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THE IMPACT OF AGING ON HEALTH CARE EXPENDITURE IN DEVELOPED COUNTRIES

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ABSTRACT

For any developed country, an increase in the proportion of the elderly entails an increase in per capita health care expenditure. This is undoubtly true, given that individual health care expenditure is an increasing function of age. But what is the magnitude of this effect in comparison with other drivers of health care expenditures?

In this paper, we use micro data to evaluate the respective effects of demographic change, changes in morbidity and changes in practices on the growth in health expenditure that occurred in developed countries.

In addition, the distribution of health care expenditure over different age groups is analysed. The study shows that changes in population aging account for barely 13% of the total increase in health care expenditure and that it is the combined effect of changes in population aging plus the faster increase in health care expenditure per capita in older age groups that governs the development of an increasing concentration of health care expenditure to older age groups.

KEYWORDS: Health Care Expenditure, Age-Structure, Population Aging, Age-Distributed Expenditure

1. INTRODUCTION

The impact of an aging population on health care expenditure is an issue of increasing importance for health policy in all OECD countries. Population aging is often referred to as an explanation for the ever growing demand for health care resources. It has, however, been difficult to quantify more precisely the magnitude of this factor, since hospital expenditure is not divided according to age group in official statistics.

Thus, one basic feature of studies measuring the effect of the age factor on health care expenditure has been a reliance on physical weights such as the age-specific number of bed days per capita. But then there is an overestimation of the age factor, since the expenditure per bed-day is on average less in higher age groups than in lower.

This paper makes use of an indirect method of estimating hospital expenditure per capita in different age groups in order to measure the impact of population aging on health care expenditure. Sweden has the oldest population among the OECD countries and has experienced a rapid change in the age structure.

In 1970, persons over 74 years of age constituted only 5% of the population. The share rose by half, to 7.4%, by 1985 and is expected to exceed 11% in 2025. In this paper, we will also analyse the health care expenditure growth disaggregated on different age-groups. In outline, the remainder of this paper is as follows. Section 2 discusses data and methods of estimating health care expenditure per capita in different age groups and measuring the impact of population aging on health care expenditure.

2. AGEING AND HEALTH CARE COSTS

Total health care and long-term care for the elderly represent around nine per cent of GDP averaged over some twenty OECD countries and around three-quarters of this is financed through the public sector. The process of ageing in OECD countries will begin to accelerate in virtually all OECD countries starting in about ten years time as the baby-boom generation begins to enter retirement. With forty to fifty per cent 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.

The extent of this increase in spending will, however, depend on a range of factors in addition to ageing. Technology and its diffusion appear to be important elements. At the same time the progressive declines in fertility rates experienced since the late 1960s will depress the growth of labor supply. The consequent slower growth in GDP will make these additional costs more difficult to finance.

3. INCENTIVES AND AGEING

For the purposes here, total care costs can be broken down into those associated with health care and those related to long-term care for the frail elderly. The first of these includes pharmaceuticals, ambulatory care and intensive hospital care and represented just over eight per cent of GDP in the late 1990s averaged over some 24 OECD countries with around six per cent of this financed by the public sector.

The second item includes a wide range of services, from home help for older individuals still living on their own to long-term institutional care for people who are completely dependent. While this includes only publicly financed long-term care and is often poorly mea- Health-care Expenditure. (Figure 1)

Health care costs have increased substantially as a share of GDP over the post-war period. After an increase of around two percentage points in the 1970s and a further point in the 1980s, health care spending (averaged over some 24 OECD countries) has stabilized just over eight per cent for most of the past decade. A number of factors are thought to have influenced the increases up to the early 1990s. Key elements include:

- The changing age structure of the population;
- Morbidity;
- Rapid introduction of new technologies;
- Strong incentives to supply (and, possibly, to over-supply) health services;
- Accompanied by significant increases in the number of hospitals and in medical personnel;
- Increased demand for health care among the population as incomes and education rose and, to a much lesser degree, coverage of medical insurance increased;
- Public policies governing the health-care system and the overall level of public health-care spending.

Macro-Economic Level

At the macro-economic level, the vast majority of studies find that age structure has a small or non significant

impact on health care expenditures, whereas GDP has a sizeable and highly significant impact. At the individual level, micro-economic studies find as well that the influence of age on health care expenditure is significantly reduced when proximity to death is taken into account.

Recently, the OECD [14] provided retrospective decompositions of the growth in public health care spending, together with projections for 2050. For the OECD countries taken as a whole, the age effect accounted for less than one tenth of the growth in health care expenditure observed between 1970 and 2002.

As for projections, the authors underline that non-demographic factors, including changes in technology, are the most important drivers in the projected increase. For the OECD countries, the share of health expenditure in GDP is forecast to increase by 3.9 percentage points (from 5.7 % in 2005 to 9.6 % in 2050), of which 0.7 percentage point only is attributable to demographic effects.

Demographic Effects

Earlier projections of future health care expenditures simulated the impact of ageing simply by applying demographic projections to the observed profile of health expenditure by age group. However, changes in health care expenditure level also depend on changes of this profile over time.

As expected, expenditures increase with age.

The main feature, however, is that a sizeable upward drift of the profile is observed between 1992 and 2000. This drift may be related to changes in health status at a given age. It may also be linked to technological progress or more broadly to changes in practices, for a given age and a given morbidity.

Beyond the pure demographic effect, the upward drift of the age profile is likely to be the main driver of health care expenditure growth. In addition, it is of major importance to identify the causes of this drift, i.e. the respective impacts of technological progress and of changes in morbidity.

Trying to forecast how health status by age might evolve in the future is a rather hazardous enter-prise. A plentiful literature has examined how increases in longevity could influence the population's health status. Various hypotheses have been considered, the two extreme ones being "expansion of morbidity" and "compression of morbidity".

Several intermediate hypotheses can be considered, with mixed situations and transition regimes regarding potential changes in illnesses and disability. At the macroeconomic level, a rough assessment is in general built on the basis of the projected increase in longevity. For instance, the "healthy ageing" hypothesis comes down to assuming that gains in longevity are gains in healthy years.

Microeconomic Level

At the microeconomic level, the Future Elderly Model, a micro simulation model built by the Rand, uses estimated transition rates to simulate changes in health status and deaths for Medicare enrollees.

Evaluating the effects of technological progress or changes in behavior is not easier. Evans et al. show that projections performed in the 70's or in the 80's greatly overstate the number of acute hospital days actually observed in 2000, and underestimate the use of physicians' service. At the microeconomic level, available studies generally focus on a limited number of illnesses and procedures, such as hip replacement or treatment for heart attack. The macroeconomic

projections performed by the OECD allow for "non-demographic" factors by simply assuming that health care expenditures grow 1% per annum faster than income, an assumption in keeping with the trends observed over the past two decades.

To sum up, identifying the factors that influence the age profile of health care expenditures is a difficult undertaking, which deserves further investigation. The purpose of this paper is to add a contribution to this open question by proposing an original microsimulation method for analyzing changes over time in the age profile. This method makes it possible to separately identify changes that are due to changes in morbidity on the one hand, and to changes in practices on the other.

As regards morbidity, we consider a vector of chronic illnesses and disability indicators and allow for the changes in prevalence by age that are observed over time for each illness or disability level.

Are we living healthier as well as longer lives, or are our additional years spent in poor health? There is considerable debate about this question among researchers, and the answers have broad implications for the growing number of older people around the world. One way to examine the question is to look at changes in rates of disability, one measure of health and function.

Some researchers think there will be a decrease in the prevalence of disability as life expectancy increases, termed a "compression of morbidity." Others see an "expansion of morbidity"—an increase in the prevalence of disability as life expectancy increases. Yet others argue that, as advances in medicine slow the progression from chronic disease to disability, severe disability will lessen, but milder chronic diseases will increase. In the United States, between 1982 and 2001 severe disability fell about 25 percent among those aged 65 or older even as life expectancy increased.

This very positive trend suggests that we can affect not only how long we live, but also how well we can function with advancing age. Unfortunately, this trend may not continue in part because of rising obesity among those now entering older ages.

We have less information about disability in middle- and lower-income countries. With the rapid growth of older populations throughout the world—and the high costs of managing people with disabilities—continuing and better assessment of trends in disability in different countries will help researchers discover more about why there are such differences across countries.

Some new international, longitudinal research designed to compare health across countries promises to provide new insights, moving forward. A 2006 analysis sponsored by the U.S. National Institute on Aging (NIA), part of the U.S. National Institutes of Health, found surprising health differences, for example, between non-Hispanic whites aged 55 to 64 in the United States and England. In general, people in higher socioeconomic levels have better health, but the study found that older adults in the United States were less healthy than their British counterpart's at all socioeconomic levels.

The health differences among these "young" older people were much greater than the gaps in life expectancy between the two countries. Because the analysis was limited to non- the generally lower health status of blacks or Latinos. The analysis also found that differences in education and behavioral risk factors (such as smoking, obesity, and alcohol use) explained few of the health differences.

This analysis subsequently included comparable NIA-funded surveys in 10 other European countries and was expanded to adults aged 50 to reported worse health than did European adults as indicated by the presence of chronic diseases and by measures of disability.

At all levels of wealth, Americans were less healthy than their European counterparts. Analyses of the same data sources also showed that cognitive functioning declined further between ages 55 and 65 in countries where workers left the labor force at early ages, suggesting that engagement in work might help preserve cognitive functioning.

Subsequent analyses of these and other studies should shed more light on these national differences and similarities and should help guide

4. WHAT DRIVES HEALTH CARE EXPENDITURES?

Per-person health care spending has risen far faster than income in the United States for more than forty years. The same has been true in most other developed nations. This gap results primarily from the separate and interacting effects of an ever-lengthening menu of diagnoses and treatments, deepening health insurance coverage, and rising health care prices.

Without fundamental changes in policy, the gap between growth of per-person income and growth of age-specific health care spending is expected to continue as medical science advances. In addition, the average age of the population in most nations is increasing, and the old use more health care than the young. For this reason, health care spending would increase even if age-specific health care spending were unchanged. For more than a decade, analysts have debated just why health care spending rises with age. (Figure 2)

At first blush, the answer is obvious—illness becomes more frequent with age and health care spending increases accordingly. A newer view holds that health care spending depends not on age since birth but on proximity to death. On this view, health care spending increases little, or not at all, with calendar age once remaining life expectancy is taken into account. This analytic distinction is of more than academic significance. As the U.S. population ages, health care spending in general and public spending on Medicare and Medicaid in particular are expected to increase.

Increases in health care spending, in turn, are expected to boost total government spending, producing large and problematic deficits unless taxes are raised or other spending is slashed. Most of the anticipated increase in total health care spending is attributed to growth of age-specific health care spending. Some will be caused by population aging.

How much depends, in part, on whether the years-since-birth or the years-until-death view is correct. If the first view is correct, population aging will push up health care spending considerably more than if the second view is correct. Whether the effect of population aging is seen as large or small influences how serious the long-term budget problems are expected to be. Of course, both calendar age and imminence of death could be at work. To further complicate matters, the impact of calendar age or proximity to death on health care spending may not be the same for all services.

Crude data indicate that the relationships between calendar age, on the one hand, and per-person expenditures on long-term care services (custodial nursing care and home care) or acute care services (hospitalization and physicians care), on the other hand, are quite different. The former rises far more steeply with calendar age than does the latter, suggesting that the relative impact on various types of health care spending of calendar age and imminence of death may differ.

Using data on actual health care spending to settle matters is not straightforward for several reasons. Age-specific health care spending has risen because of scientific advance, increased insurance coverage, and other factors. But the impact of each of these factors across age groups need not be uniform. A large jump in health care spending by the elderly followed the enactment of Medicare and Medicaid. The advent of coronary artery bypass surgery and angioplasty, for example, boosted per-person health care spending for people 40 to 70 years of age, because coronary artery disease most frequently manifests itself among these age groups.

The addition of coverage under Medicare for out-patient prescription drugs resulted in increased drug outlays by those over age 65 and the disabled. Future changes in policy could have similarly dramatic effects on relative spending by people of different ages.

- The age-specific incidence of various diseases depends on environmental conditions, which change over time. A reduction in smoking, for example, helped to lower the incidence of coronary disease, lung cancer, and emphysema among middle-aged men. The increase in obesity has raised the incidence of diabetes and associated health problems and is expected to continue to do so in the future.
- More subtly, the evolving ability of health care to forestall death influences the likelihood that people of various ages will sicken and hence changes relative age-specific health care spending. The genetic and other characteristics of those who survive because of a new cure or treatment is not necessarily the same as those who would have survived anyway.
- The norms for what constitutes satisfactory treatment vary with the age of the patient, and these norms can change over time. In particular, physicians and others reportedly are less likely to do “everything possible” for the very old than for younger patients. The fact that per-person Medicare spending on those in the last year of life declines after the age of about 75 is consistent with this speculation.4 But it is also consistent with a view that comorbidities effectively contra-indicate care to a progressively greater extent as patients age.
- The prices of various health care services change in different ways. Since the mix of health care varies by age, the age profile of health care spending can change even when the age profile of real consumption does not.

Despite these confounding influences, several researchers have tried to distinguish the relative importance of calendar age and remaining life expectancy in explaining the age gradient of health care spending. The authors of most of these studies claim that the data support the view that remaining life expectancy is the principal factor. That is, average health care spending rises with calendar age because a growing share of each cohort is near death. As life expectancy increases over time, the curve relating health care spending to age will therefore flatten. In popular parlance, “80 will be the new 60.” Or as one of the earlier studies puts matters, the belief that health care spending will rise with calendar age at the same rate as in the past is a “red herring.”

This study did not, however, include survivors. Thus, it was impossible to tell whether health care spending was related to age among those who did not die within the specified period. A separate study based on a much smaller sample of Swiss decedents and simpler statistical procedures reached similar conclusions.

A new team of three authors (including two of the three co-authors of the original “red herring” article) later found that calendar age is related to health care spending for survivors. Nonetheless, they concluded that

"a naive estimation that does not control for proximity to death will grossly overestimate the effects of population ageing on aggregate health care expenditure." 8 Another study, also based on data from Switzerland, examined data on health expenditures during the final two years of life by 415 Swiss decedents.

The study showed that after controlling for the number of quarters until death, health expenditures declined with age among those age 65 or older. Yet another study, based on data from British Columbia, found that health care spending on people alive at the end of a period rose with age; expenditures on 56 people who died during the period were much higher than on those who survived, but declined with age. It is not clear whether the positive relationship among survivors between spending and age reflected age or proximity to death. A study based on aggregate data from Taiwan spanning 1960 to 2006 concluded that health expenditures depend negatively on remaining life expectancy and positively on age; of the two forces, life expectancy was found to be stronger than age. A study of U.S. data produced results different in important ways from the studies based on Swiss data.

In particular, health care spending on those very near death was much higher than that on those further from death. But spending near death was negatively related to age. Among those near death, health outlays were lower on 65-74 year olds than on those age 85 or older. In contrast, spending increased with age among those two years or more from death. Furthermore, Medicare outlays (largely for acute care) fell with age for those within one year of dying and varied little for those more than one year from dying, while Medicaid outlays (largely for long-term care) rose for both groups.

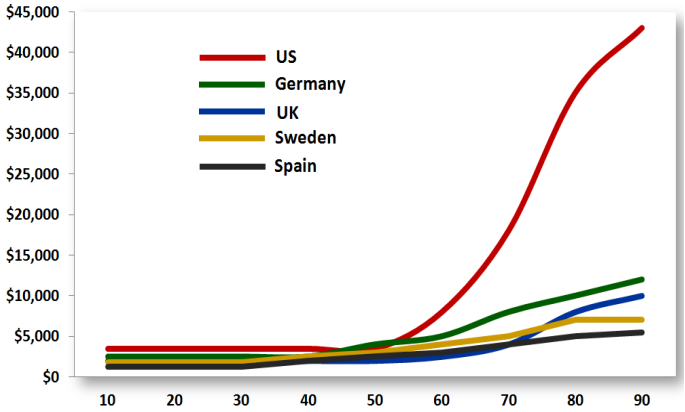

Figure 1: Annual per Capita Health Care Costs by Age

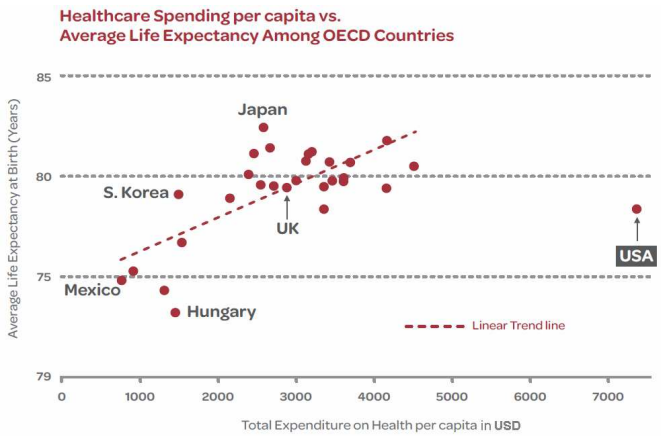

Figure 2: Average Life Expectancy among OECD Countries

CONCLUSIONS

In recent decades, elderly populations in most developed countries have increased considerably, both in absolute and relative terms. This growth of the elderly share of the population is mainly attributable to two demographic transitions: the (simultaneous) increase in longevity and decrease in fertility.

Additionally, for some European countries a third cause of population aging can be distinguished: the aging of the baby boom generation. The extent to which this third demographic transition contributes to population aging largely depends on the country under consideration. In the Netherlands, the baby boom was larger and lasted for a longer time. The aging of the Dutch population is therefore expected to reach its peak at 2040, later than other western countries. The Dutch population aged 65 and older increased from 770, 500 in 1950 to 2, 538, 300 in 2010 which amounts to an increase of 329 percent.

In relative terms, the proportion of the population aged 65 and above doubled, from 7.6 percent to 15.3 percent. However, population aging not only reflects an increasing share of the 65+ population, but also changes in the age distribution within this elderly cohort. The share of the very old has also gradually increased; the population aged 80 and above comprised 12.9 percent of the 65+ population in 1950, but 25.5 in 2010, and is expected to continue to rise to 33.3 in 2040 (Statistics Netherlands, 2011). As the first baby boomers have reached the age of 65 in 2010, population aging will accelerate the coming three decades. Population aging will definitely have a large impact on society in general and on social security systems in particular. It challenges the financial sustainability of current pension and health care systems.

The extent to which population aging threatens this modern welfare state largely depends on the underlying trend in ill-health, e.g. whether it is accompanied by a compression or expansion of ill-health (Fries, 1980; Olshansky *et al.*, 1991). A compression of ill-health is likely to alleviate the societal consequences of population aging. It will not only have enormous benefits for population health, but may help increasing the labor force participation among the elderly and to reduce health care expenditures (HCE). The objectives of this thesis are restricted to improved understanding of the relative impact of population aging on the level of HCE.

Simultaneous to the aging of western populations, an upward trend in HCE has been observed, both in absolute terms and as a percentage of Gross Domestic Product (GDP). In the Netherlands, for instance, the total amount spent on health care in current prices more than doubled over a thirty year period: it increased from 25 billion in 1977 to 56 billion in 2007. The average growth rate of total spending equaled 2.7 percent annually.

The growth rate however accelerated in recent years and reached its peak in the period 2001-2003, when the annual growth rate averaged 4.7 percent. This relatively large growth could be explained by a relaxation of inpatient budgets resulting from a growing public dissatisfaction with long waiting lists. In relative terms, the amount spent on health care as a percentage of GDP rose from 10.1 to 13.1 over the period 1977-2007. Again, the largest relative growth was observed for the years 2001, 2002 and 2003, when spending as a percentage of GDP increased by 0.5, 0.9 and 0.7 percentage points, respectively (Statistics Netherlands, 2011).

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