DEMOGRAPHIC CHANGES & AGGREGATE HEALTHCARE EXPENDITURE IN EUROPE

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Extracting the Policy Implications from

DEMOGRAPHIC CHANGES & AGGREGATE HEALTHCARE EXPENDITURE IN EUROPE

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1.   Introduction

While an increasing absolute number of elderly people – or any other age group – will inevitably increase *total* healthcare expenditures per year, the expenditure *per capita* per year will not necessarily increase, although this is a common belief. It has been assumed that as individual healthcare expenditure in general increases by age, healthcare expenditure per capita can be predicted to increase with an ageing population. This common-sense type of reasoning has nevertheless not been unanimously supported by previous studies, for at least three reasons:

First, healthcare expenditures are not only determined by demographic factors, but also by non-demographic variables, such as technology and economic and institutional characteristics, which are amenable by political and managerial decisions. A partial view on the demand pressure may therefore bias and exaggerate the effects of ageing on actual spending.

Second, increasing healthcare costs by increasing age may be partially explained by the lack of accounting for the high costs of dying. It has been found that healthcare costs increase rapidly with increasing proximity to death. Consequently, if death is postponed, the high costs will occur at a later age. This does not necessarily imply higher costs per year per capita.

Third, even if ageing means higher costs for the older population group, total budgets might simply be re-allocated within a certain overall budget ceiling for healthcare expenditure – at least in countries where there is a strong political influence on healthcare budgets, as is the case in most EU countries.

1.1   Longevity and health scenarios

Various scenarios for longevity and health status and the derived costs of health and long-term care have been formulated. In an optimistic scenario, morbidity is compressed, that is, while life expectancy is assumed to have reached a maximum, the time spent in good health increases. As a consequence, the time spent in bad health and in need of healthcare at the end of life becomes shorter. This has been termed the 'compression of morbidity' scenario.

In contrast, in a pessimistic scenario life expectancy is assumed to increase. It is furthermore assumed that the age-specific risks of health problems are constant. This implies that the time spent in bad health increases by increasing life expectancy – the "expansion of morbidity" scenario.

Combinations of these two scenarios are possible, of course. Thus, a 'dynamic equilibrium hypothesis' implies that longevity increases result in more years in 'good' life (the 'healthy ageing' scenario). As a consequence of this scenario, the number of years spent in bad health is constant.

1.2 Review of the empirical literature

No firm conclusion can be drawn from the existing literature. When analysing the determinants of healthcare spending, a distinction should be made between analyses based on individuals as the unit of observation (micro-level studies) which are usually restricted to a single country, and analyses based on aggregated healthcare spending with countries as the unit of observation (macro-level studies). Micro-level studies are often used to make predictions of healthcare spending, based on assumptions on age-specific utilisation rates, while macro level studies are used to find economic, demographic and institutional determinants of expenditure on historical data. While micro-level studies are based on the demand side alone, macro-level studies allow for both supply and demand factors to be included.

2. The study

2.1 Purpose

The main purpose of this paper is to investigate the relationship between ageing and aggregate healthcare expenditure in EU countries on a macroeconomic level when including economic and institutional variables.

2.2 Data

Data were collected form 26 countries covering up to a 24 year period. The countries included were the old 15 EU member states (EU15) and the 10 new member states (of which Cyprus and Malta were omitted from the final analysis) plus two anticipated members (Romania and Bulgaria) and one potential member (Turkey). This group is named EU11 for short in the present paper. Variables include economic, social, demographic and institutional factors, as well as variables related to capacity and production technology in the healthcare sector. For the EU11 countries in particular, data were incomplete.

2.3 Model

We hypothesise that ageing affects healthcare expenditures directly as well as indirectly through a political process where broad institutional variables are amended due to demand pressure from an ageing population, see Figure 1. A number of models were estimated in order to examine the impact of ageing, as well as the mediating effects of other variables. Due to imperfect data, EU11 countries were analysed for 1990 – 2004 while EU15 countries were analysed for the period 1980-2004. Model results were used for extrapolation of the total healthcare expenditure over the next 10 years, as an illustration of forecast.

Figure 1.
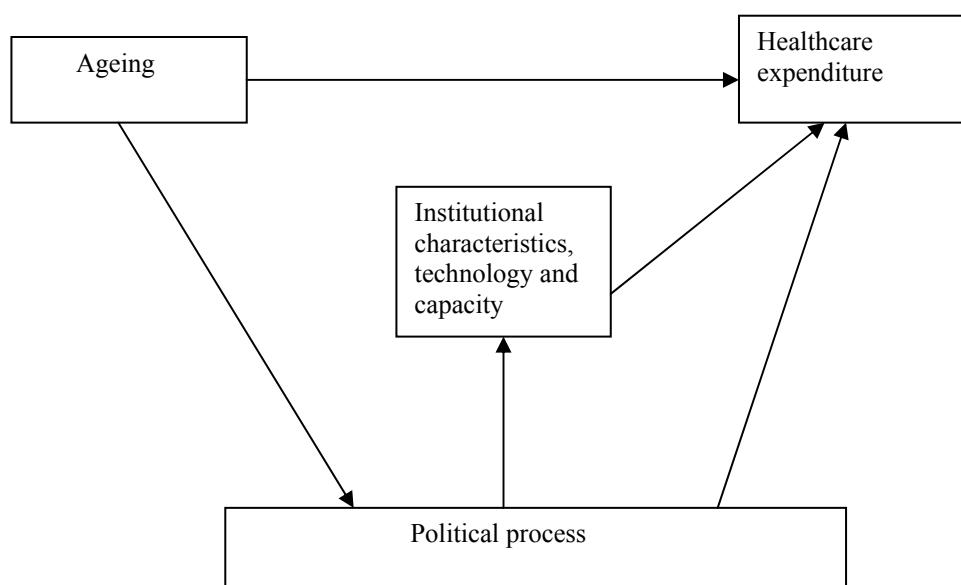
2.4 Variables

The analyses seek to explain total healthcare expenditure per capita as measured in US dollars, adjusted for purchasing power parities (PPP) and inflation. The variables that were used to explain healthcare expenditure include the following groups:

The first group of variables are considered 'demand variables' and include the economic variable GDP per capita, two behavioural variables (tobacco and alcohol consumption) and two social variables (female labour force participation and unemployment rate). The age structure variables and life expectancy are included as demographic variables. Age composition is of particular interest for the purposes of the present study and will therefore be analysed in detail. Thus, we distinguish between two age groups of older people.

The second group of variables may be loosely termed as 'supply variables' which includes characteristics of each country's healthcare system in the period 1980-2003. This list includes variables that describe institutional factors assumed to affect utilisation, and variables that are used as indicators of capacity and production technology in healthcare.

In addition to this list of variables, we included a variable indicating each specific country. This variable accounts for the specific characteristics of each country.

3. Results

It appears that there is a rather high correlation between income per capita and healthcare expenditure per capita for the EU15 countries as well as the EU11 countries. In both groups of countries, there is a tendency towards richer countries having higher percentages aged people in the population. More remarkable is that richer countries in both groups of countries tend to have a higher share of the 'oldest old' in their populations. For the age group 65-74 years the association between healthcare expenditure and income per capita seems to be much closer for the EU11 countries than for the EU15 countries.

In the simplest model, only age composition was used to explain variation in total healthcare expenditure. Here, it was found that ageing appeared to be associated with healthcare expenditure per capita in both groups of countries. The association was negative for the youngest among the old age group (increase in age implies lower expenditures) and positive for the oldest group. The effect of a one percent unit increase in one of each age group is shown in Table 1. Thus, an increase of a one per cent unit of the age group 75+ years in EU15 countries implies an increase of about 1/5 percent in healthcare expenditures.

Table 1. Effect of ageing on healthcare expenditure per capita: Regression analysis with age composition as the only explanatory variables

	EU15	EU11
Age 65-74 years	-0.06***	-0.31***
Age 75+ years	0.19***	0.16**

Note. The table is based on a model, where characteristics of each country have not been taken into account.

*** Statistical significant at a 1% level; ** at a 5 % level. The coefficients show the effect of a one % unit increase in an age group on total healthcare expenditure per capita, measured as a % change.

However, in more elaborate models mirroring Figure 1. These effects tended to disappear when controlling for health system characteristics and other variables in EU15 countries, while there is a positive association in EU11 countries, as seen from Table 2. In both groups of countries it seems to be the case that what governs healthcare expenditure is income, specific population characteristics, and the presence of specific institutional structures and healthcare technology benefiting very old people, rather than the proportion of the population being old. While this supports the hypothesis of an indirect effect of ageing through institutional and healthcare technology variables, this should be interpreted cautiously.

Table 2. Effect of ageing on healthcare expenditure per capita: Analysis with inclusion of demand and supply variables and a variable indicating characteristics of each specific country

	EU15	EU11
Age 65-74 years	0.01	0.22***
Age 75+ years	-0.11	0.07

*** Statistical significant at a 1% level. The coefficients show the effect of a one % unit increase in an age group on total healthcare expenditure per capita, measured as a % change.

Discussion

The study is based upon historical data which may give an insight into the mechanisms at play but do not predict future changes. It is concluded that the direct effect of demand for healthcare due to ageing is very small, and in EU15 countries the effect is insignificant. An apparent association between ageing and expenditure in EU15 countries may be explained by income: richer countries have a larger share of the aged population and can afford to invest in expensive technology.

This may indicate that GDP is not that important for the share of the population being in the age group 65-74 years in the richer EU15 because they have increased life expectancy with their

wealth levels whereas GDP is still an important determinant of the share of the population in the age group 65-74 year in the less wealthy EU11 countries.

Technology changes may affect the costs of care for all age groups, but potentially differently. It is an empirical question as to whether improved technology will affect the older age groups more than the rest. It appeared that there was only a statistically significant positive association between expenditure and indicators of technology in EU15 countries.

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AHEAD Work Packages	
WPI	Health and Morbidity by Age and Socio-economic Circumstances
WPII	Health and Morbidity in the New Member States
WPIII	Incidence of Poor Health and Long-term Care
WPIV	Health Status Transitions
WPV	Healthy Life Expectancy
WPVI	Determinants of Aggregate Healthcare Expenditure Focusing on Age Composition
WPVII	Health Costs Prior to Death
WPVIII	Development of Scenarios for Health Expenditure in European Union Countries
WPIX	Development of Scenarios for Health Expenditure in the New Member States

In February 2004, a CEPS-led consortium of research institutes launched the implementation of a three-year project called AHEAD (Ageing, Health Status and the determinants of Health Expenditure). Most of the consortium's 18 partner institutes are members of the European Network of Economic Policy Research Institutes (ENEPRI – see http://www.enepri.org for details). As specified in the call for proposals, the main task of the project is to carry out an "Investigation into different key factors driving healthcare expenditures and in particular their interaction with particular reference to ageing" in the (enlarged) European Union.

The strategic objectives of AHEAD are to:

- assess pressures on health spending in the existing EU and in selected candidate countries, looking both at those arising directly from ageing and at those affected by changing incomes, social change and methods of expenditure control;
- develop models for projecting future health spending and
- estimate confidence limits for these projections.

Expenditure on medical treatment has tended to rise as a proportion of national income throughout the European Union. A particular concern is that an ageing population and therefore the presence of more old people will create further pressures for expenditure on healthcare. This issue is of concern both in its own terms and because of its fiscal implications. Rising health expenditures put pressure on the targets of the Stability and Growth Pact. They also raise the question of whether budgetary targets should be tightened ahead of projected growth in public expenditures, so as to 'save up' for future spending and keep expected future tax rates reasonably constant.

This project has aimed to refine existing estimates of the links between reported states of health and use of medical services. As well as looking at the effects of ageing on healthcare, the research has taken account of the link between health expenditure and fertility rates and the demands on health services made by non-native populations. Particular attention is paid to the costs of care near death. One study examined factors other than demand (such as methods of financial control) that may influence health spending. An important aspect of this research is that the work is carried out so as to be able to provide not only the familiar projections and scenarios but also standard deviations and confidence limits for predictions of key variables, such as healthy life expectancy and demand-driven expenditure levels. These will allow policy-makers to judge not only possible outcomes but also the risks surrounding them and to assess their implications.

Participating Research Institutes

Centre for European Policy Studies, CEPS, Belgium
National Institute for Economic and Social Research, NIESR, UK
Netherlands Bureau for Economic Policy Research, CPB, The Netherlands
Deutsches Institut für Wirtschaftsforschung, DIW, Germany
Economic and Social Research Institute, ESRI, Ireland
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Centre for Social and Economic Research, CASE, Poland
Institute of Slovak and World Economy, ISWE, Slovak Republic
Institute of Economics at the Bulgarian Academy of Sciences, IE-BAS, BG
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