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The relative impact of demographic change on future social expenditure increases

An example from Cyprus

Euripides I. DEMETRIADES * and William J. HOUSE **

1. Introduction

A recent study by the IMF (1986) examined the consequences of past and prospective demographic changes for social expenditure over a 45-year period in the seven major OECD countries.[1] The trends pointed to a striking increase in the population share of the elderly and a reduced share of the young in all these countries over the next 40 years. The projections indicated that there were reasonable prospects of financing the anticipated growth in government social expenditure on health, education, pensions and other welfare benefits, including unemployment compensation, which demographic factors alone imply. But the picture is much less rosy when the growth in real benefit and cost levels and that of productivity are taken into account. This implies that there will be a need for additional policy measures to contain benefit and cost levels, particularly since sharp increases in the ratio of government social expenditure to GDP are imminent in most of the countries.

Long-term projections of this sort clearly ought to interest planners and policy-makers in developing countries, where the pace of demographic change is likely to be much more rapid. In fact, however, they often receive scant attention, despite the insights they offer into the nature of demographically induced constraints on current and future policy options.

* Director, Department of Statistics and Research, Ministry of Finance, Nicosia, Cyprus. ** ILO Population and Human Resources Adviser, Office of the President and Cabinet, Lilongwe, Malawi. This article draws on findings reached under the project "Population and Human Resources in the Context of Development Planning" carried out jointly in 1986-87 by the United Nations Population Fund (UNPFA) and the ILO in collaboration with the Department of Statistics and Research, Nicosia. The UNFPA provided generous financial support to the project. Responsibility for the views expressed in the article, however, rests with the authors alone.

[1] France, the Federal Republic of Germany, Italy, the United Kingdom, Canada, the United States and Japan.

This article is a case study of the Republic of Cyprus, a middle-income developing country which has experienced dramatic changes in both its demographic parameters and its economic structure in recent years. Its crude birth rate has fallen fairly steadily, from about 30 per 1,000 in the immediate post-Second World War period to 19.5 by 1985. The total fertility rate, which estimates the average number of children a typical woman would bear if she were to experience the age-specific birth rates of a particular year and were to survive at least until the end of her reproductive years, fell from 3.5 in 1960 to 2.4 in 1985. The pattern of mortality decline is reflected in the increase in life expectancy at birth, from 57 for males and 59 for females during the period 1931-46 to 72 and 77 respectively by 1985 (Republic of Cyprus, 1986a).

As in the OECD countries studied by the IMF, these past changes will contribute to the phenomenon of "population ageing" in Cyprus whereby a growing proportion of the population will be at least 65 years of age and a declining proportion will be under 15. Such changes can be expected to have profound effects on future public expenditure outlays for health, education, pensions and other social services. The demographically induced growth of such outlays, relative to the growth of national output, and its policy implications are the subject of this case study.

Section 2 takes a brief look at prospective population changes in Cyprus, while their implications for social expenditure increases under various scenarios of benefit and cost increases are discussed in sections 3 and 4. The final section draws some policy conclusions from these findings.

2. Future population changes

In 1985 the population of the Government-controlled (Greek Cypriot) area of Cyprus was about 537,000 and was growing at 1 per cent annually. It seems reasonable to assume that the recent trends of falling fertility and mortality will continue. Under scenario A we assume that the total fertility rate falls from its current level of 2.4 in the period 1985-90 by 0.06 births every five years, attaining a level of 2.05 (just below replacement) by the period 2015-20. Scenario B assumes a faster fertility decline of 0.11-0.12 births every five years to reach 1.7 births by the period 2015-20. These fertility levels are national averages and no attempt has been made to disaggregate them by rural and urban subgroups.

Given that mortality levels in Cyprus compare favourably with those in the most advanced countries, only very modest increases can be projected in life expectancy. Female life expectancy at birth is assumed to rise from 77 years in 1985 to 77.5 by 1990 and to remain at this level thereafter. Male life expectancy rises gradually from 72.3 years in 1985 to 73.8 by 2005, after which it is assumed to remain constant. These assumptions are maintained for both projection scenarios A and B.

Perhaps the least reliable of our assumptions concerns the flow of immigration and emigration to and from Cyprus, especially in the light of past waves of out-migration during periods of political tension and armed conflict. More recently, however, a small net inflow of return migration has been registered and this pattern is postulated to continue during the projection period, producing a small net annual inflow of 230.

No significant change is expected to reverse the continuous drift to the towns. The rate of urbanisation is conservatively assumed to increase by one percentage point every five years under scenario A and by two percentage points every five years under scenario B, i.e. from 64 per cent in 1985 to 71 per cent and 78 per cent respectively by 2020. Age selectivity in migration is accounted for in these projections by using the age-specific rates of migration calculated from the demographic survey of 1980/81.

Variants A and B therefore contain the following assumptions:

Demographic variable	Variant A	Variant B
Fertility	Falls by 0.06 every five years from 2.4 in 1985 to 2.05 by 2020	Falls by 0.11-0.12 every five years to 1.7 by 2020
Mortality – life expectancy at birth	For males rises from 72.3 in 1985 to 73.8 years by 2005 and stays constant thereafter; for females rises from 77 in 1985 to 77.5 years by 1990 and stays constant thereafter	Same as for variant A
International in-migration (net)	230 annually	Same as for variant A
Internal migration (degree of urbanisation)	Urbanisation rate rises by one percentage point every five years, from 64% in 1985 to 71% in 2020	Urbanisation rate rises by two percentage points every five years, from 64% in 1985 to 78% in 2020

The population in the Government-controlled area of Cyprus is projected to rise from 537,000 in 1985 to 618,000 by the year 2000 and to 705,000 by 2020 according to our variant A. Alternatively, the lower-fertility variant B implies a population of 615,000 in 2000 and only 675,000 by 2020. The changing age structure of the population will give rise to variations in the demand for different kinds of social services at selected points in time.

Changes in different age groups

Changes in the size and composition of the various school-age population groups (table 1) will affect the demand not only for educational

Table 1. Projections of school-age population in Cyprus by education level, 1985-2020

Education level and age group	1985	1990	2000	2010	2020
Population variant A					
Pre-primary (3-5)	29 190	31 830	28 760	29 470	29 830
Primary (6-11)	50 800	59 470	60 410	57 490	60 650
Secondary (12-17)	49 300	49 680	63 190	58 140	59 160
Tertiary (18-24)	64 720	58 940	64 060	72 120	66 790
Total	**194 010**	**199 920**	**216 420**	**217 220**	**216 430**
Population variant B					
Pre-primary (3-5)	29 190	31 830	27 530	26 470	24 740
Primary (6-11)	50 800	59 470	59 420	53 460	52 600
Secondary (12-17)	49 300	49 680	63 290	56 020	53 490
Tertiary (18-24)	64 720	58 940	64 060	71 770	63 180
Total	**194 010**	**199 920**	**214 300**	**207 720**	**194 010**

Source: Authors' projections.

infrastructure and teachers but also for such goods and services as mother and child care, health services, children's wear and sports goods and facilities.

Evidently, education planners can expect a long period of dynamic change in potential pupil enrolment at the various school levels. Furthermore, these differential shifts imply significant changes in total expenditure on education because of marked variations in unit costs between education levels.

According to our projections the *working-age population* (15-64 years) grows from 344,000 in 1985 to 407,000 in the year 2000, indicating favourable underlying conditions for an expanding labour force over the remaining years of this century. It will take the subsequent 50 years, however, to realise the same absolute growth of population in these age groups under variant A, while there is only a small absolute increment over this long period under variant B. By 2020, the population of working age under variant A is 54,000 larger than in the year 2000 but only 46,000 larger under variant B.

During the remaining years of this century there will be a slight fall in the proportion of *older persons* (65 years and over) and only a small absolute increase in their number. During the first two decades of the twenty-first century, however, the population will age considerably. The proportion of older persons will rise, from 10.1 per cent in the year 2000 to between 13 and 14 per cent by 2020. What is more dramatic, however, is the rapid expansion of the absolute numbers of older persons after 2000. During the first decade

of the next century an additional 12,000 persons will enter the 65+ group, and 20,000 during the subsequent decade. Evidently, these dynamic changes in the size and structure of the population will have profound implications for social expenditure.

Changes in the size and structure of the labour force

How will the changes taking place in the size, structure and distribution of the island's population influence the growth and structure of its labour force over the next 35 years? A decline in the growth rate of the labour force without any compensating changes in capital formation or productivity will clearly result in a fall in the growth of output of goods and services. On the demand side, population size and the purchasing power of the income received by members of the labour force are key determinants of internal aggregate demand.

Our labour force projections are based on two further alternative sets of assumptions. No changes are assumed to take place in the age-specific labour force participation rates (LFPRs) of males aged 20 or over since they are already very high. The existing relatively low rates for males aged 15-19 reflect their high rate of school enrolment in which no change is anticipated either. However, factors such as rising real wages and greater diversity of employment opportunities, increased investment by women in training and education, declining fertility, and falling relative prices of labour-saving household appliances all suggest that the trend towards greater involvement of women in paid employment will continue. Therefore, two alternatives have been assumed in scenario A and scenario B respectively: a one percentage point and a two percentage point rise in both the rural and the urban LFPR of females in each age cohort every five years to the year 2020. By this time the highest urban female LFPR would be attained by the 20-24 year-olds at 73 or 80 per cent, depending on the percentage point increase. In the rural areas the highest rate of female participation is attained by those aged 40-44 years at 73 or 80 per cent.[2]

With no spectacular upsurge in the propensity of its citizens to emigrate *en masse*, Cyprus is assured of considerable growth in its labour force over the next 35 years as illustrated in table 2, even without any increase in female LFPRs, largely because of its favourable age structure and the consequent growth in its working-age population. If the female participation rates also increase according to our assumptions, then the labour force grows in the 35 years after 1985 by 104,000, or 43 per cent, under scenario A, and by 118,000, or 49 per cent, under scenario B. For the first decade of the twenty-first century the growth rate of the working-age population and the labour force is over 1 per cent per annum, under both scenarios.

[2] More detailed data on LFPRs by sex and location are reported in Demetriades and House, 1988.

Table 2. Projected labour force, 1985-2020

Indicator	1985	1990	2000	2010	2020
Population variant A					
Participation rate [1]					
Refined	60.2	61.4	61.7	62.4	62.2
Crude	44.9	45.4	46.9	48.7	49.0
Labour force ('000s)	241.3	257.5	289.7	324.5	345.6
Growth rate (% p.a.)	..	1.3	1.2	1.1	0.6
Population variant B					
Participation rate [1]					
Refined	60.2	61.9	63.2	64.9	65.6
Crude	44.9	45.8	48.3	51.6	53.2
Labour force ('000s)	241.3	259.8	296.7	336.8	359.6
Growth rate (% p.a.)	..	1.5	1.3	1.3	0.7

[1] The crude participation rate measures the percentage of the labour force in the total population. The refined participation rate restricts the denominator of this ratio to the population aged 15 years and over.
Source: Authors' projections.

These projected patterns of change in the population and labour force of Cyprus will enable us to estimate the demand for benefits and services in the various social sectors as well as the growth of overall output in the economy and to relate it to social expenditure. But first let us say a few words about the projection methodology.

3. Social expenditure projections: The methodology

How should the social expenditure of government be defined? While some expenditures, for example on education, health care, pensions, unemployment compensation and welfare payments to the poor and disabled, are clearly "social" in nature, others are more difficult to define. (A guide to some of these issues has been provided by the IMF study cited earlier.) The magnitude of social expenditure is also affected by the degree of population coverage and the part played by the private sector in education and health. In Cyprus the private share of social expenditure is not large, except in the health sector, where it is 58 per cent. In the education sector it is only 20 per cent and it is negligible for pension coverage.

In this study of Cyprus we have included as government social expenditure the fairly obvious broad categories, i.e. both current and capital costs in health, education, pensions and other welfare benefits, and unemployment compensation. (In this respect our study conforms quite closely to the definition of social expenditure and the sectors included in the IMF study.)

In 1985 these sectors accounted for about C£150 million of expenditure amounting to almost 10 per cent of GDP. The share of social expenditure in Cyprus is significantly lower than it is in the major OECD countries. For example, in 1980 it was largest in France and the Federal Republic of Germany at 31 per cent of GDP, followed by Italy with 25 per cent, the United Kingdom with 23 per cent and Canada with 20 per cent. Of the seven countries considered, it was lowest in the United States (18 per cent) and Japan (15 per cent) (IMF, 1986, p. 57). The smaller share in Cyprus is mainly because coverage rates are much lower. For example, Cyprus has no public university and students rely largely on scholarships or private funds to finance their higher education overseas. While it is estimated that 50-60 per cent of the Cypriot population is eligible for free government medical services, the actual utilisation rate is certainly much less. In some of the OECD countries the proportion of the population eligible for free medical treatment is much higher.

While pension coverage is widespread in Cyprus it is much less extensive than in these OECD countries. For example, the large number of unpaid female family workers in agriculture are not eligible in their own right for pension and other social insurance benefits; while the earnings-related part of the Social Insurance Scheme only began operating in 1980 so it is far from mature. Finally, unemployment benefits are payable for only the first six months without work whereas they are usually payable for longer periods in most of the OECD countries. In addition, the rate of unemployment is much lower in Cyprus so expenditure is necessarily lower.

By definition, the volume of expenditure of a social programme is the product of the number of its beneficiaries and the average real benefit that each receives. If the average real benefit is held constant, the volume of services provided by the programme will rise with the number of beneficiaries. Because we are especially concerned with the implications of anticipated future demographic developments, we attempt to isolate this pure demographic effect on expenditure for each social programme and on total social expenditure. The exercise captures the joint effect of growth in the size of the population groups covered by the programme and of changes in the coverage rate, or the proportion of the population eligible for benefits.

In general, our study assumes that the coverage rate remains constant, particularly in the sectors of health, education and unemployment compensation. In the case of pensions, however, some allowance is made for an expanded coverage of the female population owing to the recent increase of women in the labour force and hence of the larger number who will become eligible for retirement pensions.

Our projections of social expenditure necessarily entailed making certain assumptions about future growth in the levels of real benefits and costs of the services supplied. In general, three alternative assumptions were made:

1. *No change* occurs in real benefits and costs of the services of a programme from their 1985 level. In the case of pensions and social welfare benefits, however, the earnings-related supplementary benefit is assumed to rise because of the increasing maturity of the Social Insurance Scheme.

2. Benefits and costs in sectors other than health rise over the whole period to 2020 at the *same annual rate* as that assumed for the growth of *overall productivity* in the economy, which is forecast to be 2.5 per cent in the current (1987-91) Development Plan. In the health sector they are assumed to rise by 3 per cent annually, reflecting the historical experience of many countries that medical costs outpace productivity growth (IMF, 1986, p. 39). It also reflects the labour intensity of the production technology and the lack of opportunity for factor substitution in the health sector.

3. Sectoral benefits and costs rise at the *same annual rates* as they did in *1980-85*. Because increases in this period were relatively large the implications for increases in social expenditure prove to be very significant, as we shall see below.

In projecting changes in the ratio of social expenditure to GDP it is necessary to make further assumptions about the pattern of future economic growth. From the projected labour force for various years we subtract the numbers assumed to be unemployed at that time in order to obtain the size of the employed labour force. Subperiod growth rates of employment can then be calculated which are used, together with the assumed rate of productivity growth, to derive the corresponding growth rate of national output for the period.

The rate of unemployment in 1985 was 3.3 per cent; subsequently it rose to 4 per cent only to fall again to about 3 per cent. For projection purposes we make two alternative assumptions about the future rate of unemployment. In the optimistic projection we assume it averages 3.5 per cent over the period 1985-90 and then falls back to 2.5 per cent for the remaining years to 2020.[3] In the pessimistic projection we assume it averages 6 per cent over the 1985-90 period but declines to 4 per cent thereafter. With an absolutely larger number of persons employed our optimistic scenario will generate higher economic growth and a higher level of GDP at any future time than will the pessimistic version. Nevertheless, the growth rates of employment, and therefore of output, are dominated by demographic developments and are not very sensitive to the future rates of unemployment.

We now have all the ingredients for projecting employment and output growth for the 35 years from 1985 to 2020. The projections are shown in table 3. The growth rates of output correspond to the product of the corresponding subperiod employment growth rates and the assumed productivity growth

[3] During most of the 1960s and early 1970s unemployment in Cyprus averaged less than 2 per cent. Between 1978 and 1982 it averaged 2.2 per cent and only since then has it slightly exceeded 3 per cent (Republic of Cyprus, 1987b, p. 39). Therefore, our optimistic scenario reflects the more long-run pattern.

Table 3. Projected annual growth rates of employment and output, 1985 [1]-2020 (%)

Population scenario	Employment		Output	
	Optimistic	Pessimistic	Optimistic	Pessimistic
Scenario A (slow fertility decline; 1% point rise in female LFPR)				
1985-90	1.47	1.16	3.97	3.66
1990-2000	1.19	1.19	3.69	3.69
2000-10	1.37	1.14	3.87	3.64
2010-20	0.40	0.63	2.90	3.13
Scenario B (fast fertility decline; 2% point rise in female LFPR)				
1985-90	1.66	1.34	4.16	3.84
1990-2000	1.34	1.34	3.84	3.84
2000-10	1.27	1.27	3.77	3.77
2010-20	0.66	0.66	3.16	3.16

[1] In 1985 the number of employed persons was 233,324 and GDP amounted to C£1.48 billion.
Source: Authors' assumptions.

rate. In general we find only marginal differences between the various growth scenarios and the final levels of GDP in 2020. For example, output in the terminal year is highest under population scenario B and the optimistic assumption about employment. It is smallest under scenario A and the pessimistic employment assumption. Even so, output is only 5.5 per cent greater under the former scenario than under the latter.

The output of goods and services is projected to remain buoyant over the whole period largely because of the anticipated relatively high growth of the labour force and employment, and low levels of unemployment. This directly reflects the demographic situation in the country. However, past demographic changes and the expected continued decline in fertility suggest that, by the final decade of our projection period, employment and output growth will be somewhat reduced from the levels attained during the previous 25 years.

The social expenditure scenarios described later combine with these economic growth rates to generate the ratio of social expenditure to GDP. No attempt has been made to model the interrelationships between expenditure on the social service sectors and the growth of GDP except that expenditure on unemployment compensation is made a function of the assumed rate of unemployment and output. GDP has not been related to the level of expenditure on health and medical care, education or pensions whereas, in reality, there are no doubt definite linkages. Nor is any attempt

made to explore the inter-relationships between an ageing labour force and the consequences for overall labour productivity and economic growth. The complexities of trying to unravel these linkages go far beyond the scope of this paper.

4. Sectoral expenditure estimates

The education sector

School enrolments

In order to estimate public expenditure on the education sector it was necessary to generate prospective school enrolments from our population projections. Enrolment rates were derived for 1985 using data on the numbers attending school by age, sex and grade, which were then related to the relative numbers in the respective population cohorts. The enrolment rates at the primary and secondary levels are already very high and no changes were assumed to take place over our 35-year projection period. Enrolments at the public pre-primary level have increased dramatically over the past decade, no doubt as a result of rising female LFPRs. No changes from their 1985 levels were assumed in these enrolment rates during the projection period although, depending on the development of female employment, it may be that rates of kindergarten enrolment will rise in the future; but to say how fast would be pure guesswork. The low level of tertiary level enrolments is more apparent than real since, as noted earlier, Cyprus has no public university of its own. Public expenditure from local sources for Cypriots studying abroad is negligible.

Applying the enrolment rates to the projected school-age populations for the period to 2020 generates a set of pupil enrolments (shown as indices in table 4). Under both population variants, total enrolment peaks in the year 2000 – at 19-20 per cent greater than in 1985. Thereafter, enrolments decline marginally under variant A but much more rapidly under variant B. These patterns follow from the diverse trends at the different levels of schooling. Reflecting anticipated fertility declines, the greatest contraction comes at the pre-primary level, while a major expansion occurs at the secondary level, particularly in the period 1990-2000. This expansion reflects the post-1974 revival in fertility that followed its dramatic decline during wartime. Given that education costs per student rise with the level of education, we would expect increasing outlays on schooling from the demographic effect alone, even if the real pupil costs were to remain at their 1985 levels.

Education expenditure

Published data on unit costs of public education include current and capital costs (Republic of Cyprus, 1986b). As mentioned earlier, we have

Table 4. Indices of school enrolments, 1985-2020 (1985 = 100)

School enrolment	1985	1990	2000	2010	2020
Population variant A					
Pre-primary	100	107	96	99	100
Primary	100	115	117	112	118
Secondary general	100	101	129	119	121
Secondary technical	100	102	130	119	122
Tertiary	100	91	99	111	103
Special education	100	100	113	114	113
Total	**100**	**109**	**120**	**114**	**117**
Population variant B					
Pre-primary	100	107	92	89	83
Primary	100	115	115	104	102
Secondary general	100	101	129	114	109
Secondary technical	100	102	126	115	110
Tertiary	100	91	99	111	98
Special education	100	100	113	110	102
Total	**100**	**109**	**119**	**107**	**104**

Source: Authors' projections.

made three alternative assumptions about the future growth of unit costs: they do not change over the whole period; they grow at 2.5 per cent per annum, the same rate as overall productivity; and they grow at the overall rate recorded between 1980 and 1985.[4]

The pure demographic effect on education expenditures is illustrated in table 5 in the rows where unit costs are assumed to remain unchanged over the period. The largest contribution to rising costs of education comes from the primary and secondary levels where enrolments are heaviest and where their expansion is projected to exceed that of all other levels. Under population variant A, the higher fertility scenario, we find demographic change alone will add 22 per cent to the overall education budget by the turn of the century, after which a small decline will set in. Under the more rapidly falling fertility variant B, expenditure rises to peak at 20 per cent above the 1985 level in the year 2000, but falls thereafter and by 2020 is only 5 per cent greater than in 1985. Therefore Cyprus can expect to be spending, by the turn of the century, at least 20 per cent more on public education because of increasing enrolments alone.

[4] The following annual growth rates in unit costs for the period 1980-85 in 1980 prices were calculated: pre-primary 1 per cent; primary 9.3 per cent; secondary-general 10.3 per cent; secondary-technical 10.4 per cent; tertiary 3.8 per cent; special education 14.4 per cent. For further details on these calculations see Demetriades and House, 1988.

Table 5. Indices of social expenditure on education under alternative population variants and unit cost changes, 1985-2020 (1985 = 100)

Unit costs	1985	1990	2000	2010	2020
Population variant A					
No change	100	107	122	115	118
Increase by 2.5% p.a.	100	121	176	213	280
Increase by same rate as in 1980-85	100	168	492	1 205	3 287
Population variant B					
No change	100	107	120	109	105
Increase by 2.5% p.a.	100	121	174	202	249
Increase by same rate as in 1980-85	100	168	487	1 148	2 935

Source: Authors' assumptions and calculations.

Given the strong pressure of the teachers' trade union to maintain the relative incomes of its members, we might expect teachers' salaries, which are the largest component of education costs, to rise at least at the same rate as the overall level of productivity. Such a pattern of rising costs would also reflect the high degree of labour intensity in the education sector and the few opportunities to substitute capital for labour. In this case, the assumption that unit costs rise by 2.5 per cent annually – the assumed rate of overall productivity increase – is likely to be much more realistic. Hence we find a 21 per cent increase in real public expenditure on education between 1985 and 1990, and by the year 2000 expenditure is 76 per cent greater under population variant A and 74 per cent greater under variant B. By the end of our 35-year period expenditure is 180 per cent greater under variant A and 149 per cent greater under variant B.

As we have noted, unit costs of public education rose very dramatically during the period 1980-85, particularly at the primary and secondary levels. Table 5 indicates that, should unit costs rise at these same high annual rates over the projection period, the increase in overall expenditure on education would be astronomical. By 1990 real outlays would be 68 per cent greater than five years earlier and a 400 per cent increase would be registered by the turn of the century, while enrolments would have increased by only 20 per cent. No one can realistically expect such recent growth in unit costs to continue indefinitely since it would not be financially viable or socially accepted. Therefore, the projected expansions of expenditure in table 5 for the years beyond 2000 are only meant to illustrate the dire long-term consequences of an inflationary spiral of unit costs completely out of control. They demonstrate the need for strict vigilance in putting an early brake on the growth of unit costs of schooling.

Education expenditure as a proportion of GDP

With unit costs unchanged, education expenditure would fall from almost 4 per cent of GDP in 1985 to only 1.34-1.36 per cent by 2020 under variant A and to 1.15-1.16 per cent under variant B. However, it is unrealistic to expect real education costs to remain unchanged. If they grow at the same rate as overall productivity, the ratio of education expenditure to GDP falls marginally in the initial 15 years to the year 2000, and then declines by almost one percentage point by 2020. By then, outlays on education would constitute almost 3 per cent of GDP. On the other hand, if the trend in unit costs follows its most recent pattern, education's share of GDP would rise to about 11 per cent by the year 2000 and continue to rise until, by 2020, it absorbed about one-third of the country's GDP. We can be certain that steps will be taken to ensure that this does not happen.

The health sector

Long-term projections of expenditure on health care are subject to great uncertainty because of the large number and complexity of its determinants. Since the frequency and severity of illness are both age-related, per capita expenditure on medical care in any country will directly reflect its demographic structure. Since we have projected growing numbers of older persons in Cyprus, the treatment of chronic illness and other disabilities can be expected to grow accordingly.[5]

Currently, the proportion of GDP in Cyprus absorbed by social expenditure on the health sector is only 1.66 per cent, which is relatively low by international standards. For example, France spends 6.7 per cent, the Federal Republic of Germany 6.1 per cent, Italy 6.0 per cent and the United Kingdom 5.8 per cent of their respective GDPs on the health sector. The low ratio in Cyprus is partly due to the fact that only about 50-60 per cent of the population is eligible for free medical coverage and that a smaller proportion actually takes advantage of it. Consequently, considerable sums are spent on private medical services, which are not reflected in our data. In addition, very expensive latest-vintage technologies for the treatment of rare or special illnesses and diseases are lacking in Cyprus.

We noted earlier that the growth of unit health costs in the seven major OECD countries has far exceeded the growth of overall productivity, and this should be borne in mind when we consider the likely trend in Cyprus.

Unit costs of health care

The major problem in making projections of expenditure on health care is our inability to cost the wide range of medical services offered by the

[5] The absolute number of persons aged 65 and over in Cyprus will rise by 66 per cent, from 57,000 to 95,000, between 1985 and 2020.

sector. Our projection model is, therefore, necessarily simple. Health statistics for Cyprus for 1985 allow us to estimate the intensity of use of in-patient and out-patient services by age group of the population. We assume that these rates of utilisation remain unchanged over the projection period.

In a study conducted in 1983 by the Social Health Insurance Unit of the Ministry of Health, the share of total government medical expenditure on in-patient care was estimated at 65 per cent, with the remaining 35 per cent going to out-patient care (Republic of Cyprus, 1983a, p. 3). We assumed that these ratios held also in 1985 and, by applying them to total public expenditure on health for that year, it was possible to obtain the respective aggregate costs for in-patient and out-patient care. These were then divided by the number of in-patient days and out-patient visits respectively, to generate the unit costs of services provided in 1985. For example, current government expenditure on the health sector in 1985 amounted to C£24,577,000.[6] The in-patient share of this total is assumed to be the same 65 per cent as found in 1983, giving C£15,975,000 as the outlay attributable to in-patients and C£8,602,000 attributable to out-patients. The number of in-patient days in government hospitals in 1985 was 278,283 while the number of out-patient visits was 946,737 (Republic of Cyprus, 1987a, pp. 54-57 and 110). Therefore, the unit cost of an in-patient day in 1985 was C£57.4, while the unit cost of an out-patient visit was C£9.1

These unit cost estimates have been used in our projection exercise. Evidently, much is subsumed in both. For example, the costs of in-patient and out-patient treatment and drugs are included as well as the overhead costs of hospital equipment, medical personnel, etc. Unfortunately, we cannot attribute different unit costs by the age group of patients. The assumption that the average cost per patient is invariant across age groups does not appear to be far out of line with the experience of countries where complete data are available (IMF, 1986, p. 39).

Health expenditure

The age structure of in-patient days and out-patient visits in 1985 is given in the official publication *Health and hospital statistics, 1985*. This was applied to the 1985 population to generate indices of utilisation which show that the relationship between use intensity of health facilities and age is broadly U-shaped, with the very youngest and oldest persons making the largest demands on available facilities. Applying these indices to the projections of the Cyprus population at various future dates, we obtain the estimated number of in-patient days and out-patient visits over the 35 years from 1985 to 2020.

The aggregate indices of expenditure reflecting the pure demographic effect of changes in the demand for health service, are given in scenarios (i) and (iv) of table 6. Under variant A, the overall demand rises moderately

[6] Capital expenditure was only C£869,000 in 1985 and this has been excluded from our calculations.

Table 6. Indices of social expenditure on the health sector under alternative population variants and changes in unit costs of in-patient and out-patient services (1985 = 100)

Unit costs		1985	1990	2000	2010	2020
Population variant A						
(i)	No change	100	100	109	124	138
(ii)	Increase by 3% p.a.	100	116	171	259	388
(iii)	Increase by same rate as in 1980-85	100	150	371	954	2 436
Population variant B						
(iv)	No change	100	100	109	122	134
(v)	Increase by 3% p.a.	100	115	170	256	379
(vi)	Increase by same rate as in 1980-85	100	150	371	942	2 373

Source: Authors' assumptions and calculations.

until the year 2000 but more rapidly thereafter because of the absolute rise in the number of older persons and their propensity to use the services more intensively. Because of the slightly slower growth of population under variant B the demands placed on health facilities are somewhat less.

In the unlikely eventuality that real unit costs of medical services remain unchanged, therefore, demographic change in Cyprus will result in a real public expenditure increase of 9 per cent in the sector by the turn of the century and an increase of 34-38 per cent by 2020 over current outlays in 1985. Given anticipated economic growth and rising real output, these increases could easily be absorbed by the economy. Even if, under the pessimistic scenario, the economy grows only by 3.7 per cent annually to the year 2000, total output will then be 70 per cent higher than in our base year of 1985.

More realistically, however, in line with the recent experience of Europe and North America, we can expect unit health costs to outpace the increase in economy-wide labour productivity: in the Cypriot case, this translates into an annual rise of 3 per cent. This more realistic assumption reflects the relatively high labour intensity of the sector and the ability of medical personnel to maintain their relative earnings over time.

In scenarios (ii) and (v) we find real expenditure rising by 70 per cent in the 15 years to 2000 and by about 280 per cent in 2020 compared with 1985. Even under our pessimistic economic growth scenario the public sector would seem to have sufficient capacity to absorb such increases without needing new sources of revenue.[7]

[7] For example, even if the economy grew only at 3.5 per cent annually over the whole 35-year period, output would be 230 per cent greater in 2020 than in 1985.

As in the case of the education sector, however, if real unit health costs were to rise at the same rate as in the recent past,[8] the picture would be much less rosy. In scenarios (iii) and (vi) overall expenditure would then grow by 50 per cent in the five years to 1990 and by 270 per cent in the 15 years to the end of the century. For illustrative purposes we have carried the projections through to the year 2020 without believing that such cost increases are possible – for the growth of public sector outlays on health would then become astronomical.

Evidently, the impact of demographic change alone on social expenditure in the health sector will not present major problems for government financial planners. If they were unable to control unit costs, however, then the health expenditure burden could become onerous. Indeed, other forces may be at work to raise costs. In 1983 the Social Health Insurance Unit estimated that total government health expenditure would rise by at least 90 per cent if free coverage by public health services were extended to 100 per cent of the population instead of the present 50-60 per cent (Republic of Cyprus, 1983b, p. 5). If a free comprehensive national health service were to be introduced, our expenditure estimates would need to be almost doubled. In that case social expenditure, even under our relatively optimistic assumption that annual unit cost increases are limited to 3 per cent, would become increasingly burdensome, even before the end of the century.[9]

Health expenditure as a proportion of GDP

Social expenditure on the health sector as a proportion of GDP is projected to decline from its current level of 1.66 per cent to roughly 1 per cent by the year 2000, and to fall further to only 0.7 per cent by 2020, as a result of the effect of demographic change alone. However, real costs are likely to rise as the economy grows and the public comes to expect improvements in the quality of the services provided. If the Ministry concerned is able to maintain a high level of cost-consciousness and keep unit cost increases down to a level just marginally above the overall level of productivity increase, social expenditure on health remains fairly constant at around 1.6-1.7 per cent of GDP to the year 2010, and rises only marginally in the final decade of our projection period. Even then, it is still less than 2 per cent of GDP in 2020. More disconcerting, however, are the results of the

[8] It has been shown that over the 1980-85 period the annual real growth of unit costs was 9.1 per cent for in-patient care and 7.0 per cent for out-patient care (Demetriades and House, 1988). These real unit cost increases in the public health sector are much greater than those in the private sector, which have been estimated at 2.7 per cent a year over this period.

[9] To the extent that, under a national health scheme, social expenditure simply replaced private health expenditure, the net health burden on the economy would remain unchanged. But the Government would be faced with the problem of raising sufficient tax revenue to support such increases in public expenditure.

scenario where unit health costs rise at the same high rates as in the recent past. In that case the share of expenditure on the health sector in GDP more than doubles to 3.5-3.6 per cent by the end of the century and continues to grow to 11-12 per cent of GDP by 2020.

These projections have been made with the implicit assumption that the rate of free government medical coverage remains at about 50 per cent of the population. If the rate of coverage were to increase, perhaps even to 100 per cent, the intensity of utilisation rates assumed here would necessarily have to be increased. Social expenditure on health would then rise dramatically, even with modest increases in unit costs, and intolerably so under our scenario of rapidly increasing unit costs.

Pensions and other welfare benefits

Scope and coverage

The largest single item of social expenditure in Cyprus is for pensions and other welfare benefits. Even so, at 4 per cent of GDP, the current share is quite small compared with that in the Federal Republic of Germany (13 per cent), France (10 per cent) and Italy (12 per cent). It lies below that in Japan (4.8 per cent), the United Kingdom (5.8 per cent) and the United States (6.3 per cent) and just above that in Canada (3.5 per cent). This reflects the lower average pensions paid in Cyprus. The Social Insurance Scheme began operations only in 1957, the earnings-related benefits were established as recently as 1980, and the share of the elderly in the population is still relatively low.

The benefits considered here are those available to participants in the Cyprus Social Insurance Scheme administered by the Ministry of Labour and Social Insurance as well as pensions paid to retired civil servants. Payments under the Social Insurance Scheme include old-age, widows' and invalidity pensions, such benefits as orphan's disablement and death benefits, as well as certain short-term benefits for sickness, maternity and injury. Unemployment benefits are also paid by the scheme. Government expenditure on pensions includes retirement and widows' pensions and gratuities paid to those leaving the public service on or before retirement.

As a rule, public sector retirement pensions and gratuities are paid out of the general government budget. In contrast, the Social Insurance Scheme is funded from contributions by employees and their employers, as well as by the self-employed, and a contribution by the State. The original flat-rate scheme has, as noted above, been complemented by a supplementary earnings-related scheme since 1980. The basic or flat-rate part is approaching maturity in the sense that every retired person has accrued the maximum pension possible given his or her earnings. On the other hand, the immaturity of the supplementary part will persist for many years in the sense that latterly retired pensioners will continue to benefit, relative to their

predecessors, from having been in the programme for a greater part of their working lives. The annual mean real supplementary benefit – the total supplementary payments made by the scheme during a year divided by the total number of pensioners, whether in receipt of the supplementary part or not – will necessarily grow over time as those with longer contribution periods and larger entitlements come to predominate.

Anticipated increase of pensioners

The pension coverage of the male population is very high, reflecting high male LFPRs. For our projections we have assumed that it will be maintained at 98 per cent of the eligible male population aged 65 years and over. However, we estimate that, at present, only 23 per cent of females have pension entitlements, a figure that is explained by the ineligibility of large numbers of women who have never been economically active and the fact that the great majority of women in agriculture work as unpaid family labour and are not covered by the Social Insurance Scheme. In recent years, however, increasing numbers of women have joined the non-farm labour force, leading to rising female LFPRs. We therefore predict that more female workers will become eligible for an old-age pension in the future. For illustrative purposes our best estimate is that the pension coverage rate of the female population 65 years and over will rise from 23 to 26 per cent by 1990 and then to 30 per cent by the year 2000, 35 per cent by 2010 and 40 per cent by 2020.[10]

The great majority of widows in receipt of a pension in 1985 were probably aged 45 and over. In that year they accounted for 17.8 per cent of the total resident female population in that age group, a proportion we have used in our projections of the number of widows during the period to 2020. In 1985 there were only 1,685 invalidity pensioners and, for projection purposes, we have assumed that their number grows at the same annual rate as the number of old-age pensioners.

Table 7 shows the indices of projected pension recipients by type of pension scheme for selected years to 2020. The number of old-age pensioners under the Social Insurance Scheme rises by only 2,000, or 6 per cent, in the 15 years after 1985. Subsequently it rises by 12,000, or 34 per cent, by the year 2010 and by 28,000, or 79 per cent, by 2020 over the number in 1985. The rapid increase in the number of old-age pensioners during the first two decades of the next century is evidently due to underlying demographic changes, including the growing ageing of the population and the rapidly rising number of eligible women as a result of their greater past involvement in economic life.

The growth in the number of invalids results from our simplifying assumptions based on the rising number of old-age pensioners while the

[10] These estimates attempt to reflect the inverted U-shape pattern of female LFPRs with age, and the rise in the level of rates since 1976 (House, 1987, table 8, p. 41).

Table 7. Indices of male (M), female (F) and total (T) pensioners by type of pension scheme, 1985-2020 (1985 = 100)

Pension scheme	1990			2000			2010			2020		
	M	F	T	M	F	T	M	F	T	M	F	T
Social Insurance Scheme pensioners												
Old-age	96	114	100	96	145	106	117	199	134	151	283	179
Widows	..	107	107	..	128	128	..	154	154	..	167	167
Invalidity	102	102	102	113	113	113	143	143	143	190	190	190
Total	**96**	**109**	**102**	**96**	**133**	**112**	**118**	**169**	**140**	**153**	**206**	**176**
Government pensioners												
Old-age	...	...	102	...	...	114	...	...	128	...	...	137
Widows	..	95	95	..	107	107	..	120	120	..	128	128
Gratuity recipients	...	...	100	...	...	112	...	...	126	...	...	134
Total	...	...	**100**	...	...	**113**	...	...	**126**	...	...	**134**

Sources : Social Insurance Scheme pensioners from the Ministry of Labour and Social Insurance ; government pensioners from the Department of Public Administration and Personnel Services of the Ministry of Finance.

number of widows increases by two-thirds between 1985 and 2020 because of the growth in the eligible female population aged 45 and over.

In order to project the number of public sector retirees to the year 2020 we would need to know the age structure of current employees as well as that of future recruits who subsequently retire within the projection period. A model incorporating the determinants of new government hiring would also be required. Abstracting from these complications, a short-cut route is to assume that certain relationships which have held in the past will prevail into the future. For example, in 1985 permanent and regular employees in government service, who will eventually draw retirement pensions, accounted for 7.58 per cent of our estimated total labour force (Republic of Cyprus, 1987b, table 3, p. 26). Public service pensioners averaged 15.7 per cent of such employees over the period 1980-85, while the mean number of recipients of government widows' pensions was 31.6 per cent of the number of persons drawing government retirement pensions during the period 1980-86. Finally, recipients of government gratuities averaged 9.11 per cent of government retirees between 1980 and 1986. In all these cases it has been assumed that these ratios remain constant over the projection period.

From these data we are able to project the number of government pensioners in the 35 years to 2020. The largest absolute and relative growth is registered by old-age retirees who increase by 2,000, or 14 per cent, in the period 1985-2000; by 2020 their number is 37 per cent greater than it was in the base year. The numbers of widows and gratuity recipients grow at a slightly lower rate. The number of government pensioners increases at a much more modest rate than the number of Social Insurance Scheme pensioners because of the falling future growth rate of overall labour supply, to which the numbers of government employees and pensioners are linked by our assumptions.

Because prospective old-age pensioners through to the year 2020 are already born, the different fertility assumptions in our population variants A and B make no difference to these projections, so that table 7 can be considered to cover both our population scenarios.

Pension benefits and expenditures

From the gross outlays by the Social Insurance Scheme and the Government, and the number of recipients by pension type, we calculated the mean benefits for the basic and supplementary pensions and government benefits for 1985. With the real mean basic annual pension held constant we estimate that the real supplementary benefit will grow by 11 per cent annually to the year 2004 to reflect the growing maturity of the scheme. Thereafter, the annual growth falls to 3.06 per cent.[11]

Fund managers are required to increase the basic benefit in line with the current growth of average real wages while only the growth in nominal

[11] The assumptions and calculations are fully reported in Demetriades and House, 1988.

supplementary benefits is discretionary. Hence, assuming that overall productivity and the general wage level grow by 2.5 per cent annually, then pension benefits, both basic and perhaps supplementary, can be expected to follow suit. Our second scenario therefore projects the mean basic benefit to rise by 2.5 per cent and the mean supplementary benefit to rise by 13.5 per cent annually, 11 per cent to reflect increasing maturity and 2.5 per cent to reflect rising current real wages. Our third scenario assumes that pensions rise at the same rate as in 1981-86. The mean basic old-age pension, overwhelmingly the dominant part, grew by 8.4 per cent annually during that period, and we assume that it continues to grow at this high rate over the projection period, while the real supplementary pension grows at 11 per cent annually, sufficient to reflect the increasing maturity of the scheme. This scenario applies to the old-age, invalidity and widows' pensions of the Social Insurance Scheme.

The alternative scenarios for levels of government pensions and gratuities are similar – with no real growth, a 2.5 per cent real annual growth and a real growth path of 6.3 per cent for old-age pensions, widows' and gratuities reflecting the most recent trend.

Since expenditure on old-age pensions in 1985 constituted 65 per cent of the total expenditure of the Social Insurance Scheme it is hardly surprising to find that the index of overall expenditure follows quite closely the index of old-age expenditure. We isolated the impact of two factors on pension outlays, namely the effect of demographic change and the effect of the increasing maturity of the supplementary earnings-related scheme. Overall expenditure is projected to rise by 27 per cent during the period 1985-2000 (slightly less for old-age pensions and slightly more for invalids and widows). During the subsequent two decades, however, both factors ensure that total pension expenditures grow much more rapidly. This reflects the much more rapid increase in the number of retirees in the post-2000 period, which rises by 32,000, or about 50 per cent, between 2000 and 2020, and the growing weight of earnings-related supplementary benefits in the total. Real outlays on pensions are almost 200 per cent greater in 2020 than in 1985. If mean annual state pension rates are assumed to remain constant in real terms over the projection period, the 13 per cent increase between 1985 and 2000 and the 35 per cent rise to 2020 in total government outlays for this item reflect the pure demographic effect.

When mean benefits rise by 2.5 per cent annually, along with the growing maturity of the Social Insurance Scheme, total outlays almost double by the turn of the century and are almost 600 per cent greater in 2020 than 35 years earlier. Alternatively we assume that mean pension benefits follow their most recent patterns of growth throughout the projection period. Benefits have risen quite rapidly since 1980 so that, if past growth rates are extrapolated indefinitely, total Social Insurance pension outlays would rise by 47 per cent in the five years to 1990 and by almost 275 per cent by the turn of the century. For their part, government pension outlays rise by almost 200

per cent under this scenario during these initial 15 years. While we do not believe that such a rapid increase could occur in reality without exhausting the Social Insurance Fund or inducing a taxpayers' revolt, these projections illustrate how explosive future pension expenditures can become if the most recent trends continue into the future.

Pension expenditure as a proportion of GDP

Under population variant A and the optimistic economic growth scenario, and assuming that basic pensions are unchanged in real terms and that the increasing maturity of the scheme raises mean supplementary pensions, the share of pensions in GDP falls from 4.1 per cent in 1985 to 2.92 per cent by the year 2000. A slight increase to 3.07 per cent is then registered by 2020 because of our projected demographic changes and increasing numbers of retired persons. Under our pessimistic economic growth scenario the share of pensions in GDP is slightly greater than this, falling to 3.11 per cent by 2020.

With basic pensions and government pensions following the assumed growth in overall productivity, the share of pension expenditure in GDP is only marginally higher by the year 2000 – at 4.15 per cent (optimistic) and 4.21 per cent (pessimistic) – than in 1985. Thereafter, however, the share rises to about 7 per cent by 2020.

The most dramatic rises in the share of pensions in GDP come when recent pension benefit increases are assumed to continue into the future. By the turn of the century their share of GDP doubles to over 8 per cent and reaches 30 per cent by 2020. No doubt social and political forces would intervene to ensure that such an increase did not occur. The message for planners and policy-makers is clear: obviously, recent past increases in real pension benefits cannot be maintained over the medium to long run.

Unemployment compensation

The level of unemployment affects the share of social expenditure in GDP in two ways. Obviously, with an unchanged pattern of unemployment duration, the greater the number of unemployed at any time the greater will be the expenditure on them, and the smaller will be the size of the labour force employed in income-generating activities, resulting in a reduced level of GDP.

Since registered unemployment has traditionally been low in Cyprus, measuring 1-2 per cent of the labour force over the period 1960-80 and showing only a marginal increase in the 1980s, social expenditure on unemployment is necessarily limited, amounting to only 0.28 per cent of GDP in 1985.[12]

[12] In 1980 the share of unemployment compensation in GDP in the seven major OECD countries ranged from 1.7 per cent in France to 0.3 per cent in Japan (IMF, 1986, p. 57). All these countries are experiencing much higher rates of unemployment than Cyprus and many treat their unemployed more generously.

Unlike other Social Insurance Scheme benefits, the earnings-related supplementary portion of the unemployment benefit is already mature and does not depend on a long history of past contributions but only on the recent level of earnings of the unemployed. Therefore, our three scenarios project the growth of the supplementary benefit at the same rate as that of the basic unemployment benefit. They are assumed (1) to remain constant,[13] (2) to follow the growth of overall productivity at 2.5 per cent annually, and (3) to rise at 8.4 per cent annually as they did during the period 1980-86.

Differences in the numbers unemployed between population variants A and B are insignificant for most of the projection period since different fertility patterns take time to be reflected in the size of the labour force.

The largest differences occur between the optimistic and pessimistic unemployment scenarios described earlier, with unemployment about 60 per cent greater under the latter. Total expenditure on unemployment compensation rises by about 8 per cent between 1985 and 1990 under the optimistic assumption, and by 100 per cent under the pessimistic outlook and assuming that no change occurs in the real basic benefit. As the absolute size of the labour force and the numbers unemployed increase under variant B, expenditure on unemployment compensation grows and is about 70 per cent greater in 2020 than in 1985. Again, when the recent rapid increases in basic benefits are projected to continue into the future, outlays on unemployment compensation become explosive, rising to between 17 and 29 times their 1985 level. Even so, they remain the smallest component of overall social expenditure. Under the most optimistic assumption of no growth in the value of average basic benefits, the share in GDP falls rapidly from 0.28 per cent in 1985 to 0.10 per cent by 2020. The greatest threat to the viability of the Social Insurance Scheme again comes from projected increases in mean benefits based on recent past trends. In the unlikely event that basic benefits were to grow at 8.4 per cent annually over the whole 35-year period, expenditure on unemployment compensation under our pessimistic economic outlook would rise eightfold from 0.28 per cent of GDP in 1985 to 2.3 per cent by the year 2020.

5. Conclusions and policy implications

The implications of prospective demographic changes, together with the assumptions about overall productivity increases and resulting economic growth, as well as the changes in the level of real benefits and costs of social services, combine to generate our projections of social expenditures. Their total share in GDP for various years under the different scenarios is shown in table 8. When it is assumed that the Government simply maintains the real 1985 per capita level of social benefits and that unit costs of the various

[13] This is the least plausible assumption given that the supplementary unemployment benefit is earnings-related, and earnings will inevitably rise along with overall productivity.

Table 8. Total social expenditure as a proportion of GDP under various population variants and assumptions on cost and benefit increases, 1985-2020 (%)

Scenario	1985	1990	2000	2010	2020
No change in costs and benefits					
Population variant A					
Economic growth					
Optimistic	9.96	8.50	6.79	5.64	5.17
Pessimistic	9.96	8.81	6.99	5.91	5.29
Population variant B					
Economic growth					
Optimistic	9.96	8.42	6.61	5.47	4.82
Pessimistic	9.96	8.79	6.80	5.63	4.93
Costs and benefits increase with productivity					
Population variant A					
Economic growth					
Optimistic	9.96	9.53	9.87	10.45	12.23
Pessimistic	9.96	9.90	10.14	10.96	12.54
Population variant B					
Economic growth					
Optimistic	9.96	9.46	9.60	10.13	11.38
Pessimistic	9.96	9.87	9.89	10.41	11.68
Costs and benefits rise by same rates as in 1980-85					
Population variant A					
Economic growth					
Optimistic	9.96	12.65	23.14	40.32	80.31
Pessimistic	9.96	13.11	23.80	42.33	82.37
Population variant B					
Economic growth					
Optimistic	9.96	12.53	22.54	38.85	73.13
Pessimistic	9.96	13.10	23.18	38.96	75.16

Source: Authors' assumptions and calculations.

services remain constant, changes in the size and structure of the population lead to a significant growth in social expenditure by the end of the projection period. In any case, average pension benefits will inevitably rise because of the increasing maturity of the Social Insurance Scheme. However, relative to the growth of projected GDP these increased expenditures appear easily manageable. As table 8 shows, the ratio of social expenditure to GDP falls continuously over the period under all scenarios, from roughly 10 per cent in 1985 to about 7 per cent by the turn of the century, and declines further to roughly 5 per cent by 2020. Therefore, we may safely conclude that the

growth in government social expenditure implied by demographic factors alone can be financed without much difficulty.

However, benefit and cost levels in 1985 are unlikely to remain constant over the subsequent 35 years, given past experience in Cyprus and elsewhere. If we assume that they rise at the same rate as overall productivity (or just above this in the health sector), we find that total social expenditure as a proportion of GDP remains fairly close to the 10 per cent level of 1985 up to 2000, but rises to 11-12 per cent by 2020. Three of the four core sectors show an increased share of expenditure in GDP, with the fastest growth occurring in pensions and other welfare benefits, particularly after the turn of the century. Because of the relative decline in the school-age population, the share of education expenditures in GDP declines under all scenarios.

Since the beginning of the 1980s, however, the growth in the level of benefits and costs has far outstripped the growth of overall productivity. When recent growth rates in benefits and costs are projected to continue into the future, the share of social expenditure rises from slightly less than 10 per cent to almost one-quarter of GDP by the end of the century, a proportion already exceeded by France, the Federal Republic of Germany and Italy. Evidently, very radical changes in institutions, consumer spending patterns and income distribution would have to occur in Cyprus over this 15-year period for such an increase to be tolerable. A new consensus on the intergenerational distribution of income would also need to emerge.

The data for the years beyond 2000 are meant to be merely illustrative, since it is totally unrealistic to think that social expenditure could absorb more than three-quarters of GDP by 2020.

The main conclusion of our projection exercise is that demographic changes now under way in Cyprus will make a considerable impact on the size and structure of expenditures on social services over the 35 years between 1985 and 2020. Nevertheless, from a relatively low share of GDP at present, such expenditures can be maintained within tolerable limits in future years if real benefit and cost increases are limited to the growth of overall productivity. Dire consequences could be expected if recent past increases were to continue for very long and this must be a major concern of policy-makers. Such increases will be especially difficult to contain in the case of Social Insurance Scheme pensions since the mean benefit paid will necessarily continue to grow over the long term because of the increasing maturity of the earnings-related supplement. One possible way to curtail this built-in upward momentum would be to amend the current practice of automatically raising the basic part of pension benefits in line with average real wage increases. As a result, the "replacement rate" – the ratio of initial pension benefits to previous earnings – would be lowered. But then the distribution of income would move against older Cypriots who are already over-represented among the relatively poor (House, 1989), and such a change may therefore be considered undesirable.

Another policy option currently being debated is to reduce the normal pensionable age of retirement, at least for certain occupations, from 65 to 60 years. Our calculations indicate that this would have profound consequences for old-age pension expenditures and significantly raise the share of pensions in GDP.

We find that demographic changes currently under way are such as to lower the relative importance of education expenditure in GDP. However, a number of important policy measures are now being debated in Cyprus whose implementation would offset this declining trend: for example the establishment of a public university subsidised and funded by the State. Our estimates suggest that the construction and operation of the university would add almost 25 per cent to state spending on education during the initial five years and at least a further 17 per cent of 1985-level expenditure for each year thereafter.

Current health policies contain a built-in momentum to raise unit costs. For example, new public hospitals are planned in which unit costs will inevitably be higher than at present. Public provision for the care of a growing number of very old people will raise them further, particularly if the traditional family unit in Cyprus should follow the Western trend and gradually accept less responsibility for caring for the elderly. This could also be induced by rising LFPRs among younger females who formerly stayed at home to look after older relatives. Evidently, pressures exist in all of the core social service sectors to expand operations and raise unit costs. Innovations are needed if essential services are to expand with increased efficiency and productivity at near-constant unit costs.

We have seen that a buoyant economy should be quite capable of absorbing increased social expenditure resulting from demographic changes, provided it is limited to the rate of increase of overall productivity. The principal danger comes from a continuation of the recent historical experience of rapidly increasing unit costs and a propensity to expand the coverage of social services. Clearly, policy-makers and planners in Cyprus will need to take some major decisions in the near future which will have profound consequences for social expenditure over the longer term.

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