-69		0	6	295.8	6	295.8
70-74	1	11.1			1	11.1
75-79						0
80-84						0
85-89						0
90+	16	169.6	15	160.5	31	330.1
Total	55105	687805.1	512	876790	116395	1564595.1

Source: MISAs Annual Report

Appendix 6

Table 6.1.F.9 : Number of survivors' pensions in payment, average pension by age, sex and category of work (Parents)

Age	Male		Female		Total	
	Number	Amount of Pension	Number	Amount of Pension	Number	Amount of Pension
40-44			4	78.0	4	78.0
45-49	4	58.4	37	762.2	41	820.6
50-54	17	207.4	104	1924.0	121	2131.4
55-59	65	708.5	287	4592.0	352	5300.5
60-64	130	1391.0	526	6732.8	656	8123.8
65-69	269	2421.0	819	10155.6	1088	12576.6
70-74	283	2490.4	930	11904.0	1213	14394.4
75-79	245	2156.0	713	9055.1	958	11211.1
80-84	155	1519.0	561	8022.3	716	9541.3
85-89	71	837.8	236	3374.8	307	4212.6
90+	36	547.2	93	1683.3	129	2230.5
Total	1275	12336.7	4310	58284.1	5585	70620.8

Source: MISAs Annual Report

Table 6.1.F.10 :Number of survivors' pensions in payment, average pension by age and sex (Widow(er)s)

Age	Male		Female		Total	
	Number	Amount of Pension	Number	Amount of Pension	Number	Amount of Pension
14		0.0		0 0	0	0.0
15		0.0		0.0	0	0.0
16		0.0		0.0	0	0.0
17		0.0		0.0	0	0.0
18		0.0	2	31.4	2	31.4
19		0.0	3	103.8	3	103 8
20		0.0	3	65.1	3	65.1
21		0.0	12	253.2	12	253.2
22		0.0	14	323.4	14	323.4
23		0.0	24	595 2	24	595.2
24		0.0	39	1021.8	39	1021.8
25		0.0	44	1016.4	44	1016 4
26		0.0	88	1944.8	88	1944 8
27		0.0	98	2518 6	98	2518 6
28		0.0	115	2944.0	115	2944.0
29		0.0	182	4750.2	182	4750.2
30		0.0	192	4992.0	192	4992.0
31		0.0	238	6640.2	238	6640.2
32		0.0	292	8088.4	292	8088.4
33		0.0	385	10587.5	385	10587.5
34		0.0	490	13671.0	490	13671.0
35		0.0	455	12558.0	455	12558.0
36		0.0	600	16920.0	600	16920.0
37		0.0	700	19530 0	700	19530.0
38		0.0	698	20451.4	698	20451.4
39		0.0	752	21883.2	752	21883 2
40		0.0	814	23524.6	814	23524.6
41		0.0	925	27102.5	925	27102.5
42		0.0	1089	31472.1	1089	31472.1
43		0.0	1138	33912.4	1138	33912.4
44		0 0	1242	36514 8	1242	36514.8
45		0.0	1381	41291.9	1381	41291.9
46		0.0	1466	43686 8	1466	43686 8
47		0.0	1640	50512.0	1640	50512.0
48		0.0	1633	50459.7	1633	50459.7
49		0.0	1650	51645.0	1650	51645.0
50		0 0	1765	55597.5	1765	55597.5
51	1	37.2	1716	56113.2	1717	56150.4
52		0.0	1917	63069.3	1917	63069.3
53	1	41 0	1747	59747.4	1748	59788.4
54	1	12.4	1705	58652 0	1706	58664.4
55		0.0	1810	62264 0	1810	62264 0
56		0.0	1882	65305.4	1882	65305 4
57		0.0	2218	79626.2	2218	79626.2
58	1	29.7	1962	72397.8	1963	72427.5
59	2	60.2	2048	76595.2	2050	76655.4
60		0 0	1962	74359 8	1962	74359.8
61		0.0	2076	80341.2	2076	80341.2
62		0.0	1991	80436.4	1991	80436.4
63		0.0	1987	82659 2	1987	82659.2
64		0.0	1891	80934 8	1891	80934.8
65		0.0	1825	81395.0	1825	81395.0
66		0.0	1750	80325.0	1750	80325.0
67	1	20.8	1933	91237.6	1934	91258.4
68	1	28.9	1566	77517.0	1567	77545.9
69	1	53.5	1304	65721 6	1305	65775.1
70	2	72.6	1110	56721.0	1112	56793 6
71	1	68.8	996	53983 2	997	54052 0
72		0.0	921	49826.1	921	49826.1
73		0 0	737	41345.7	737	41345.7
74	2	62.0	524	28977.2	526	29039.2
75	1	35.9	391	22091 5	392	22127.4
76		0.0	349	19334.6	349	19334.6
77		0.0	306	17136 0	306	17136 0
78		0.0	172	10010 4	172	10010.4
79		0 0	125	7212.5	125	7212.5
80		0 0	86	4884 8	86	4884 8
81	1	50 6	59	3304.0	60	3354 6
82		0.0	57	2889.9	57	2889.9
83		0.0	54	2840 4	54	2840 4
84	1	44.6	54	2694.6	55	2739 2
85		0.0	27	1522 8	27	1522.8
86		0.0	5	253.0	5	253 0
87		0.0	9	296.1	9	296.1
88		0.0	2	111 4	2	111.4
89		0.0	0	0.0	0	0.0
90+		0 0	6	383 4	6	383 4
Total	17	618 2	61449	2311125 6	61466	2311743.8

Source: MISAs Annual Report

Table 6.2.1 :Projected Number of Contributors of ESSPS Over 1997-2025 (Low Cost Scenario)

Schemes			1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Male	GSF	Civil Servant	2568590	2655001	2737644	2822281	2906423	2994327	3083727	3172159	3261926	3728726	4201777	4673155	5136920
	PPSF	Public Workers	1137360	1175623	1212217	1249694	1286951	1325874	1365460	1404618	1444366	1651063	1860528	2069252	2274605
		Private Workers	3187949	3295196	3397767	3502813	3607243	3716343	3827299	3937055	4048467	4627827	5214943	5799983	6375575
		Casual Workers	5653098	5843277	6025163	6211436	6396619	6590083	6786840	6981466	7179030	8206392	9247508	10284943	11305624
		Working Abroad	11830	12228	12608	12998	13386	13790	14202	14609	15023	17173	19351	21522	23658
		Self-Employed	1410287	1457731	1503107	1549577	1595774	1644038	1693123	1741677	1790964	2047261	2306990	2565800	2820431
		TOTAL	13969114	14439056	14888506	15348799	15806396	16284455	16770651	17251584	17739776	20278442	22851097	25414655	27936813
Female	GSF	Civil Servant	1212904	1267589	1308423	1356166	1402892	1449079	1498178	1545840	1594200	1836490	2077358	2311096	2538047
	PPSF	Public Workers	216640	226407	233701	242228	250574	258824	267594	276107	284744	328020	371042	412791	453327
		Private Workers	787051	822536	849033	880013	910334	940305	972165	1003093	1034473	1191694	1347994	1499666	1646933
		Casual Workers	180852	189006	195094	202213	209180	216067	223388	230495	237706	273833	309748	344600	378440
		Working Abroad	1165	1217	1256	1302	1347	1391	1438	1484	1531	1763	1995	2219	2437
		Self-Employed	305391	319160	329441	341462	353227	364856	377219	389219	401396	462400	523048	581899	639042
		TOTAL	2704003	2825915	2916948	3023384	3127554	3230522	3339982	3446238	3554050	4094200	4631185	5152271	5658226
Total	GSF	Civil Servant	3781494	3922590	4046067	4178447	4309315	4443406	4581905	4717999	4856126	5565216	6279135	6984251	7674967
	PPSF	Public Workers	1354000	1402030	1445918	1491922	1537525	1584698	1633054	1680725	1729110	1979083	2231570	2482043	2727932
		Private Workers	3975000	4117732	4246800	4382826	4517577	4656648	4799464	4940148	5082940	5819521	6562937	7299649	8022508
		Casual Workers	5833950	6032283	6220257	6413649	6605799	6806150	7010228	7211961	7416736	8480225	9557256	10629543	11684064
		Working Abroad	12995	13445	13864	14300	14733	15181	15640	16093	16554	18936	21346	23741	26095
		Self-Employed	1715678	1776891	1832548	1891039	1949001	2008894	2070342	2130896	2192360	2509661	2830038	3147699	3459473
		TOTAL	16673117	17264971	17805454	18372183	18933950	19514977	20110633	20697822	21293826	24372642	27482282	30566926	33595039

Source: Derived by Author

Table 6.2.2:Projected Number of Contributors of ESSPS Over 1997-2025 (Medium Cost Scenario)

Schemes			1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Male	GSF	Civil Servant	2561465	2637489	2715576	2799504	2883321	2967896	3054571	3142392	3230842	3691047	4167350	4656061	5159957
	PPSF	Public Workers	1134205	1167868	1202445	1239608	1276722	1314171	1352550	1391437	1430603	1634379	1845284	2061683	2284806
		Private Workers	3179106	3273462	3370377	3474542	3578571	3683539	3791113	3900111	4009889	4581062	5172214	5778768	6404168
		Casual Workers	5637418	5804735	5976592	6161306	6345777	6531913	6722671	6915954	7110620	8123466	9171739	10247323	11356326
		Working Abroad	11797	12147	12507	12893	13279	13669	14068	14472	14880	16999	19193	21443	23764
		Self-Employed	1406375	1448116	1490990	1537070	1583091	1629526	1677115	1725334	1773897	2026573	2288088	2556415	2833080
	TOTAL		13930366	14343817	14768487	15224923	15680761	16140714	16612088	17089700	17570731	20073526	22663868	25321693	28062101
Female	GSF	Civil Servant	1209692	1245242	1281595	1325831	1367634	1409485	1453152	1496947	1539926	1760556	1979098	2198707	2433126
	PPSF	Public Workers	216066	222416	228909	236810	244277	251752	259551	267374	275050	314458	353492	392717	434587
		Private Workers	784967	808035	831625	860329	887455	914612	942948	971366	999255	1142421	1284233	1426736	1578851
		Casual Workers	180373	185674	191094	197690	203923	210164	216675	223205	229613	262510	295097	327842	362795
		Working Abroad	1161	1196	1230	1273	1313	1353	1395	1437	1479	1690	1900	2111	2336
		Self-Employed	304582	313533	322686	333824	344350	354887	365882	376909	387730	443281	498307	553601	612625
	TOTAL		2696841	2776096	2857139	2955757	3048952	3142253	3239603	3337238	3433053	3924916	4412127	4901714	5424320
Total	GSF	Civil Servant	3771157	3882731	3997171	4125335	4250955	4377381	4507723	4639339	4770769	5451603	6146448	6854768	7593084
	PPSF	Public Workers	1350271	1390284	1431354	1476418	1520999	1565923	1612101	1658811	1705653	1948837	2198776	2454400	2719393
		Private Workers	3964073	4081497	4202002	4334871	4466026	4598151	4734061	4871477	5009144	5723483	6456447	7205504	7983019
		Casual Workers	5817791	5990409	6167686	6358996	6549700	6742077	6939346	7139159	7340233	8385976	9466836	10575165	11719121
		Working Abroad	12958	13343	13737	14166	14592	15022	15463	15909	16359	18689	21093	23554	26100
		Self-Employed	1710957	1761649	1813676	1870894	1927441	1984413	2042997	2102243	2161627	2469854	2786395	3110016	3445705
	TOTAL		16627207	17119913	17625626	18180680	18729713	19282967	19851691	20426938	21003785	23998442	27075995	30223407	33486422

Source: Derived by Author

Table 6.2.3 :Projected Number of Contributors of ESSPS Over 1997-2025 (High Cost Scenario)

Schemes			1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Male	GSF	Civil Servant	2536550	2602283	2664694	2735259	2802499	2868068	2934027	2998966	3063702	3395232	3725077	4081211	4470045
	PPSF	Public Workers	1123173	1152279	1179915	1211161	1240934	1269968	1299174	1327929	1356594	1503393	1649448	1807142	1979316
		Private Workers	3148183	3229766	3307226	3394807	3478260	3559640	3641504	3722101	3802447	4213917	4623298	5065305	5547899
		Casual Workers	5582582	5727251	5864609	6019914	6167898	6312206	6457373	6600294	6742769	7472417	8198361	8982159	9837929
		Working Abroad	11682	11985	12272	12597	12907	13209	13513	13812	14110	15637	17156	18796	20587
		Self-Employed	1392695	1428786	1463053	1501797	1538715	1574716	1610931	1646585	1682129	1864155	2045258	2240793	2454283
		TOTAL	13794865	14152350	14491769	14875535	15241213	15597807	15956522	16309687	16661751	18464751	20258598	22195406	24310059
Female	GSF	Civil Servant	1237501	1244095	1287521	1347050	1402415	1458907	1517578	1577518	1638776	1976224	2357414	2815089	3374167
	PPSF	Public Workers	221033	222211	229968	240600	250489	260579	271059	281765	292706	352979	421064	502811	602669
		Private Workers	803012	807290	835470	874098	910024	946682	984753	1023648	1063399	1282368	1529721	1826706	2189490
		Casual Workers	184520	185503	191978	200854	209109	217533	226281	235218	244352	294668	351506	419748	503111
		Working Abroad	1188	1194	1236	1293	1346	1401	1457	1515	1573	1897	2263	2703	3240
		Self-Employed	311584	313244	324178	339167	353107	367331	382103	397195	412619	497584	593561	708797	849564
		TOTAL	2758838	2773537	2870351	3003062	3126490	3252433	3383231	3516859	3653425	4405720	5255529	6275854	7522241
Total	GSF	Civil Servant	3774051	3846378	3952215	4082309	4204913	4326975	4451605	4576484	4702479	5371456	6082492	6896300	7844212
	PPSF	Public Workers	1344206	1374490	1409883	1451761	1491423	1530547	1570233	1609694	1649300	1856372	2070512	2309953	2581985
		Private Workers	3951195	4037056	4142696	4268905	4388284	4506322	4626257	4745749	4865846	5496285	6153019	6892011	7737389
		Casual Workers	5767102	5912754	6056587	6220768	6377007	6529739	6683654	6835512	6987121	7767085	8549867	9401907	10341040
		Working Abroad	12870	13179	13508	13890	14253	14610	14970	15327	15683	17534	19419	21499	23827
		Self-Employed	1704279	1742030	1787231	1840964	1891822	1942047	1993034	2043780	2094748	2361739	2638819	2949590	3303847
		TOTAL	16553703	16925887	17362120	17878597	18367702	18850240	19339753	19826546	20315177	22870471	25514128	28471260	31832300

Source: Derived by Author

Appendix 6

Table 6.2.A.1 :Estimation of the GSF members over 1997-2025 (Medium Cost Scenario)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Number Covered	3771157	3882731	3997171	4125335	4250955	4377381	4507723	4639339	4770769	5451603	6146448	6854768	7593084
No Pensioners	522327	558785	597897	639374	683283	729733	779109	831000	885164	1218833	1709154	2392391	3336057
Old-Age and Early retirement	391127	418389	447634	478521	511060	545301	581564	619365	658385	897351	1253645	1741558	2401123
Invalidity and Work Injuries	14846	16479	18292	20304	22537	25016	27768	30823	34213	57651	95395	159298	265283
Death (cases)	116354	123917	131972	140550	149686	159415	169777	180813	192565	263831	360114	491534	669651
Demographic Ratio	13.9	14.4	15.0	15.5	16.1	16.7	17.3	17.9	18.6	22.4	27.8	34.9	43.9

Source: Derived by Author

Table 6.2.A.2 :Estimated Income and Expenditure of the GSF over 1997-2025
High Growth & Low Cost Scenario

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Total Income	10681	11840	13238	14433	16038	17876	19966	21936	24422	39820	64984	99687	145563
Pensionable Salary (In million L.E)													
Basic Pensionable Salary	8258	8827	9456	10123	10861	11649	12556	13538	14603	21444	31242	45200	63304
Variable Pensionable Salary	7622	8148	8729	9345	10025	10753	11590	12497	13479	19795	28839	41723	58435
Total Pensionable Salary	15880	16975	18185	19468	20886	22402	24146	26035	28082	41239	60081	86923	121739
Contribution													
Basic Contribution	2457	2626	2813	3011	3230	3465	3734	4027	4343	6379	9293	13445	18830
Variable Contribution	2348	2510	2689	2879	3088	3312	3570	3849	4151	6097	8883	12851	17998
Total Contribution	4889	5226	5598	5993	6429	6897	7433	8015	8644	12695	18495	26758	37475
Treasury Subsidy													
Treasury Subsidy 1% (Basic+Variable)	84	90	96	103	111	120	129	139	150	219	319	462	647
Treasury Subsidy Increments	1190	1324	1480	1655	1860	2091	2375	2696	3061	5633	9857	16312	24199
Other Treasury Subsidy	153	175	200	228	261	298	346	400	462	907	1652	2801	4192
Total Treasury Subsidy	1427	1589	1776	1986	2232	2509	2850	3234	3673	6759	11828	19574	29038
Total Contribution +Subsidy	6316	6815	7374	7979	8661	9406	10283	11249	12317	19454	30323	46332	66513
Investment Income	4200	4816	5640	6214	7120	8194	9386	10366	11759	19858	33921	52285	77551
Other Incoms	165	209	224	240	257	276	297	321	346	508	740	1070	1499
Total Expenditure (in million L E.)	2827	3239	3613	4069	4584	5148	5842	6552	7419	12894	21712	34076	49115
Amount of Pension													
Old-Age and Early Retirement	2218	2549	2878	3244	3660	4116	4657	5240	5909	10212	17316	27447	39710
Basic	742	837	921	1015	1121	1235	1369	1507	1669	2630	4256	6397	8968
Variable	367	479	581	693	817	949	1100	1256	1434	2473	4162	6347	8945
Increment	1109	1233	1376	1536	1723	1932	2189	2478	2806	5109	8897	14702	21797
Ivalidity and Work Injury	48	56	65	75	86	98	111	127	143	253	415	645	934
Basic	17	19	20	22	24	27	29	31	34	50	71	97	131
Variable	8	10	12	14	16	18	21	23	26	42	63	89	122
Increment	23	27	32	38	45	53	62	72	83	161	282	458	681
Survivors Benefits	94	120	148	179	214	256	304	357	415	821	1429	2290	3375
Basic	20	30	40	51	62	76	91	106	123	230	376	570	827
Variable	16	26	37	48	59	74	89	104	121	229	376	570	827
Increment	58	64	72	81	93	107	125	146	171	363	678	1151	1721
Total Pension	2360	2725	3090	3498	3959	4469	5072	5724	6467	11286	19160	30382	44019
Basic	779	885	981	1088	1207	1338	1488	1645	1826	2909	4703	7064	9926
Variable	392	516	630	755	892	1041	1209	1383	1581	2744	4601	7006	9894
Increment	1190	1324	1480	1655	1860	2091	2375	2696	3061	5633	9857	16312	24199
Amount of other Benefits	327	357	355	391	432	472	547	588	693	1227	1997	2891	3972
Remuneration	145	153	162	173	191	209	242	260	307	543	884	1280	1758
Lump Sums, Grants, and other Allowance	182	204	193	218	241	263	305	328	386	684	1113	1611	2214
Administrative Costs	140	157	168	180	193	207	223	240	259	381	555	803	1124
Net Income	7854	8602	9625	10364	11454	12728	14124	15384	17003	26927	43272	65611	96449
Reserve at the Start of the year	38355	46209	54810	64435	74799	86254	98981	113105	128489	145492	257272	438037	713041
Reserve at the End of the year	46209	54810	64435	74799	86254	98981	113105	128489	145492	257272	438037	713041	1121766
Main Financial Indicators													
Contribution/Expenditure	172.9	161.4	154.9	147.3	140.3	134.0	127.2	122.3	116.5	98.5	85.2	78.5	76.3
Treasury Subsidy/Expenditure	50.5	49.1	49.2	48.8	48.7	48.7	48.8	49.4	49.5	52.4	54.5	57.4	59.1
Benefit Expenditure/ Contribution	57.8	62.0	64.5	67.9	71.3	74.6	78.6	81.7	85.8	101.6	117.4	127.3	131.1

Source: Derived by Author

Table 6.2.A.3 :Estimated Income and Expenditure of the GSF over 1997-2025

Moderate Growth & Medium Cost Scenario

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Total Income	10681	11825	12909	14090	15596	17323	19191	20676	22798	35305	54534	78680	107854
Pensionable Salary (In million L.E)													
Basic Pensionable Salary	8258	8829	9435	10082	10780	11532	12307	13135	14016	19431	26478	35559	46161
Variable Pensionable Salary	7622	8150	8709	9306	9951	10645	11360	12125	12938	17936	24441	32824	42610
Total Pensionable Salary	15880	16979	18144	19388	20731	22177	23667	25260	26954	37367	50919	68383	88771
Contribution													
Basic Contribution	2457	2626	2807	2999	3206	3430	3661	3907	4169	5780	7876	10577	13731
Variable Contribution	2348	2511	2682	2866	3064	3279	3499	3735	3985	5525	7528	10110	13124
Total Contribution	4889	5227	5585	5968	6381	6827	7286	7776	8297	11503	15674	21051	27327
Treasury Subsidy													
Treasury Subsidy 1% (Basic+Variable)	84	90	96	103	111	118	126	134	143	198	270	364	472
Treasury Subsidy Increments	1190	1325	1474	1643	1835	2055	2293	2558	2857	4906	8086	12701	18029
Other Treasury Subsidy	153	175	199	226	258	293	334	379	432	791	1357	2181	3122
Total Treasury Subsidy	1427	1590	1769	1972	2204	2466	2753	3071	3432	5895	9713	15246	21623
Total Contribution +Subsidy	6316	6817	7354	7940	8585	9293	10039	10847	11729	17398	25387	36297	48950
Investment Income	4200	4799	5332	5911	6756	7757	8861	9518	10737	17447	28520	41541	57811
Other Incoms	165	209	223	239	255	273	291	311	332	460	627	842	1093
Total Expenditure (in million L.E.)	2827	3239	3607	4053	4554	5105	5746	6390	7178	12016	19552	29678	41566
Amount of Pension													
Old-Age and Early Retirement	2218	2550	2872	3232	3637	4082	4581	5114	5722	9552	15717	24195	34163
Basic	742	837	921	1015	1121	1235	1369	1507	1669	2630	4256	6397	8968
Variable	367	479	581	693	817	949	1100	1256	1434	2473	4162	6347	8945
Increment	1109	1234	1370	1524	1700	1898	2113	2351	2619	4449	7298	11450	16250
Ivalidity and Work Injury	48	56	65	74	85	97	110	123	139	235	369	550	768
Basic	17	19	20	22	24	27	29	31	34	50	71	97	131
Variable	8	10	12	14	16	18	21	23	26	42	63	89	122
Increment	23	27	32	38	45	52	60	69	78	143	236	364	514
Survivors Benefits	94	120	148	179	212	254	300	349	402	773	1303	2026	2918
Basic	20	30	40	51	62	76	91	106	123	230	376	570	827
Variable	16	26	37	48	59	74	89	104	121	229	376	570	827
Increment	58	64	71	81	91	105	120	138	159	314	552	887	1265
Total Pension	2360	2725	3084	3485	3934	4433	4990	5586	6263	10559	17389	26771	37849
Basic	779	885	981	1088	1207	1338	1488	1645	1826	2909	4703	7064	9926
Variable	392	516	630	755	892	1041	1209	1383	1581	2744	4601	7006	9894
Increment	1190	1325	1474	1643	1835	2055	2293	2558	2857	4906	8086	12701	18029
Amount of other Benefits	327	357	355	389	429	467	537	571	666	1112	1693	2275	2897
Remuneration	145	153	162	172	190	207	238	253	295	492	749	1007	1282
Lump Sums, Grants, and other Allowance	182	204	193	217	239	260	299	318	371	620	944	1268	1615
Administrative Costs	140	157	168	179	191	205	219	233	249	345	470	632	820
Net Income	7854	8586	9302	10037	11042	12217	13445	14286	15620	23290	34981	49002	66288
Reserve at the Start of the year	38355	46209	54795	64096	74133	85175	97393	110837	125123	140743	238683	388562	599575
Reserve at the End of the year	46209	54795	64096	74133	85175	97393	110837	125123	140743	238683	388562	599575	888474
Main Financial Indicators													
Contribution/Expenditure	172.9	161.4	154.8	147.2	140.1	133.7	126.8	121.7	115.6	95.7	80.2	70.9	65.7
Treasury Subsidy/Expenditure	50.5	49.1	49.0	48.7	48.4	48.3	47.9	48.1	47.8	49.1	49.7	51.4	52.0
Benefit Expenditure/ Contribution	57.8	62.0	64.6	67.9	71.4	74 8	78.9	82.2	86.5	104.5	124.7	141.0	152.1

Source: Derived by Author

Table 6.2.A.4 :Estimated Income and Expenditure of the GSF over 1997-2025

High Growth & high Cost Scenario

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Total Income	10692	11762	13310	14750	16321	18123	20071	21622	23834	36878	56921	82090	112496
Pensionable Salary (In million L.E)													
Basic Pensionable Salary	0	9226	9860	10536	11265	12051	12861	13726	14647	20305	27670	37159	48238
Variable Pensionable Salary	0	8639	9232	9864	10548	11284	12042	12853	13714	19012	25907	34793	45167
Total Pensionable Salary	0	17865	19091	20400	21813	23335	24902	26579	28361	39318	53577	71953	93405
Contribution													
Basic Contribution	2457	2757	2947	3149	3366	3602	3844	4102	4377	6069	8270	11106	14418
Variable Contribution	2348	2662	2843	3038	3248	3476	3709	3959	4224	5857	7980	10717	13911
Total Contribution	4889	5521	5898	6302	6737	7207	7691	8207	8757	12136	16531	22198	28813
Treasury Subsidy													
Treasury Subsidy 1% (Basic+Variable)	84	102	108	115	123	130	138	146	155	210	282	376	484
Treasury Subsidy Increments	1190	1365	1519	1693	1892	2118	2363	2637	2945	5058	8336	13094	18588
Other Treasury Subsidy	164	187	213	242	276	313	358	406	462	847	1452	2334	3340
Total Treasury Subsidy	1438	1654	1840	2050	2290	2561	2859	3189	3562	6114	10070	15804	22412
Total Contribution +Subsidy	6327	7175	7738	8352	9028	9769	10550	11396	12319	18250	26601	38003	51225
Investment Income	4200	4367	5337	6147	7026	8067	9215	9899	11166	18145	29661	43203	60123
Other Incoms	165	219	234	251	268	287	306	327	349	483	658	884	1148
Total Expenditure (in million L.E.)	2827	3329	3706	4164	4678	5244	5902	6564	7374	12346	20088	30487	42691
Amount of Pension													
Old-Age and Early Retirement	2218	2613	2943	3312	3727	4183	4694	5240	5863	9787	16104	24793	35009
Basic	742	853	939	1035	1143	1260	1396	1537	1702	2682	4341	6525	9147
Variable	367	489	593	707	833	968	1122	1281	1463	2523	4246	6474	9124
Increment	1109	1271	1411	1570	1750	1955	2176	2422	2698	4582	7517	11794	16738
Ivalidity and Work Injury	48	57	67	77	88	100	113	127	143	243	382	569	794
Basic	17	19	21	23	25	27	29	32	35	50	72	99	134
Variable	8	10	12	14	17	19	21	24	27	43	64	92	126
Increment	23	28	34	40	46	54	62	71	82	149	246	378	535
Survivors Benefits	94	123	152	184	218	261	308	359	414	794	1340	2084	3001
Basic	20	30	40	51	63	77	92	108	124	233	382	578	839
Variable	16	27	38	49	61	75	91	107	123	234	385	583	846
Increment	58	66	74	84	95	109	125	144	166	327	574	922	1316
Total Pension	2360	2794	3162	3572	4032	4544	5114	5726	6420	10824	17826	27447	38805
Basic	779	902	1000	1109	1231	1364	1518	1677	1861	2966	4795	7203	10120
Variable	392	526	643	770	910	1062	1234	1412	1613	2800	4695	7149	10096
Increment	1190	1365	1519	1693	1892	2118	2363	2637	2945	5058	8336	13094	18588
Amount of other Benefits	327	377	374	411	453	493	567	603	703	1174	1787	2402	3058
Remuneration	145	157	166	176	195	212	244	259	302	504	768	1032	1314
Lump Sums, Grants, and other Allowance	182	220	208	234	258	281	323	343	401	670	1020	1369	1744
Administrative Costs	140	159	170	181	193	207	221	235	251	348	475	638	828
Net Income	7865	8432	9604	10587	11643	12878	14168	15058	16460	24532	36833	51603	69805
Reserve at the Start of the year	38355	46220	54652	64256	74843	86486	99364	113532	128590	145050	238683	388562	599575
Reserve at the End of the year	46220	54652	64256	74843	86486	99364	113532	128590	145050	238683	388562	599575	888474
Main Financial Indicators													
Contribution/Expenditure	172.9	165.8	159.2	151.3	144.0	137.4	130.3	125.0	118.7	98.3	82.3	72.8	67.5
Treasury Subsidy/Expenditure	50.9	49.7	49.7	49.2	49.0	48.8	48.4	48.6	48.3	49.5	50.1	51.8	52.5
Benefit Expenditure/ Contribution	57.8	60.3	62.8	66.1	69.4	72.8	76.7	80.0	84.2	101.7	121.5	137.3	148.2

Source: Derived by Author

Table 6.2.B.1 :Estimated Income and Expenditure of the Public and Private Workers Schemes over 1997-2025
High Growth & Low Cost Scenario

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Total Income	6269	7192	7937	8815	9796	10901	12086	13369	14760	23554	36770	56014	80432
Pensionable Salary (In million L.E)													
Basic Pensionable Salary	13735	15969	17882	20130	22655	25471	28467	31651	35020	55495	85780	129058	182971
Variable Pensionable Salary	2873	3002	3048	3127	3244	3400	3574	3776	4030	5587	7613	10224	13272
Total Pensionable Salary	16608	18972	20930	23258	25899	28870	32041	35428	39050	61082	93393	139282	196244
Contribution													
Basic Contribution													
Variable Contribution													
Total Contribution	3989	4641	5131	5719	6389	7141	7943	8802	9722	15272	23448	35123	49635
Treasury Subsidy													
Treasury Subsidy 1% (Basic+Variable)	41	48	53	59	66	74	82	91	100	157	242	362	511
Treasury Subsidy Increments	2071	2292	2512	2755	3026	3334	3663	4029	4435	7253	11656	18308	27095
Other Treasury Subsidy	153	180	205	233	265	302	344	391	445	815	1398	2247	3215
Total Treasury Subsidy	2266	2520	2770	3047	3357	3710	4089	4511	4980	8226	13296	20917	30821
Total Contribution +Subsidy	6213	7114	7848	8707	9680	10777	11951	13223	14602	23341	36502	55678	79945
Investment Income	56	78	89	108	116	124	135	146	158	213	268	336	487
Other Incomes													
Total Expenditure (in million L.E.)	3534	4047	4519	5039	5610	6256	6970	7745	8607	14352	23328	36557	54584
Amount of Pension													
Old-Age and Early Retirement	2135	2449	2742	3066	3424	3819	4255	4732	5269	8851	14748	23538	35947
Basic	563	653	733	821	917	1021	1139	1267	1412	2339	3885	6101	9366
Variable	268	365	454	551	656	770	897	1034	1186	2139	3674	5828	8957
Increment	1304	1431	1555	1694	1851	2029	2219	2432	2671	4374	7189	11609	17624
Ivalidity and Work Injury	382	434	487	544	606	676	751	833	925	1534	2453	3818	5671
Basic	96	108	121	134	149	166	184	203	226	372	598	940	1433
Variable	59	68	79	91	103	117	132	148	166	282	456	717	1093
Increment	228	258	287	319	354	394	436	482	533	881	1399	2161	3144
Survivors Benefits	750	857	963	1077	1199	1347	1503	1670	1847	3012	4597	6772	9591
Basic	162	186	208	231	256	289	322	358	394	637	975	1459	2165
Variable	108	133	158	183	210	244	279	315	351	587	894	1309	1888
Increment	480	537	597	662	732	815	902	998	1102	1788	2729	4005	5538
Total Pension	3266	3740	4192	4686	5229	5842	6509	7236	8040	13397	21799	34128	51209
Basic	821	947	1062	1186	1322	1475	1645	1828	2031	3347	5457	8500	12965
Variable	435	567	691	825	969	1130	1307	1496	1703	3007	5024	7853	11939
Increment	2011	2226	2439	2675	2938	3237	3557	3912	4306	7042	11317	17775	26305
Amount of other Benefits	268	307	327	353	381	414	461	509	567	955	1529	2429	3375
Remuneration	157	180	191	207	223	241	269	298	331	558	894	1421	1973
Lump Sums, Grants, and other Allowance	111	127	135	146	157	172	191	211	234	395	632	1005	1396
Unemployment Benefits	0.5	0.5	0.6	0.7	0.8	0.9	0.9	1.0	1.1	1.9	3.0	4.2	5.9
Administrative Costs	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Income	2735	3145	3418	3776	4186	4645	5116	5623	6153	9201	13442	19456	25848
Reserve at the Start of the year	38355	38356	38357	38358	38359	38360	38361	38362	38363	56188	142665	221355	330716
Reserve at the End of the year	41090	41501	41775	42134	42545	43005	43477	43985	44516	65390	156107	240811	356564
Main Financial Indicators													
Contribution/Expenditure	112.9	114.7	113.5	113.5	113.9	114.1	114.0	113.6	113.0	106.4	100.5	96.1	90.9
Treasury Subsidy/Expenditure	64.1	62.3	61.3	60.5	59.8	59.3	58.7	58.2	57.9	57.3	57.0	57.2	56.5
Expenditure/Contribution	88.6	87.2	88.1	88.1	87.8	87.6	87.8	88.0	88.5	94.0	99.5	104.1	110.0

Source: Derived by Author

Table 6.2.B.2 :Estimated Income and Expenditure of the Public and Private Fund over 1997-2025
High Growth & Low Cost Scenario

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Total Income	11712	12504	14237	15944	17858	20094	22546	24664	27516	44928	73326	112686	164006
Pensionable Salary (In million L.E)													
Basic Pensionable Salary	8258	9182	9812	10485	11211	11993	12799	13660	14577	20208	27537	36981	48007
Variable Pensionable Salary	7622	8476	9057	9678	10349	11071	11814	12610	13456	18653	25419	34137	44314
Total Pensionable Salary	15880	18188	19436	20768	22207	23756	25352	27059	28873	40028	54544	73252	95091
Total Contribution	4240	4792	5293	5892	6575	7342	8160	9035	9971	15625	23937	35778	50473
Treasury Subsidy													
Treasury Subsidy 1% (Basic+Variable)	40	46	50	56	63	70	78	86	95	150	230	345	487
Treasury Subsidy Increments	2463	2490	2720	2975	3258	3580	3922	4302	4722	7630	12184	19089	28243
Other Treasury Subsidy	153	182	207	235	268	305	348	395	449	823	1411	2269	3247
Total Treasury Subsidy	2656	2717	2978	3266	3589	3955	4348	4783	5267	8602	13825	21702	31976
Total Contribution +Subsidy	6897	7510	8271	9159	10164	11297	12507	13818	15238	24228	37762	57480	82449
Investment Income	4367	4534	5457	6218	7062	8092	9253	9977	11319	19198	33262	51766	76704
Other Incoms	448	461	509	567	632	706	785	869	959	1502	2302	3440	4853
Total Expenditure (in million L.E.)	4268	4852	5393	5992	6650	7393	8211	9098	10083	16630	26885	42103	62976
Amount of Pension													
Old-Age and Early Retirement	2591	2950	3287	3659	4071	4525	5025	5573	6188	10299	17076	27298	41860
Basic	648	744	828	920	1021	1130	1254	1387	1537	2496	4089	6368	9710
Variable	268	365	454	551	656	770	897	1034	1186	2139	3674	5828	8957
Increment	1675	1841	2005	2188	2394	2626	2875	3153	3464	5664	9313	15103	23192
Ivalidity and Work Injury	401	454	508	566	629	700	777	860	953	1570	2501	3883	5760
Basic	100	112	125	138	153	170	188	207	230	376	603	946	1441
Variable	59	68	79	91	103	117	132	148	166	282	456	717	1093
Increment	242	274	304	337	373	414	457	505	557	912	1442	2219	3225
Survivors Benefits	837	950	1062	1180	1308	1463	1625	1798	1981	3186	4824	7065	9963
Basic	183	207	230	253	278	311	345	380	417	662	1003	1492	2204
Variable	108	133	158	183	210	244	279	315	351	587	894	1309	1888
Increment	546	609	674	744	820	908	1002	1103	1213	1937	2926	4265	5871
Total Pension	3828	4354	4857	5405	6008	6688	7427	8231	9122	15055	24401	38246	57583
Basic	931	1063	1182	1311	1452	1610	1786	1974	2184	3535	5696	8806	13356
Variable	435	567	691	825	969	1130	1307	1496	1703	3007	5024	7853	11939
Increment	2463	2724	2983	3269	3587	3948	4333	4761	5234	8514	13681	21586	32288
Amount of other Benefits	273	314	333	360	389	422	470	520	577	974	1563	2481	3452
Administrative Costs	166	184	204	227	253	282	314	347	384	601	921	1376	1941
Net Income	7444	7653	8844	9951	11208	12702	14335	15565	17433	28298	46441	70583	101030
Reserve at the Start of the year	41994	49438	57091	65934	75885	87094	99796	114130	129696	0	0	0	0
Reserve at the End of the year	49438	57091	65934	75885	87094	99796	114130	129696	147129	259295	447806	738868	1164048
Main Financial Indicators													
Contribution/Expenditure	99.4	98.8	98.1	98.3	98.9	99.3	99.4	99.3	98.9	94.0	89.0	85.0	80.1
Treasury Subsidy/Expenditure	62.2	56.0	55.2	54.5	54.0	53.5	52.9	52.6	52.2	51.7	51.4	51.5	50.8
Expenditure/Contribution	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.2

Source: Derived by Author

Table 6.2.B.3 :Estimated Income and Expenditure of the Public and Private Workers Schemes *over 1997-2025*

Moderate Growth & Medium Cost Scenario

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Total Income	6153	6811	7517	8345	9274	10322	11444	12659	13978	22321	34870	53150	76333
Pensionable Salary (In million L.E)													
Basic Pensionable Salary	13735	15355	17194	19356	21784	24491	27372	30434	33673	53361	82481	124094	175934
Variable Pensionable Salary	2873	2887	2931	3007	3119	3269	3437	3631	3875	5372	7320	9831	12762
Total Pensionable Salary	16608	18242	20125	22363	24903	27760	30809	34065	37548	58733	89801	133925	188696
Contribution													
Basic Contribution													
Variable Contribution													
Total Contribution	3989	4378	4841	5395	6027	6737	7494	8304	9172	14408	22121	33135	46825
Treasury Subsidy													
Treasury Subsidy 1% (Basic+Variable)	40	44	48	54	60	67	75	83	92	144	221	331	468
Treasury Subsidy Increments	2011	2204	2415	2648	2909	3205	3522	3873	4263	6973	11205	17599	26045
Other Treasury Subsidy	153	175	199	226	258	293	334	379	432	791	1357	2181	3122
Total Treasury Subsidy	2204	2422	2662	2928	3226	3565	3931	4336	4787	7908	12783	20111	29635
Total Contribution +Subsidy	6153	6757	7455	8270	9193	10235	11349	12557	13867	22172	34683	52915	75992
Investment Income													
Other Incomes	56	55	62	76	81	87	95	102	111	149	188	235	341
Total Expenditure (in million L.E.)	3534	4004	4471	4986	5550	6190	6897	7664	8516	14201	23082	36172	54011
Amount of Pension													
Old-Age and Early Retirement	2135	2425	2715	3035	3390	3781	4213	4686	5217	8764	14602	23305	35591
Basic	563	647	726	813	908	1011	1128	1254	1398	2316	3847	6041	9273
Variable	268	361	450	545	650	762	888	1023	1175	2118	3638	5770	8869
Increment	1304	1416	1540	1677	1833	2009	2197	2408	2645	4330	7118	11494	17449
Ivalidity and Work Injury	382	430	482	538	600	669	744	825	916	1519	2429	3780	5615
Basic	96	107	119	133	148	164	182	201	223	368	592	931	1419
Variable	59	68	78	90	102	116	130	147	164	279	451	710	1083
Increment	228	255	284	316	351	390	431	478	528	872	1386	2139	3113
Survivors Benefits	750	848	954	1066	1187	1334	1488	1654	1828	2982	4552	6705	9496
Basic	162	184	206	229	254	286	319	354	390	631	965	1444	2144
Variable	108	132	157	182	208	241	276	311	348	581	885	1296	1869
Increment	480	532	591	655	725	807	893	988	1091	1770	2702	3965	5483
Total Pension	3266	3703	4151	4640	5177	5784	6445	7164	7961	13264	21583	33790	50702
Basic	821	938	1052	1175	1309	1460	1629	1810	2011	3314	5403	8416	12836
Variable	435	561	685	817	959	1119	1294	1481	1686	2978	4975	7776	11821
Increment	2011	2204	2415	2648	2909	3205	3522	3873	4263	6973	11205	17599	26045
Amount of other Benefits	268	301	320	346	373	406	452	499	556	937	1500	2382	3309
Remuneration	157	176	187	203	218	236	264	292	325	548	877	1393	1935
Lump Sums, Grants, and other Allowance	111	125	133	143	154	169	187	207	230	387	620	985	1369
Unemployment Benefits	0.5	0.5	0.6	0.7	0.8	0.9	0.9	1.0	1.1	1.9	2.9	4.1	5.8
Administrative Costs	0	0	0	0	0	0	0	0	0	0	0	0	0
Net Income	2619	2807	3046	3359	3724	4132	4547	4995	5461	8120	11788	16978	22322
Reserve at the Start of the year	38355	40974	43781	46827	50186	53910	58042	62589	67584	100211	214150	283479	421810
Reserve at the End of the year	40974	43781	46827	50186	53910	58042	62589	67584	73046	108331	225938	300457	1121766
Main Financial Indicators													
Contribution/Expenditure	112.9	109.3	108.3	108.2	108.6	108.8	108.7	108.4	107.7	101.5	95.8	91.6	86.7
Treasury Subsidy/Expenditure	62.4	60.5	59.5	58.7	58.1	57.6	57.0	56.6	56.2	55.7	55.4	55.6	54.9
Expenditure/Contribution	88.6	91.5	92.4	92.4	92.1	91.9	92.0	92.3	92.9	98.6	104.3	109.2	115.3

Source: Derived by Author

Table 6.2.B.4 :Estimated Income and Expenditure of the Public and Private Fund over 1997-2025

Moderate Growth & Medium Cost Scenario

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Total Income	11712	12127	13812	15469	17329	19501	21883	23936	26708	43620	71222	109460	159331
Pensionable Salary (In million L.E)													
Basic Pensionable Salary	8258	8829	9435	10082	10780	11532	12307	13135	14016	19431	26478	35559	46161
Variable Pensionable Salary	7622	8150	8709	9306	9951	10645	11360	12125	12938	17936	24441	32824	42610
Total Pensionable Salary	15880	16979	18144	19388	20731	22177	23667	25260	26954	37367	50919	68383	88771
Total Contribution	4240	4608	5089	5666	6322	7060	7846	8688	9588	15024	23016	34402	48531
Treasury Subsidy													
Treasury Subsidy 1% (Basic+Variable)	40	44	48	54	60	67	75	83	92	144	221	331	468
Treasury Subsidy Increments	2463	2394	2616	2861	3133	3442	3771	4136	4541	7336	11716	18355	27156
Other Treasury Subsidy	153	175	199	226	258	293	334	379	432	791	1357	2181	3122
Total Treasury Subsidy	2656	2613	2863	3141	3451	3803	4180	4599	5064	8272	13294	20867	30746
Total Contribution +Subsidy	6897	7221	7953	8806	9773	10862	12026	13286	14652	23296	36310	55269	79278
Investment Income	4367	4445	5350	6096	6924	7933	9072	9781	11097	18822	32610	50751	75200
Other Incoms	448	461	509	567	632	706	785	869	959	1502	2302	3440	4853
Total Expenditure (in million L.E.)	4268	4803	5339	5932	6583	7318	8128	9006	9981	16462	26613	41676	62338
Amount of Pension													
Old-Age and Early Retirement	2591	2921	3255	3623	4031	4481	4976	5518	6126	10197	16907	27028	41445
Basic	648	737	820	911	1011	1119	1241	1373	1522	2471	4049	6305	9614
Variable	268	361	450	545	650	762	888	1023	1175	2118	3638	5770	8869
Increment	1675	1823	1985	2167	2370	2600	2846	3122	3430	5608	9220	14953	22963
Ivalidity and Work Injury	401	450	503	560	623	693	769	852	943	1554	2476	3844	5703
Basic	100	111	123	137	152	168	186	205	228	372	597	937	1427
Variable	59	68	78	90	102	116	130	147	164	279	451	710	1083
Increment	242	271	301	333	370	410	453	500	552	903	1428	2197	3193
Survivors Benefits	837	940	1051	1169	1295	1448	1609	1780	1962	3155	4776	6995	9865
Basic	183	205	227	250	275	308	341	376	413	656	994	1477	2183
Variable	108	132	157	182	208	241	276	311	348	581	885	1296	1869
Increment	546	603	667	737	812	899	992	1092	1201	1918	2897	4222	5813
Total Pension	3828	4311	4808	5352	5949	6622	7353	8150	9031	14906	24159	37867	57013
Basic	931	1053	1171	1298	1437	1594	1769	1955	2162	3500	5640	8719	13224
Variable	435	561	685	817	959	1119	1294	1481	1686	2978	4975	7776	11821
Increment	2463	2697	2953	3237	3552	3909	4290	4714	5183	8429	13545	21373	31968
Amount of other Benefits	273	307	326	353	381	414	461	510	566	955	1532	2432	3385
Administrative Costs	166	184	204	227	253	282	314	347	384	601	921	1376	1941
Net Income	7444	7324	8473	9537	10746	12183	13755	14930	16727	27157	44609	67785	96992
Reserve at the Start of the year	41994	49438	56762	65235	74773	85519	97702	111457	126387	0	0	0	0
Reserve at the End of the year	49438	56762	65235	74773	85519	97702	111457	126387	143114	259295	447806	738868	1164048
Main Financial Indicators													
Contribution/Expenditure	99.4	95.9	95.3	95.5	96.0	96.5	96.5	96.5	96.1	91.3	86.5	82.5	77.9
Treasury Subsidy/Expenditure	62.2	54.4	53.6	52.9	52.4	52.0	51.4	51.1	50.7	50.2	50.0	50.1	49.3
Expenditure/Contribution	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.2	1.2	1.3

Source: Derived by Author

Table 6.2.B.5 :Estimated Income and Expenditure of the Public and Private Workers Schemes over 1997-2025

High Growth & high Cost Scenario

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Total Income	10364	12049	13607	15037	16911	19078	21435	23679	26438	43180	70228	107513	156855
Pensionable Salary (In million L.E)													
Basic Pensionable Salary	13735	16608	18597	20935	23562	26489	29606	32917	36421	57715	89211	134220	190290
Variable Pensionable Salary	2873	3123	3170	3252	3374	3536	3717	3927	4191	5810	7917	10633	13803
Total Pensionable Salary	16608	19731	21767	24188	26935	30025	33323	36845	40612	63526	97129	144853	204094
Contribution													
Basic Contribution													
Variable Contribution													
Total Contribution	3989	4687	5183	5776	6452	7213	8023	8890	9819	15425	23683	35474	50131
Treasury Subsidy													
Treasury Subsidy 1% (Basic+Variable)	0	0	0	0	0	0	0	0	0	0	0	0	0
Treasury Subsidy Increments	2011	2383	2612	2864	3146	3467	3809	4189	4611	7541	12119	19035	28170
Other Treasury Subsidy													
Total Treasury Subsidy	2011	2383	2612	2864	3146	3467	3809	4189	4611	7541	12119	19035	28170
Total Contribution +Subsidy	5999	7024	7743	8583	9534	10608	11752	12992	14333	22814	35567	54158	77805
Investment Income	4200	4816	5640	6214	7120	8194	9386	10366	11759	19858	33921	52285	77551
Other Incoms	165	209	224	240	257	276	297	321	346	508	740	1070	1499
Total Expenditure (in million L.E.)	3534	4164	4650	5185	5772	6438	7173	7970	8857	14769	24006	37619	56171
Amount of Pension													
Old-Age and Early Retirement	2135	2546	2851	3187	3560	3970	4424	4920	5478	9202	15332	24470	37371
Basic	563	679	762	853	953	1061	1184	1317	1467	2431	4039	6343	9737
Variable	268	379	472	573	682	800	933	1075	1233	2224	3820	6058	9312
Increment	1304	1487	1616	1761	1925	2109	2307	2528	2777	4547	7474	12069	18322
Ivalidity and Work Injury	382	451	506	565	630	703	781	866	961	1595	2550	3969	5895
Basic	96	113	125	139	155	172	191	211	235	386	621	977	1490
Variable	59	71	82	94	107	121	137	154	173	293	474	745	1137
Increment	228	268	298	331	368	409	453	501	554	916	1455	2246	3268
Survivors Benefits	750	891	1002	1119	1246	1400	1563	1736	1920	3131	4779	7040	9971
Basic	162	193	217	241	267	300	335	372	410	662	1013	1516	2251
Variable	108	139	164	191	218	253	290	327	365	610	930	1361	1963
Increment	480	559	621	688	761	847	938	1038	1145	1859	2837	4164	5757
Total Pension	3266	3851	4317	4825	5384	6016	6703	7451	8279	13795	22446	35142	52730
Basic	821	976	1094	1222	1361	1519	1694	1882	2092	3447	5620	8752	13350
Variable	435	584	712	849	998	1164	1346	1541	1754	3097	5174	8087	12294
Increment	2011	2292	2511	2754	3025	3333	3662	4028	4434	7251	11653	18303	27087
Amount of other Benefits	268	313	333	360	388	421	469	518	577	972	1556	2473	3435
Remuneration	157	183	195	211	227	245	275	304	338	569	912	1448	2012
Lump Sums, Grants, and other Allowance	111	130	138	149	161	176	194	215	239	403	645	1024	1423
Unemployment Benefits	0.5	0.5	0.6	0.7	0.8	0.9	0.9	1.0	1.1	2.0	3.0	4.3	6.0
Administrative Costs	140	157	168	180	193	207	223	240	259	381	555	803	1124
Net Income	6830	7885	8957	9852	11139	12640	14262	15708	17581	28411	46223	69894	100684
Reserve at the Start of the year	38355	45185	53070	62027	71879	83018	95658	109921	125629	234986	412350	690364	1100864
Reserve at the End of the year	45185	53070	62027	71879	83018	95658	109921	125629	143211	263397	458573	760258	1121766
Main Financial Indicators													
Contribution/Expenditure													
Treasury Subsidy/Expenditure	56.9	57.2	56.2	55.2	54.5	53.8	53.1	52.6	52.1	51.1	50.5	50.6	50.2
Benefit Expenditure/ Contribution	88.6	88.8	89.7	89.8	89.5	89.3	89.4	89.7	90.2	95.7	101.4	106.0	112.0

Source: Derived by Author

Table 6.2.B.6 :Estimated Income and Expenditure of the Public and Private Fund over 1997-2025
High Growth & high Cost Scenario

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2010	2015	2020	2025
Total Income	11712	12673	14427	16156	18096	20362	22845	24992	27881	45519	74276	114136	166102
Pensionable Salary (In million L.E)													
Basic Pensionable Salary	8258	9366	10009	10695	11435	12233	13055	13934	14868	20612	28088	37721	48968
Variable Pensionable Salary	7622	8646	9239	9872	10556	11292	12051	12862	13725	19027	25927	34820	45201
Total Pensionable Salary	15880	18552	19825	21184	22651	24231	25859	27600	29451	40828	55635	74717	96993
Total Contribution	4240	4888	5399	6010	6706	7489	8323	9216	10170	15938	24415	36494	51482
Treasury Subsidy													
Treasury Subsidy 1% (Basic+Variable)	40	46	51	57	63	71	79	87	96	151	232	348	492
Treasury Subsidy Increments	2463	2515	2748	3005	3291	3616	3961	4345	4769	7706	12306	19280	28525
Other Treasury Subsidy	153	184	209	238	270	308	351	399	454	831	1425	2291	3279
Total Treasury Subsidy	2656	2745	3008	3299	3625	3994	4391	4831	5320	8689	13964	21919	32296
Total Contribution +Subsidy	6897	7633	8407	9309	10331	11483	12714	14046	15490	24626	38379	58413	83778
Investment Income	4367	4579	5512	6280	7133	8173	9346	10076	11432	19390	33595	52284	77471
Other Incoms	448	461	509	567	632	706	785	869	959	1502	2302	3440	4853
Total Expenditure (in million L.E.)	4268	4997	5555	6172	6849	7614	8457	9371	10385	17129	27691	43366	64866
Amount of Pension													
Old-Age and Early Retirement	2591	3039	3386	3769	4193	4661	5176	5740	6373	10608	17589	28117	43115
Basic	648	766	853	948	1051	1164	1291	1428	1583	2571	4212	6559	10001
Variable	268	376	468	567	676	793	924	1065	1222	2203	3785	6002	9226
Increment	1675	1897	2065	2254	2466	2705	2961	3247	3568	5834	9592	15556	23888
Ivalidity and Work Injury	401	468	523	583	648	721	800	886	981	1617	2576	3999	5933
Basic	100	116	128	142	158	175	194	214	237	387	621	975	1485
Variable	59	70	81	93	106	120	135	152	171	290	470	739	1126
Increment	242	282	313	347	384	426	471	520	574	940	1485	2286	3322
Survivors Benefits	837	978	1093	1216	1347	1506	1674	1852	2041	3282	4968	7277	10262
Basic	183	213	236	261	286	320	355	392	429	682	1034	1537	2271
Variable	108	137	163	189	216	251	287	324	362	604	921	1348	1945
Increment	546	628	694	766	844	936	1032	1136	1250	1996	3014	4392	6047
Total Pension	3828	4485	5002	5567	6188	6889	7650	8478	9395	15507	25133	39393	59310
Basic	931	1095	1218	1351	1495	1658	1840	2033	2249	3641	5867	9070	13757
Variable	435	584	712	850	998	1164	1347	1541	1754	3097	5175	8089	12297
Increment	2463	2806	3072	3367	3695	4067	4463	4904	5391	8769	14091	22234	33257
Amount of other Benefits	273	323	343	371	400	435	484	536	594	1003	1610	2556	3556
Administrative Costs	166	190	210	234	261	290	323	357	396	619	949	1417	1999
Net Income	7444	7675	8872	9984	11247	12747	14388	15621	17496	28389	46585	70770	101237
Reserve at the Start of the year	41994	49438	57114	65986	75970	87216	99964	114351	129972	0	0	0	0
Reserve at the End of the year	49438	57114	65986	75970	87216	99964	114351	129972	147468	259295	447806	738868	1164048
Main Financial Indicators													
Contribution/Expenditure	99.4	97.8	97.2	97.4	97.9	98.4	98.4	98.3	97.9	93.0	88.2	84.2	79.4
Treasury Subsidy/Expenditure	62.2	54.9	54.1	53.4	52.9	52.5	51.9	51.5	51.2	50.7	50.4	50.5	49.8
Expenditure/Contribution	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.2	1.3

Source: Derived by Author