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Budgetary Costs of an Ageing Population: The Case of Health Care in Portugal[(*)]

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Abstract. *In the follow-up to the Stockholm European Council in March 2001, the ECOFIN requested a report on the impact that projected population ageing will have on public spending on health and long-term care. This paper provides an answer for the Portuguese case, focusing on health care alone. All public health care outlays are considered. Profiles of real per capita health care costs by age and gender have been estimated and cover acute care, ambulatory care, and pharmaceuticals. With real per capita costs growing with GDP per capita or per worker, demographic changes are assumed to be the only driver of increasing health care expenditure.* ***As a result of ageing alone****, public spending on health care in Portugal is expected to rise from 5.3 per cent of GDP in 2000 to between 6.4 and 7.2 per cent of GDP by 2050. These numbers are, in effect, lower bounds, given that other supply and demand factors that were not explicitly considered could increase expenditure further.*

"With 40 to 50 percent of health care spending being currently directed towards the elderly and with per-capita health care costs for those over 65 being three to five times higher than for those under 65, upward pressure on health and long-term care costs is likely to ensue."

in *Jacobzone, S., and Oxley, H., (2002)*

(*) Comments welcome at prodrigues@dgep.pt. While the paper documents official Portuguese projections, the authors claim full responsibility for the analysis and for any remaining errors. This research began when Guilherme Caldas was an intern at the Research Department of the Portuguese Ministry of Finance. The authors thank Miguel Gouveia for insightful comments and for the permission to use the age and gender profiles of public expenditure on health he computed. We wish to thank the staff at the General Directorate of Health at the Ministry of Health for providing expert assistance with the data.

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1. INTRODUCTION

For some time now, demographers have alerted us to the emergence of population ageing, the change in the age structure of the population whereby old-age dependency rates are expected to double in almost all OECD countries over the next half century (Eurostat, 2000). All forecasts are uncertain but long-term demographic projections are typically more reliable. The reason why population forecasts tend to be more reliable, at least for the next thirty years or so, is that most of these people - baby boomers at some time or other - are already alive and are expected to live longer than ever before.

Population ageing is a good sign, we sometimes hear; it's a sign that people are living longer. Why, then, do policymakers consider population ageing as a formidable challenge? While it is true that having more elderly around means that society has triumphed in delaying mortality, such an event will definitely strain public budgets. As spending on pensions, health care, and care for the aged (a.k.a. long-term care) is expected to increase, taxes levied on labour income will possibly decrease, as employment falls. Even with people living longer, they may not always be in good health, as the risk of becoming seriously ill increases with age. On the other hand, even if the future elderly are healthy until the end,[1] the hitherto unprecedented number of old people coupled with the significant costs of treating terminal illnesses are enough to warrant our concern about escalating public spending on health.

Demographics and macroeconomics are intertwined - even though most of the time we treat the first as exogenous. Given the magnitude of population ageing alone and the potential havoc it can wreak, it's quite surprising how little we know about its expected macroeconomic effects; real interest rates, for example, could go any way - up or down - as a result. Elmendorf and Sheiner (2000) have recently stressed the need for further research in this field and, in particular, the urgency of a comprehensive macroeconomic strategy with which to face this daunting challenge. On account of political economy considerations, and capital market implications, they remind us, issues such as optimal taxation may have to be rethought.

While the academic community and the OECD have long highlighted some of these issues (see Auerbach and Lee, 2001, Jackson, 1998, and Leibfritz et al, 1995, for three recent accounts, or Auerbach et al, 1989, and Cutler et al, 1990, for path breaking analyses), it is reassuring to see that policymakers worldwide, mainly through the influence of key institutions and constraints that force politicians to take a more farsighted approach, are becoming increasingly aware of this fiscal challenge.[2]

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[1] According to the distance-to-death argument, age can be a poor predictor of health costs.

[2] Very recently, the Federal Reserve in the U.S. held a conference just on population ageing (see Federal Reserve Bank of Boston, 2001), the Organization for Economic Cooperation and Development published yet another report on the sensitivity of age-related public spending (OECD, 2001b), and the European Union, through its Economic Policy Committee, set up an Ageing Working Group that is actively involved in determining the budgetary and

As a member state in the European Union, Portugal fully shares these concerns and partakes in finding a solution for them. In the note to the Stockholm European Council on the contribution of public finances to growth and employment (see Council document 6997/01 of 12 March 2001) the ECOFIN Council requested the Economic Policy Committee to provide a report on the impact that projected population ageing will have on public spending on health and long-term care. At the request of the Economic Policy Committee of the EU, this paper focuses on projecting public spending on health care in Portugal until 2050. These projections should *not* be taken as forecasts of what *will* happen, but rather they are intended as a signpost to policymakers of *what increases (in percentage points of GDP) to expect simply as a result of demographics*. Naturally, then, other channels will add to this level of spending (see Section 5 for a discussion of these channels). This report is part of a wider initiative that aims to determine the budgetary impact of ageing in Portugal. So far, only public pensions (see Rodrigues, 2002, and Pereira and Rodrigues, 2002) and now health care have been considered, though long-term care, education, tax revenues, and macroeconomic effects will, data permitting, be the focus of future research.

This paper is structured as follows. In Section 2 we provide a brief account of the health care system in Portugal. In Section 3 we explain the methodology underlying the 50-year projections, and in Section 4 we present and discuss the results. Finally, Section 5 closes with some caveats and concluding remarks.

2. AN OVERVIEW OF THE PORTUGUESE HEALTH CARE SYSTEM

In this section we describe the most salient characteristics of the Portuguese health care system, focusing primarily on the institutional setup. For a more comprehensive account, the reader is referred to EOHCS (1999) and, in particular, to OPSS (2001). A slightly more dated, though still useful, source of information is WHO (1997).

Health care services in Portugal are provided by three co-existing systems: the National Health Service (*Sistema Nacional de Saúde* or SNS in Portuguese), special health insurance programmes associated with occupational schemes, and voluntary health insurance packages. In what follows, we provide a short description of each.

2.1. The National Health Service

The SNS was founded in 1979 to create a nationwide network of public hospitals and health care centres. Its function is to provide free access to primary health care for everyone. Only certain diagnostic

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macroeconomic effects of an ageing population (see EPC, 2001, for a first report). Thus, central banks and ministries of finance alike are concerned with the effects ageing can have on economic growth and stability and their implications both for public finances and for inflation.

and emergency services require a co-payment that is calculated taking into account the socio-economic status of the user. Besides medical treatment, the system subsidises a wide range of medication.

The National Health System is centrally run by the Ministry of Health that is responsible for its regulation, organization and planning. The SNS is almost entirely funded by tax revenues, and so budget submissions as well as the hiring of additional staff require the formal approval of the Ministry of Finance.

At a regional level, the system is run by five Regional Health Administrations (*Administrações Regionais de Saúde* or ARSs in Portuguese) and subdivided into 18 sub-administrations, which are responsible for implementing policy, allocating resources, and running several local primary health care centres. Hospitals and health care centres are aggregated as units under each ARS. Employees of the SNS are civil servants with wages that are determined by their hierarchical position as well as their length of service rather than indexed to performance. Doctors working for the SNS are allowed to practise in the private sector as well.

2.2. Special health insurance schemes

In addition to the SNS, several professions are entitled to separate health insurance schemes. The ADSE, the scheme available to civil servants and their dependants, covers around 15 per cent of the population and is by far the largest. Bank workers have the second largest scheme but many others exist for the military personnel, postal workers, insurance companies' employees, the national mint, the Ministry of Justice and the CGD, the largest public bank. These systems offer better quality services than the SNS on account of free choice among competing health care providers.

2.3. Voluntary health insurance schemes

The use of voluntary health insurance is now becoming quite common. These schemes exist in Portugal since 1982 and have grown substantially in the last decade; in 1998, around 10 per cent of the population had one.

The private sector is taking on an ever-increasing role in the provision of health care in Portugal. In fact, it is becoming complementary to the SNS rather than an alternative, mainly providing services such as ecographies, lab tests and dental care. Most tests can now be done at privately run clinics or health centres that have agreements with the SNS or one of the other systems. These facilities, along with private practitioners and *Misericórdias*, religious institutions that have always played an important role, represent the larger part of privately provided-health care. In the future, the private sector's role is expected to further increase, moving into the management of public hospitals.

2.4. General considerations

In terms of health care associations, doctors, nurses, and pharmacists each have separate guilds. These have mandatory membership, regulatory power over the profession and serve group interests. Regarding consumers, there is no organization that specifically defends patients' rights, but several support groups do exist that are associated to chronic conditions such as diabetes, haemophilia and AIDS.

3. AN ACCOUNTING MODEL

The key question that this report must answer is: *Looking at the health care channel, how serious a threat is population ageing to the long-term sustainability of public finances?* The methodology adopted is similar in spirit to that used in Johnston and Teasedale (1999) or Ermisch (1990), cited in Disney (1998).

It is natural, then, that we focus on the level of public spending on health care as percentage of GDP in the year 2050. Let us dub this ratio *H/Y*. Furthermore, let uppercase letters denote nominal values and lowercase letters denote real values, let *PH* be the price index of health care services, let *P* be the GDP deflator, and let *gX* be the growth rate of the variable *X*. Then, public spending on health care as a percentage of GDP is determined as

$$H/Y = (h * PH) / (y * P).$$

From here it follows that the growth rate of this ratio is

$$g(H/Y) = g(h) + g(PH) - g(y) - g(P).$$

Following recommendations (see European Commission, 2001) we have set *g(PH)* equal to *g(P)*. This is a simplifying assumption that allows us to avoid discussing whether the increase in public spending is due to a greater quantity or an improved quality of health care services, an issue that is not easily analysed in the context of an aggregate model such as the one we use here. Note that if the price of health care rises relative to the GDP deflator then real spending on health will differ from the quantity of health purchased. In reality, though, because of Baumol's disease and the tendency to overuse technology, one would expect the two price indices to behave quite differently. At present, however, we still do not have a satisfactory health care price index.

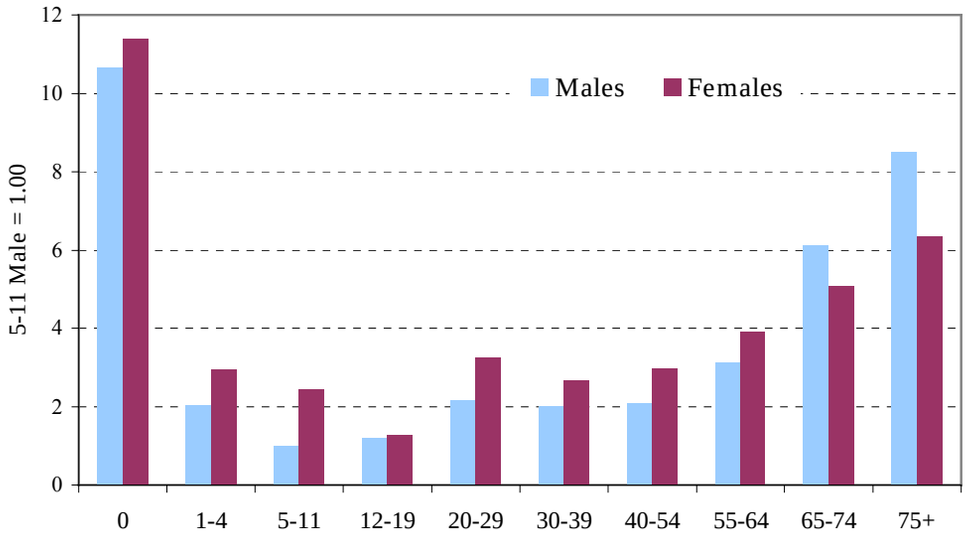
To carry out the projections for *H/Y*, we must specify how GDP will fare. The rate of economic growth is determined after specifying a growth rate for labour productivity and for employment. The latter depends on demographics and assumptions regarding future labour participation rates (see Section 4 for further details).

Variable *h* is public expenditure on health care in real terms. The growth of real public expenditure on health care, *g(h)*, is influenced by demographic and other factors. Regarding demographics, the level

of population and the corresponding age structure are important determinants insomuch as a higher population means that more people have to be provided with health services, and an ageing population typically translates into rising expenditure on account of the fact that older people cost more than younger people. This is because older people generally have a worse health status (a greater prevalence of disability, and a larger number of hospital admissions). Other factors that contribute to rising health expenditures in real terms include a myriad of factors, the most significant of which includes technology and personnel costs (see Section 5, for more on this).

To proceed, we project real health care expenditure using a micro profile of real per capita health care costs broken down by age groups and gender (see **Figure 1**).[3] Using the demographic forecasts, we multiply the number of people projected in each age and gender cell by the corresponding real per capita health care costs. Adding the expenditure over all age and gender cells provides an estimate of total public spending on health. Throughout the projection horizon we assume that the shape of this profile remains unchanged. This does not preclude, however, that the expenditure profile be scaled up as time goes by. In the projections carried out and detailed in Section 4, we have assumed that these real per capita costs either grow with GDP per capita or with GDP per worker.

Figure 1 - Profile of real per capita health care costs by age group and gender, 5-11 = 1.00



Source: Gouveia (2001); Note: Does not include public co-payments in pharmaceuticals.

[3] The expenditure profile or, more precisely, the profile of real per capita health costs by age groups and gender depicted in Figure 1 was taken from Gouveia (2001) in the context of a project of resource allocation formulae to be applied to the various subsystems. Figure 1, however, is already the final expenditure profile that was obtained after scaling it up so as to replicate aggregate health care expenditure. This ensures that the profile determined using micro data is compatible with overall expenditure data at a macro level. Gouveia (2001) uses the 1995/1996 National Health Survey to determine a consumption profile by age group and gender. The health services considered include hospitalisation, visits to the doctor, blood and urine tests, ecographies and X-rays, and ECGs. Public co-payments in pharmaceutical goods are, however, lacking (for an estimate of the real per capita cost profile by age and gender for drugs, see sub-section 4.3). Health care production is then valued at administratively set prices (according to Law 348-B/98) and adjusted to approximate real costs or shadow prices using cost accounting records.

3.1. Historical trends in public spending on health care in Portugal

The objective of this subsection is to extract historical expenditure trends looking at the 1990-1999 period. In particular, what we are most interested in is how much did real per capita health costs grow over this period, and what is the relationship with the average growth rate of GDP per capita and GDP per worker.

From 1990 to 1999, public spending on health care as a percentage of GDP increased 1.14 pp from 4.2 per cent to 5.34 per cent (OECD, 2001a). A part of the increase can be attributed to demographics. Using "back casting", i.e., applying the 1990 population data to the expenditure profile instead of applying the corresponding 1999 demographic data, we obtain an estimate of what the public spending on health care to GDP ratio would have been in 1999, had the level and age structure of the population remained unchanged. Using this technique, we conclude that demographics are responsible for 0.24 percentage points of the increase. This means that, had demographics stayed the same, the ratio would have been 5.1 per cent of GDP.

Over the nineties, on average, real GDP grew at 2.49 per cent per annum, the GDP deflator grew at 5.98 per cent, and the health price index rose 8.48 per cent per year (INE, Instituto Nacional de Estatistica). Also, from 1990 to 1999, population rose by 1.08 per cent. Using the accounting framework described above, these figures suggest that real per capita health care costs grew at 2.05 per cent per year. This was equal to the growth rate of GDP per worker and roughly 30 basis points lower than the rate at which GDP per capita grew.

4. PROJECTIONS OF PUBLIC SPENDING ON HEALTH CARE

In this section we present and discuss the array of projections that were agreed at one of the Ageing Working Group meetings (see European Commission, 2001, for the supporting document).

The analytical framework sketched in Section 3 suggests that the trend in health care prices *vis-à-vis* that of the general price level, demographics, macroeconomic performance, and the growth of real per capita health care costs are the crucial determining factors of how the ratio of public expenditure to GDP will change over the next half century.

Following recommendations, we set the general increase in health care prices equal to the inflation rate, assumed constant at 2 percent. So, the relative price channel will be switched off.

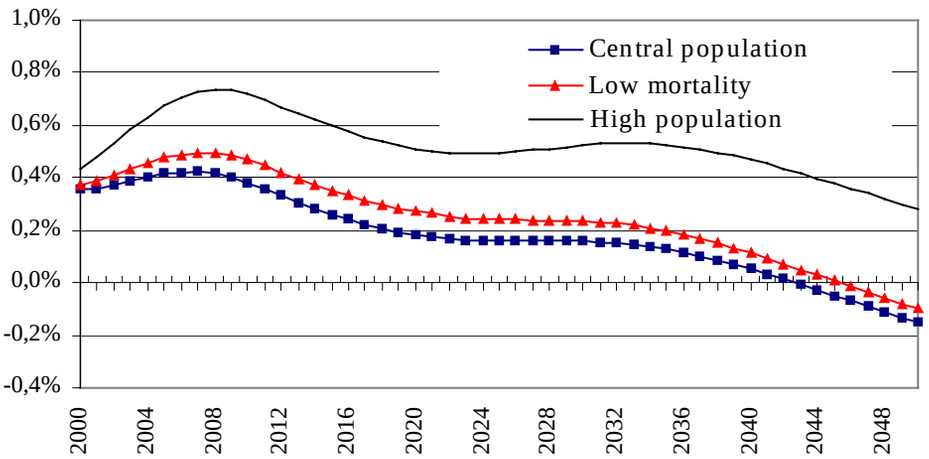
4.0. Demographic and macroeconomic scenarios

In the projections that were done, the demographic variants used were 'low mortality', 'central population', and 'high population' (see Eurostat, 2000). The three variants chosen reflect the facts that

older people are more costly than younger people, and "more people" means a greater need for health services. The 'low mortality' and the 'central population' variants exhibit the highest old age dependency rates, and the 'high population' variant projects the largest number of people. **Figure 2** and **Figure 3** portray annual population growth and the share of the elderly for all three demographic projections. The last graph describes the change in the age structure.

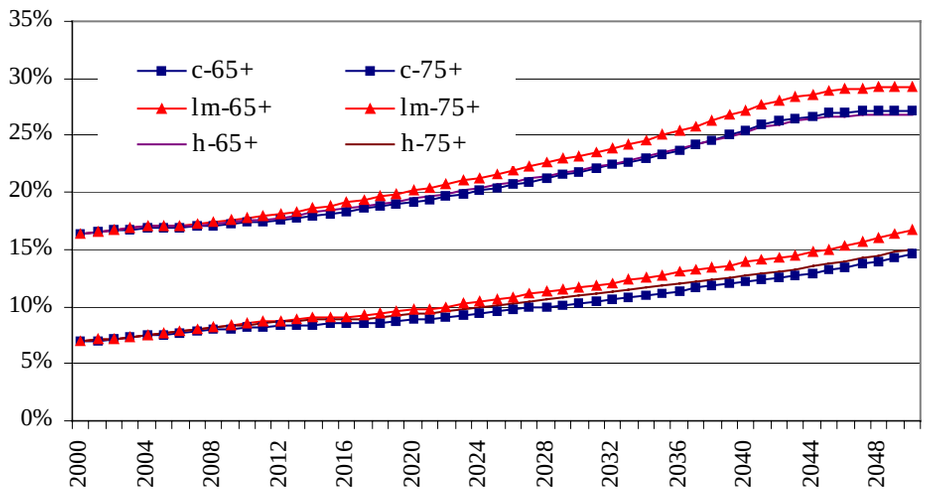
Regarding economic growth, the macroeconomic scenarios used are the same as those agreed upon for the exercise in projecting pension expenditure (see Economic Policy Committee, 2001). These two alternatives are dubbed the "Current policy scenario" and the "Lisbon scenario" and they differ in labour participation rates and in the growth rate of labour productivity.

Figure 2 - Annual population growth as projected by Eurostat (2000)



Source: Eurostat (2000).

Figure 3 - The old and the oldest old as a share of total population



Source: Eurostat (2000).

It should be further highlighted that the "Lisbon scenario" assumes that the high population variant will materialize, and is meant to reflect the strategic objectives for the EU that were established at the Special European Council held in Lisbon towards the end of March 2000. Essentially, the aims are to raise the overall employment rate to 83 per cent by 2045, and to reach the same level of productivity as that of the US by 2050. An implicit assumption is that from now until then labour productivity in the US will grow at an average rate of 1 percent p.a. **Table 1** summarizes the labour participation rates assumed.

The labour force is determined after summing the cross products of age and gender-specific labour participation rates by the corresponding population data. Assuming an overall unemployment rate held fixed at 4 percent, the level of employment is easily obtained. Figure 3 plots the growth in employment that results from the different population projections and labour participation rates.

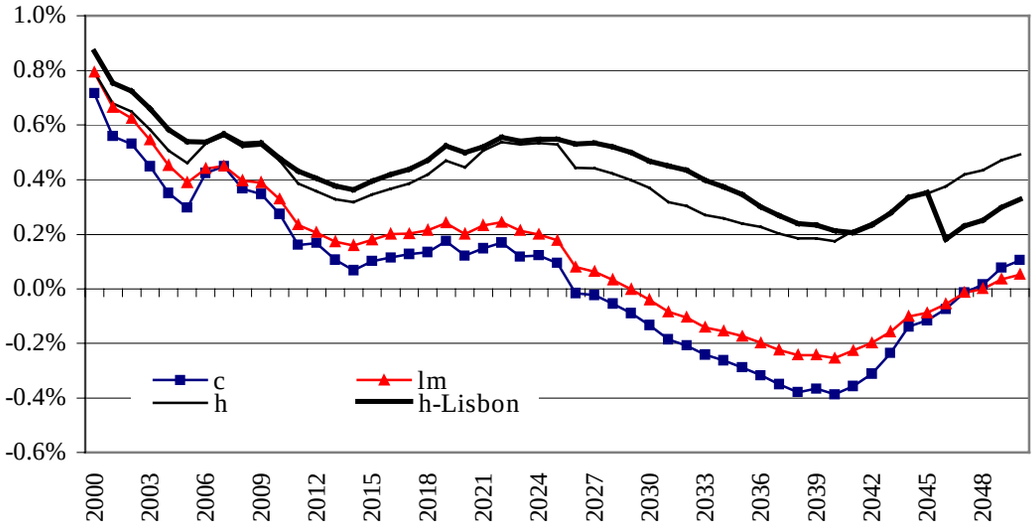
By definition, labour productivity is GDP per worker. It follows, therefore, that the growth of GDP will be the sum of the rates at which employment and labour productivity grow. It should be noted from **Figure 4** that, in both the current policy and the Lisbon scenario, because the rate at which population grows is generally higher than the rate at which employment grows, GDP per worker is projected to grow faster than GDP per capita. This is a direct result of an ageing population where the dependency rate rises. Finally, to carry out the projections, all we need is to specify how real per capita health care costs will grow. Together with the population data and the micro profile, the change in per capita costs will determine the real growth of public spending on health care.

Table 1 - Labour participation rates for both macroeconomic scenarios

			2000	2005	2010	2020	2030	2040	2050
Current policy scenario	Males	0-19	12.3	10.8	9.4	9.4	9.4	9.4	9.4
		20-54	91.8	91.8	91.8	91.8	91.8	91.8	91.8
		55-64	62.6	61.1	61.1	61.1	61.1	61.1	61.1
		65+	16.7	15.5	14.3	14.3	14.3	14.3	14.3
	Females	0-19	10.9	9.8	8.7	8.7	8.7	8.7	8.7
		20-54	72.8	75.0	77.3	79.6	82.0	84.4	86.8
		55-64	33.7	34.4	35.1	39.2	43.8	48.8	54.5
		65+	7.1	6.8	6.5	6.5	6.5	6.5	6.5
Lisbon scenario	Females	0-19	10.9	9.8	8.7	8.7	8.7	8.7	8.7
		20-54	72.8	76.5	78.1	80.4	83.7	87.7	87.7
		55-64	33.7	36.6	39.5	45.3	51.0	59.7	59.7
		65+	7.1	6.8	6.5	6.5	6.5	6.5	6.5

Source: ILO (1997) and commonly agreed assumptions

Figure 4 - Growth of employment under different population and labour participation assumptions



Source: Authors' calculations using commonly agreed assumptions.

Typically, per capita health costs grow with the economy. GDP per capita and GDP per worker are indicators of a country's standard of living. As such, they are two obvious candidates on which to index the growth of per capita health care costs. We consider both alternatives and discuss the implications of each in the following two subsections.

4.1. Real per capita health care costs grow with GDP per capita

If health care prices follow the general price trend, if real per capita health care costs grow with GDP per capita, and if there are no changes in the age structure of the population, then public spending on health care will remain constant as a share of GDP. Under such a setting, we can easily determine by how many percentage points of GDP public expenditure on health care will rise simply as a result of an ageing population.

4.1.1. The current policy scenario

Under the current policy scenario, if real per capita health care costs grow with GDP per capita at an average rate of 1.76 percent per year, then public expenditure on health care is projected to rise from 5.34 percent in 1999 to between 6.14 and 6.38 per cent of GDP, depending on the demographic variant that materializes (see **Table 2**).

Table 2 - Population ageing and public spending on health care under the current policy scenario

Real per capita health care costs grow with	GDP per capita
at an average rate of	1.76
Demographic variant	Public spending as a % of GDP in 2050
Central population	6.14
High population	6.18
Low mortality	6.38

Source: Authors' calculations

4.1.2. The Lisbon scenario

Under the Lisbon scenario, if real per capita health care costs grow with GDP per capita at an average rate of 2.26 percent per year, then public expenditure on health care is projected to rise from 5.34 percent in 1999 to 6.15 percent of GDP (see **Table 3**).

Table 3 - Population ageing and public spending on health care under the Lisbon scenario

Real per capita health care costs grow with	GDP per capita
at an average rate of	2.26
Demographic variant	Public spending as a % of GDP in 2050
High population	6.15

Source: Authors' calculations

4.1.3. Sensitivity analysis around the growth of real per capita health care costs

If real per capita health care costs grow a little more or a little less than GDP per capita, how do the results of the projection change? Here plus or minus 0.25 percentage points seems a sensible range.

If real per capita health care costs grow 0.25 percentage points lower than GDP per capita, at an average rate of 1.51 percent per year, then public expenditure on health care is projected to rise from 5.34 percent in 1999 to 5.44 percent of GDP in 2050. In that case, the impact of an ageing population on health care expenditure is fully neutralized.

If, however, real per capita health care costs grow 0.25 percentage points *higher* than GDP per capita, at an average rate of 2.01 percent per year, then public expenditure on health care is projected to rise from 5.34 percent in 1999 to 7.02 percent of GDP in 2050 (see **Table 4** for a summary).

4.2. Real per capita health care costs grow with GDP per worker

In this subsection we redo the exercise described in subsection 4.1, this time assuming that real per capita health care costs grow with labour productivity or GDP per worker.

Table 4 - Growth of real per capita health care costs: some sensitivity analysis

Assumptions:	Central population; Current policy
Real per capita health care costs grow with	GDP per capita minus 0.25 pp
at an average rate of	1.51
Public spending as a % of GDP in 2050 is	5.44
Real per capita health care costs grow with	GDP per capita
at an average rate of	1.76
Public spending as a % of GDP in 2050 is	6.18
Real per capita health care costs grow with	GDP per capita plus 0.25 pp
at an average rate of	2.01
Public spending as a % of GDP in 2050 is	7.02

Source: Authors' calculations

4.2.1. The current policy scenario

Under the current policy scenario, if real per capita health care costs grow with GDP per worker at an average rate of 1.89 percent per year, then public expenditure on health care is projected to rise from 5.34 percent in 1999 to between 6.51 and 6.81 per cent of GDP, depending on the demographic variant that materializes (see **Table 5**).

4.2.2. The Lisbon scenario

Under the Lisbon scenario, if real per capita health care costs grow with GDP per worker at an average rate of 2.35 percent per year, then public expenditure on health care is projected to rise from 5.34 percent in 1999 to 6.43 percent of GDP (see **Table 6**).

Table 5 - Population ageing and public spending on health care under the current policy scenario

Real per capita health care costs grow with	GDP per worker
at an average rate of	1.89
Demographic variant	Public spending as a % of GDP in 2050
Central population	6.61
High population	6.51
Low mortality	6.81

Source: Authors' calculations

Table 6 - Population ageing and public spending on health care under the Lisbon scenario

Real per capita health care costs grow with	GDP per worker
at an average rate of	2.35
Demographic variant	Public spending as a % of GDP in 2050
High population	6.43

Source: Authors' calculations

4.3. Now including pharmaceuticals

The ultimate goal of this report is to determine the budgetary effect that an ageing Portuguese population will have on health care costs. In the analysis so far, we have relied upon the profile of real per capita health care costs by age group and gender, detailed in Gouveia (2001). But, as we've already mentioned, public co-payments in pharmaceuticals are lacking because these were omitted from the National Health Survey (see Ministério da Saúde, 1995), from which the profile was estimated.

In this sub-section we explore other statistical sources so as to arrive at an age and gender profile of public co-payments in pharmaceuticals, a key step towards our goal. Our concern to have as many expenditure items as possible encompassed by an age and gender profile is particularly warranted in the case of pharmaceuticals.

According to a recent household budget survey (see INE, 2002), health costs represent 5.2% of total household expenses and, of these, 56% is spent on drugs and medical apparatus. For the elderly, in particular, pharmaceutical outlays are a significant strain to their budgets. From a fiscal perspective, however, what matters, equity considerations aside, is how much of this tab the Government picks up.

Table 7 - Public co-payments in pharmaceuticals in 2000 and corresponding subsidisation rates

Case	Public spending (10^6 Euros)	Subsidisation rate (%)
SPECIAL REGIME		
Patients that are pensioners	519	75.6%
Manipulated drugs / dietetics for pensioners	14	80.1%
Chronic patients	5	100%
Other particular cases for special patients	4	99.9%
NORMAL REGIME		
Normal patients	438	60.6%
Manipulated drugs / dietetics for normal patients	19	70.2%
Other particular cases for normal patients	1	61.3%
TOTAL	999	68.3%

Source: IGIF (2001)

Apparently, quite a lot. Administrative data (see IGIF, 2001, or **Table 7** for a summary) reveal that, in 2000, the average subsidization rate was around 68% - for normal patients, pensioners, and chronic patients, effective public co-payments were 60.6, 75.6, and 100%, respectively. These rather generous rates, coupled with the complaints by households that a significant fraction of their budget goes on medicine are an indicator that Portugal is a heavy consumer of pharmaceutical goods.

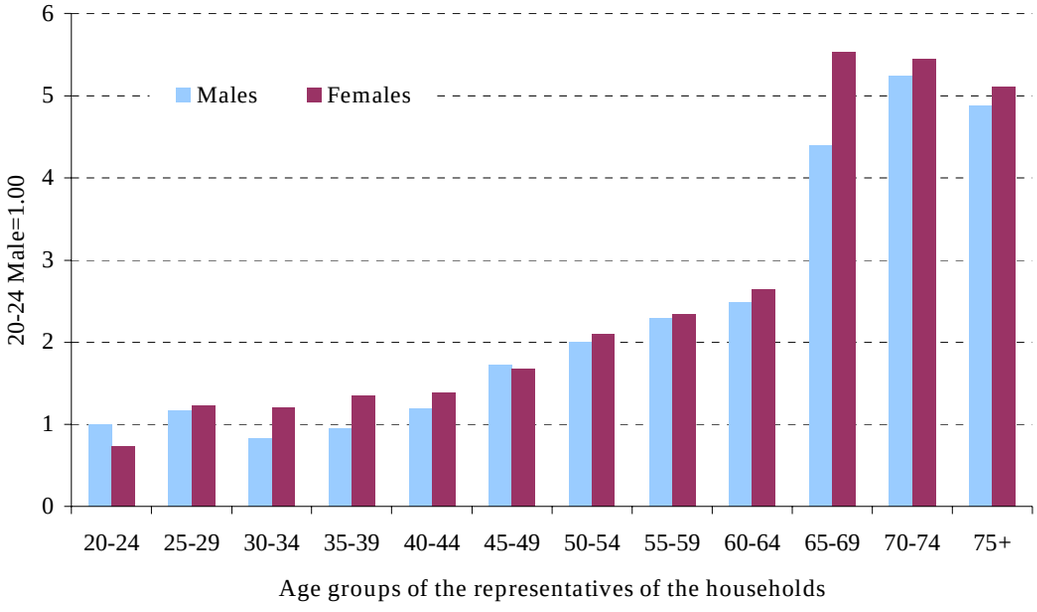
Having acknowledged this fact, the Government is implementing a generic drug policy. The rules governing co-payments have also changed: instead of paying a given fraction of the final price, the Ministry of Health sets a reference price for a type of drug and subsidizes a fraction thereof. In their prescriptions, doctors will be obligated to mention only the active substance (a.k.a. international common denomination) and not a certain brand name. This should allow patients the right to choose generic drugs that are reported to be around 35% cheaper than the corresponding brand names. In time, significant savings are expected, although the success of this measure will largely depend on the doctors' willingness to adopt generics. Doctors, in effect, have the power to prohibit such a substitution. Even so, given the already-mentioned strain on family budgets, one would expect patients to demand the right to substitute into cheaper goods.

In spite of these new developments on the drugs policy front, it's still interesting to determine what the likely effect of population ageing would be, under the old rules governing co-payments. To the best of our knowledge, this is the first attempt at characterizing the Portuguese age and gender profile of real per-

capita public co-payments in pharmaceuticals. For this reason, in what follows, we briefly describe the way it was constructed (see **Figure 6** for the result).

In INE (2002), a recent household budget survey, families were asked how much they spent in 2000 on drugs and pharmaceutical specialities. Then, using the average subsidisation rates obtained through IGIF (2001) we get to an estimate of how much of the public purse is spent on co-payments for individuals of a given age and gender. A few shortcuts had to be taken (see **Table 8** for a summary table of the main assumptions). First, we assume that all of the expenditure reported by households under the item "drugs and pharmaceutical specialities" is in fact publicly co-financed, when in fact this is incorrect – most drugs sold freely over the counter and alternative medicines such as herbal teas are not subsidized at all. Second, for those who are chronically ill - like people that suffer from epilepsy, diabetes, asthma, etc., who are dependent on certain drugs – the subsidisation rate is 100 per cent. Because these patients can be of any age, we have ignored them in the construction of our age and gender profile. It turns out that this distortion is in fact a small one, given that pharmaceutical subsidies to chronic patients represented less than half a percent of overall public co-payments in 2000 (IGIF, 2001).

Figure 5 - Profile of real per capita public co-payments in pharmaceuticals



Source: Authors' calculations, using IGIF (2001) and INE (2002).

Finally, and possibly more fundamentally, with the data that is currently available, there is a serious problem in imputing a cost to individuals of a certain age and gender. This is because, in the survey, a representative of the household is questioned as to the total health expenditures of the family. Only the age and gender of the representative are recorded, along with the type of household, which enables us to infer the number of family members. In the case of a single-person household then the characteristics of

the representative are trivially those of the household. For the remaining cases, for example, married with two children, there is no way of knowing how old the kids are, their gender, and how much was spent on their account. A cross-table between the age group of the representative and the type of household in question revealed that the representative is typically the head of the household. So, Figure 6 that depicts the profile of real per capita public co-payments in pharmaceuticals was constructed by applying the subsidisation rates in **Table 7** to the household expenditures on pharmaceuticals in each age and gender cell. Given the shortcomings of the budget survey, namely the fact that we only have age and gender data on the representative of the household, the average spending on health that is imputed for a given age and gender cell refers to the characteristics of the representative and assumes a family size as reported in **Table 8**. Our object of analysis is the budgetary cost of ageing. For that reason, given that at the upper end of the profile many households are of the "single individual aged 65 or more" type, our method of imputing per capita costs by age and gender should not be far off from the truth and should therefore yield a fairly good approximation.

Table 8 - Assumptions used in estimating the profile of public co-payments in pharmaceuticals

A1	All expenditure on drugs and pharmaceutical specialities is publicly co-financed
A2	There are only two cases: normal patients and patients that are pensioners
A3	The family member that answered the questionnaire is representative of the household

Types of households considered in the budget survey	*Family size assumed*
Single individual aged 30 or less	1
Single individual aged 30-64	1
Single individual aged 65 or more	1
Couple with no children both aged under 65	2
Couple with no children - at least one is older than 65	2
Couple with 1 child	3
Couple with 2 children	4
Couple with 3 or more children	5
Monoparental household with children	2
Other types	2

With these shortcomings in mind, we move on to updating the effect of ageing on public health care costs over the next 50 years, now taking into account public co-payments in pharmaceuticals. As would be expected, we follow the procedure described in Section 4 and consider both the "current policy scenario" and the "Lisbon scenario". In the first case, we consider three alternative demographic variants – central population, low mortality, and high population, while the Lisbon scenario presumes that it's the high population variant that plays out. The age and gender profile (that was obtained from micro data) is then scaled up or down to match overall public spending on co-payments in pharmaceuticals (macro data), which amounted to 0.88 per cent of GDP in 2000 (IGIF, 2001). Finally, for each of the scenarios, real per capita costs grow each year either according to GDP per capita or according to GDP per worker.

Table 9 presents the results. An update of the projections suggests that policymakers can expect overall public health care costs as a percentage of GDP to increase anywhere between *an extra* 0.16 and 0.33 pp, depending on what scenario materialises, on account of the effect that ageing will have on public spending with co-payments of drugs.

Table 9 - Percentage point increase in public spending on co-payments in pharmaceuticals as of 2050

With per capita costs growing with	GDP per capita	GDP per worker
Current policy scenario		
Central population variant	0.21 pp	0.28 pp
Low mortality	0.25 pp	0.33 pp
High population	0.16 pp	0.22 pp
Lisbon scenario		
High population	0.16 pp	0.21 pp

Source: Authors' calculations

5. CONCLUDING REMARKS

In the 1970s, public spending on health care averaged around 5 percent of GDP, for most of the OECD. By the end of the 1990s, it had reached 8 per cent (OECD, 2001a). Of this 3 pp increase, empirical studies have determined that population ageing played a rather insignificant role – technology and relative prices were the main drivers. This may have been so, because demographic changes were only of a second order of magnitude.

This paper reports on a simple exercise: *In the case of Portugal, how will population ageing alone affect public spending on health care?* The profile of per capita health care costs by age groups and gender that is at the core of the long-term projections is one of the first of its kind using Portuguese data and, although it can certainly be improved upon, is quite comprehensive in scope. It covers all publicly financed health care costs: intensive hospital care (a.k.a. acute care), ambulatory care, and pharmaceuticals.

Table 10 conveniently summarizes the projections. In 2000, Portugal's public spending on health care was 5.34 per cent of its GDP. According to results presented in this report, over the next 50 years, just as a result of population ageing, we should expect an increase of somewhere between 1 and 1.8 pp of GDP. *We think that the most likely outcome is around 1.6 pp, meaning that by 2050, absent other cost-increasing forces, health care is expected to absorb around 6.9 per cent of GDP.*

Table 10 - Summary of the projections of the effect of ageing on public health care spending

	Public health care costs in 2050 as a percentage of GDP		Increase in pp *vis-à-vis* the 2000 level	
With real per capita costs growing with	GDP pc	GDP pw	GDP pc	GDP pw
Current policy scenario				
Central population variant	6.39	6.93	1.05	1.59
Low mortality	6.67	7.18	1.33	1.84
High population	6.38	6.77	1.04	1.43
Lisbon scenario				
High population	6.35	6.68	1.01	1.34

Source: Authors' calculations

In addition to the normal critique surrounding long-term projections for the GDP, the best way to discuss the caveats of the analysis done is to highlight how the other forces that affect both the demand for and supply of health care services could behave. For that purpose we identify first the downside risks and then the upside risks. For a discussion of the effects between demographics and health care spending over the long-term, see Cutler and Sheiner (2001).

Better nutrition, healthier sanitary conditions, and improved working conditions are fortunately a part of our day-to-day. Some scholars defend that the increase in longevity will mean longer lives in good health. If so, then the bulk of one's lifetime medical costs would normally be associated with the last year or months of life, and these would be delayed in a context of increased longevity. In fact, recent research

for the U.S., the Netherlands, and for Sweden has determined that health care costs are more a function of the distance from death rather than of the distance from birth. In this vein, it would be interesting to complement the results of this report with others obtained using death-related expenditure. To carry out such an exercise one would require an estimate of health care costs just prior to death. At present, though, health care services are registered as incidents. This makes it impossible to discriminate between someone that is in and out of hospital in their last year of life, and another person that was never discharged until death. Ideally, the health administration would keep an individual record of health services consumed that were co-financed by the Government. The user's card that already has a magnetic strip is, hopefully, a step in that direction. Having this data would be instrumental – by providing researchers with dynamic panel data over one's lifetime, a richer typification of cases would enable policymakers to better plan the allocation of scarce resources. Of course, there are unresolved issues of an ethical nature with respect to who and in what circumstances should be given access to such a database. Insurance companies would certainly be interested in performing some queries. In general, administrative data from the health authorities should be used as benchmarks and should be given precedence over survey data. At present, however, diagnostic related groups (DRGs), a coherent system of accounts, only exist for in-patient care. A corresponding classification for out patient is currently under development at IGIF, a department of the Ministry of Health. If, however, politicians decide that improving administrative sources of data is just not feasible, and instead opt for instruments such as the National Survey of Health, then we would suggest that a question on pharmaceutical consumption should also be included, and that the time frame of analysis be greater than just a fortnight.

On the upside, we argue that increased demand for health services, technology, adverse changes in relative prices, and the changing nature of illnesses are all potential cost-augmenting factors.

New technology comes at a price, we are told. Technology can actually have two offsetting effects on health care costs. On one hand, endoscopic surgeries, for example, shorten the length of stay following an intervention but do so at a higher overall cost. According to Jacobzone and Oxley (2002) most of the increase in expenditures at older ages is due to more intensive use of high-cost technology. This is an especially urgent issue to address in future research. Frequently, doctors have the tendency to adopt costly (and often painful) procedures that are only marginally effective. Thus a systematic assessment of costs and benefits of new technologies is in order.

Another very significant cost-driving factor is an increase in prices of health care services. As societies become richer, more health-conscious and aware of available treatments, the demand for health care increases. We should then expect the relative price of health-related goods and services to increase over time, as the elderly become financially more independent. Also, as populations age we should expect a pronounced shortage of medical personnel. Care giving is mostly a labour-intensive activity, which means that it'll be difficult to substitute into capital as labour becomes relatively more expensive. Over time, the nature of illnesses has changed. One or two generations ago, when someone got seriously sick

then it usually meant that they would die after a short period of time. Nowadays, a person can remain in a state of prolonged bad health for a long time. Conditions like severe disability, AIDS, cancer, and especially neuro-degenerative diseases can be extremely costly towards the end, be it through life-support or care giving.

The issues surrounding the budgetary cost of an ageing population are both novel and complex, as many relationships between health status and demographics have yet to be uncovered. Rather than providing a definite answer as to what health care will cost in the future, this report aims to evaluate the importance of the demographic channel and to trigger a discussion of how the Portuguese health care system should be reorganised to better care for the elderly of the future in a way that is both effective and financially sound. For a fresh skeptical account as to the angst of ageing, see Freund and Teasdale (2002).

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