Project no: 028412

**AIM-AP**

# Accurate Income Measurement for the Assessment of Public Policies

Specific Targeted Research or Innovation Project

*Citizens and Governance in a Knowledge-based Society*

## Deliverable 1.3 Distributional impact of health

Due date of deliverable: October 2007
Actual submission date: July 2008

Start date of project: 1 February 2006 Duration: 3 years

Lead partner: CERES

Revision [draft]

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# Distributional effects of public health care transfers in seven European countries

**AIM-AP Project 1 – Comparative Report**

July 2008

ABSTRACT

Most of the existing comparative studies of inequality and its determinants tend to ignore incomes in-kind. Theoretically, full income, which includes cash incomes as well as private and public in kind incomes, is a superior measure of a household's command over resources than is the conventional measure of cash disposable income. One of the most important public in kind transfers available to all or the majority of the citizens in most developed countries are in the field of health care. The present paper investigated the short-run effects of including in-kind public health care transfers in the concept of resources in seven European countries (Belgium, Germany, Greece, Ireland, Italy, the Netherlands and the United Kingdom), using a risk-related insurance value approach and under the assumption of that these transfers do not create externalities, combining the information of existing national income databases with external information on spending per age group taken from the databases of the OECD. Although using the insurance-based approach, all population members benefit from public health care transfers, our estimates show that in all countries under examination these transfers are directed disproportionally to population members located close to the bottom of the income distribution (primarily elderly persons). Cross country differences are evident and can be attributed to different demographic structures across countries, cross-country differences regarding the public-private mix in the financing health care services as well as differences in the share of health care spending in GDP. The move from the distribution of disposable income to the "augmented" income distribution that includes cash incomes as well as the value of public health care services is associated with a considerable increase in the share of resources of the bottom quintiles of the population (and a corresponding reduction in the share of the richest quintile) and a very substantial declined in measured inequality levels. Despite this evidence, our results cannot be considered as water-tight. The reason is that, due to lack of alternatives, in both distributions (cash incomes and "augmented" distribution) we used the same set of equivalence scales, thus, implicitly assuming that health care needs are distributed in a similar pattern as all the other needs for goods and services. Although this assumption is not uncommon in similar empirical studies, it is far from uncontroversial.

## 1. Introduction

The great majority of empirical studies analyzing cross-national differences in the levels of inequality and poverty as well as the redistributive effectiveness of welfare state policies utilize data on the disposable income of the population members. Such studies focusing in Europe tend to confirm hypotheses about distinct welfare state regimes in particular sets of countries [Titmus (1958), Esping-Andersen (1990), Ferrera (1996)] and emphasize the importance of welfare state transfers, particularly for those segments of the population located close to the bottom of the income distribution. Scandinavian and Nordic countries are big spenders and reduce inequality the most; the English speaking countries spend relatively little and reduce inequality the least; and the continental European countries spend a lot, but achieve less equality than the Scandinavians. Southern European nations spend the least and have the highest inequality and poverty [Atkinson, Rainwater and Smeeding (1995), Gustafsson and Johansson (1999), Heady, Mitrakos and Tsakloglou (2001), Alderson and Nielsen (2002), Dennis and Guio (2003), Moller et al (2003), Kenworthy (2004), Förster and Mira d'Ercole (2004), Hacker, Mettler and Pinderhughes (2005)].

Nevertheless, in the developed countries, about half of welfare state transfers consist of in kind benefits such as education, health insurance, child care, elderly care and other services. In kind as well as cash transfers reduce inequalities in standards of living as documented in research within selected countries but only occasionally cross nationally and never for a large set of rich countries [for notable exceptions, see Smeeding et al (1993) and Marical et al (2006)]. The theoretical and empirical importance of valuing in kind benefits has been understood for a long time [Smeeding (1977, 1982)]. Conceptually it is clear that these benefits are worth some nontrivial amount to beneficiaries. Therefore, from a theoretical point of view, a measure that counts in kind transfers is superior to the conventional measure of cash disposable income as a measure of a household's standard of living [Atkinson and Bourguignon (2000), Atkinson et al (2002), Canberra Group (2001)].

The omission of non-cash incomes in general and publicly provided health care services in particular from the concept of resources used in distributional studies may call into question the validity of several comparisons of distributional outcomes of these studies - both time-series within a particular country and cross-sectional

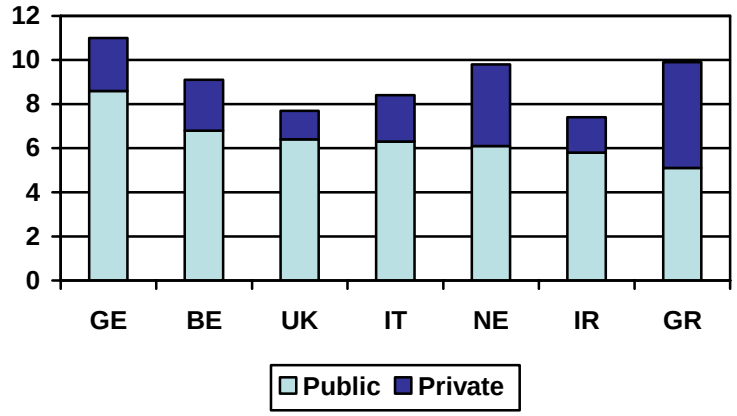
across countries. For example, inter-temporal comparisons of inequality or poverty in a particular country ignoring publicly provided services in general and health care services in particular are likely to lead to misleading conclusions at times of considerable expansion or contraction of the role of the welfare state. Likewise, comparisons of inequality and poverty levels between groups of countries with dramatically different welfare state arrangements regarding the provision of particular services may well lead to erroneous conclusions. For instance, comparing the income distributions of two countries, one where health services are primarily covered by private out of pocket payments and another where such services are provided free of charge by the state to the citizens is likely to is lead to invalid conclusions and, perhaps, policy implications.

The present paper relies on the national reports on the distributional effects of publicly provided health care services that were carried out in the framework of the AIM-AP project [Verbist and Lefebure (2007), Frick, Grabka and Groh-Samberg (2007), Koutsambelas and Tsakloglou (2007), D'Ambrosio and Gigliarano (2007), Callan and Keane (2007), de Vos (2007) and Mullan, Sutherland and Zantomio (2007)] and its remaining is structured as follows. Section 2 provides an outline of health care spending, structure and outcomes in the seven European countries covered. Section 3 discusses alternative methods used in the literature in order to account for health care services in distributional studies. Section 4 presents the data and the methodology used in the paper, Section 5 contains the empirical results of the paper and Section 6 provides the conclusions.

## 2. Health care in seven EU countries

The countries covered in this report (Belgium, Germany, Greece, Ireland, Italy, the Netherlands and the United Kingdom) vary considerably with respect to the organization of the health care sector, its funding mechanisms and the health outcomes. A brief overview of these aspects of the health care systems of the seven countries is provided below.

**Graph 1. Health care expenditures as % of GDP in 2003.**




Source: OECD, 2005

Graph 1 reports the share of health care expenditures in GDP in the seven countries under consideration in 2003. The figure is further broken down into its public and private components. The share of health care expenditures in GDP – especially, of public spending - is usually considered an indicator of policy effort, at least when the demographic structures of the societies compared do not differ considerably. Germany has the highest level of both total and public health expenditures in GDP (10.9% and 8.5%, respectively). Greece and the Netherlands also have high shares (slightly lower than 10%), but the share of private spending is very considerable in these countries. The lowest shares are reported in the United Kingdom and Ireland (in the later, though, this is not very surprising since, on average, the population is much younger than the rest of the countries examined here).

Barr (1988) defines three broad models of financing mechanisms of health care systems:

A) The quasi-actuarial system. In this scheme insurance is either employer based or individuals purchase the medical insurance they choose from private markets. Also the factors of medical production are private. The ideal paradigm of a quasi-actuarial system is the USA health care.

B) The earnings-related social-insurance contributions system. Central feature is the compulsory coverage of the working population, which is financed by earnings related contributions and possibly tax-subsidized. A well-known example of this Bismarckian type model is Germany.

C) The universal medical care system. The archetypal paradigm is undoubtedly Great Britain, where the whole population enjoys full coverage financed by general taxation.

**Table 1. Characteristics of Health Care: Funding sources**

| Country | General taxation | Social security contrib. | Public | Private |
|---|---|---|---|---|
| Belgium (B) | … | … | 75% | 25% |
| Germany (D) | 10 | 68 | 78% | 22% |
| Greece (GR) | 36 | 22 | 58% | 42% |
| Ireland (IR) | 77 | 1 | 78% | 22% |
| Italy (IT) | 75 | - | 75% | 25% |
| Netherlands (NL) | 4 | 58 | 62% | 38% |
| United Kingdom (UK) | 83 | - | 83% | 17% |

In the seven countries analysed in this paper we find representatives of the last two models. All seven countries have a mix of private and public funding, but the proportions vary a lot (see Table 1). We distinguish three groups of countries:

1. Dominance of social security contributions (cf. Model B)): Belgium, Germany and the Netherlands
2. Dominance of general taxation (cf. Model C)): Ireland, Italy, United Kingdom
3. Hybrid (with considerable out-of pocket payments): Greece

In order to compare the performance of the health care systems among countries we present a selection of indicators. Availability and access is measured by inpatient utilization and performance in acute hospitals on one hand and by the number of medical staff on the other hand. We complement this with a selection of outcome indicators that refer directly to the health status of the population.

**Table 2. Inpatient utilization and performance in acute hospitals in Western Europe (2002 or latest available year)**

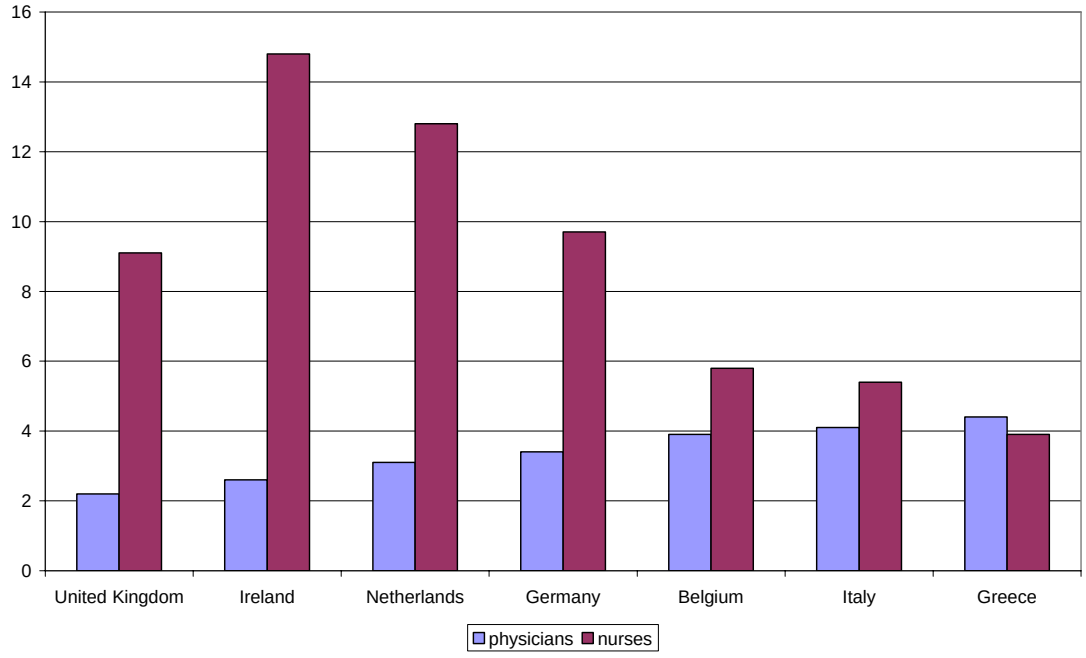
| Country | Hospital beds per 1000 inhabitants | Admissions per 100 inhabitants | Average length of stay in days | Occupancy rate (%) |
|---|---|---|---|---|
| Austria | 6.1 | 28.6 | 6.0 | 76.4 |
| Belgium | 5.8[a] | 16.9[c] | 8.0[c] | 79.9[d] |
| Denmark | 3.4 | 17.8[a] | 3.8[a] | 83.5[b] |
| Finland | 2.3 | 19.9 | 4.4 | 74.0[g] |
| France | 4.0 | 20.4[c] | 5.5[c] | 77.4[c] |
| Germany (2001) | 6.3 | 20.5 | 9.3 | 80.1 |
| Greece | 4.0[b] | 15.2[d] | – | – |
| Ireland | 3.0 | 14.1 | 6.5 | 84.4 |
| Italy | 4.0 | 15.7[a] | 6.9[a] | 76.0[a] |
| Luxembourg | 5.6 | 18.4[h] | 7.7[d] | 74.3[h] |
| Netherlands (2001) | 3.1 | 8.8 | 7.4 | 58.4 |
| Norway (2001) | 3.1 | 16.0 | 5.8 | 87.2 |
| Portugal (1998) | 3.3 | 11.9 | 7.3 | 75.5 |
| Spain (1998) | 3.0[e] | 11.5 | 7.5 | 76.1 |
| Sweden | 2.3 | 15.1 | 6.4 | 77.5[f] |
| Switzerland | 4.0 | 16.3[d] | 9.2 | 84.6 |
| United Kingdom | 2.4 | 21.4[f] | 5.0[f] | 80.8[d] |
| **EU-15 average** | **4.1** | **18.1**[c] | **7.1**[c] | **77.9**[d] |

*Notes: a* 2001; *b* 2000; *c* 1999; *d* 1998; *e* 1997; *f* 1996; *g* 1995; *h* 1994;
*Source:* Busse and Riesberg (2004).

The number of hospital beds is an important indicator for hospital activity and presented in Table 2, together with number of admissions, length of stay and occupancy rate. These figures however must be interpreted with care in a comparative perspective, as the concepts of hospital and hospital beds are not

uniform across countries. With 6.3 and 5.8 respectively Germany and Belgium have a comparatively high number of hospital beds per 1,000 inhabitants. Greece and Italy are close to the EU-average of 4.1, whereas the Netherlands, Ireland and especially the UK fall well below this average capacity. Many European countries try to reduce the time patients spend in hospital in order to control health care expenditures. Still, average length of stay is relatively high in Germany (9.3 days) and Belgium (8.0 days) and rather low in the United Kingdom (5.0 days). For most countries studied here the occupancy rate is with around 80% above the EU-average. The major exception here is the Netherlands with a very low occupancy rate of 58.4%.

**Graph 2. Number of practising physicians and nurses per 1000 inhabitants in 7 European countries, 2003 or latest available year**



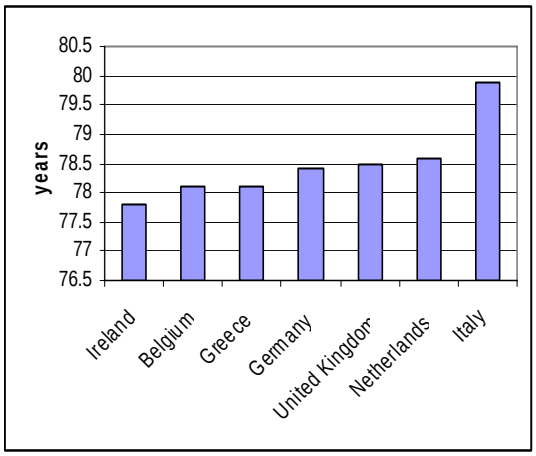

Note 1: Number of physicians refers to 2001 for Greece, to 2000 for United Kingdom. Data for Ireland and the Netherlands refer to physicians entitled to practice rather than actually practicing (upward bias).
Note 2: Number of nurses refers to 2001 for Netherlands, to 2000 for Greece. Italy reports only nurse employed in hospitals (underestimation)
Source: OECD (2005)

The number of nurses and physicians present further indicators for the availability and access of health care services. These indicators are of course influenced by various factors, such as restrictions imposed on entry into the medical profession,

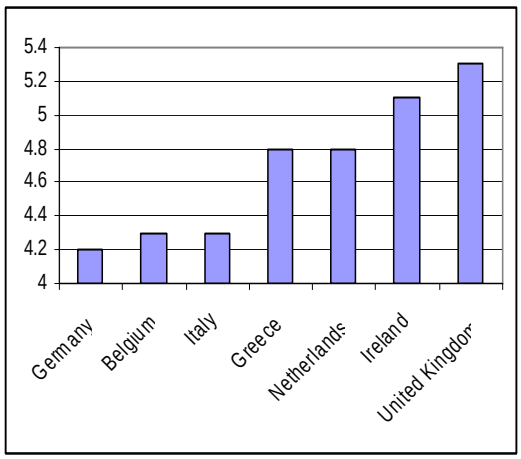
remuneration, working conditions. In our set of seven countries there are large variations in both the number of practising physicians and practising nurses. With more than 4 per 1,000 inhabitants Greece and Italy report a high score for practising doctors, against a low 2.2 for the United Kingdom. The number of nurses ranges from highs of more than 10 nurses per 1,000 inhabitants in Ireland and the Netherlands, to lows of less than 4 per 1,000 inhabitants in Greece. The figures in Graph 2 suggest a trade-off between the number of physicians and the number of

**Graph 3. Health status indicators for 7 European countries, 2003 or latest available year**

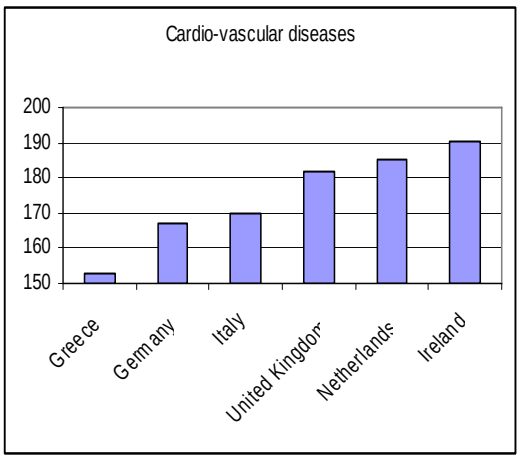
(a) Life expectancy

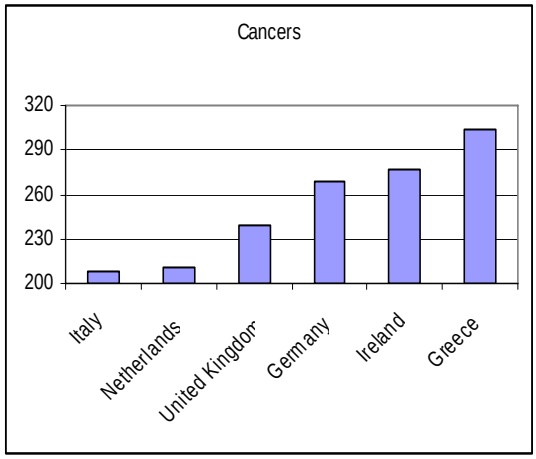



(b) Infant mortality




Mortality rates for (c) cardio-vascular diseases and (d) cancers




Notes: Figures in panel (a) for Belgium and Ireland refer to 2002; figures in panel (d) for Germany, Ireland and Italy refer to 2001.
*Source:* OECD (2005).

nurses. This potential substitution between physicians and nurses was investigated in the United States and the United Kingdom by Buchan and Calman (2004). They found that nurses can provide care which is equivalent to that provided by doctors, when they take on certain medical tasks once the diagnosis has been established.

Finally, we present four indictors relating to the health status, namely life expectancy, infant mortality, age-standardised mortality rates for cardio-vascular diseases and for cancers. Again, we find considerable variation among the seven countries. Life expectancy is highest for Italy with 79.9 years, and lowest for Ireland (77.8 years). Infant mortality rates and mortality rates from cardio-vascular diseases are highest in Ireland and the United Kingdom. Infant mortality is lowest in Germany, Italy and Belgium. Greece has the highest cancer mortality rate, but the lowest for cardio-vascular diseases. Higher spending on health is generally associated with better health status, although this relationship is not comprehensive as also other factors affect the health status (e.g. socio-economic conditions, exposure to risk factors)(OECD, 2005). Germany for instance has the highest level of health care expenditures, but performs only best with respect to infant mortality.

## 3. How to account for health care services in distributional analyses?

In the literature of the distributive evaluation of health care services we find three main methods. Each of them highlights a specific aspect of the distributional picture of health care costs. With the first method, income is reduced with out-of-pocket payments and the resulting income distribution is considered (see e.g. Gardiner et al, 1995). A second method looks at the distributive consequences of different types of financing. Countries differ considerably in the financing mix of their health care systems using private contributions (in the form of either private insurance of out-of-pocket payments), direct and indirect taxes, and social security contributions. As the distributional effects of these various sources differ, this results in cross-country differences with respect to the equity effects of health care funding (see e.g. van Doorslaer et al., 1999; De Graeve et al., 2003). The third and most often-used method accounts for the impact of distributional health care services by increasing household income by the sum of the corresponding public expenditures. Three approaches can be distinguished in this context: 1) the actual consumption approach; 2) the insurance value approach; and 3) using equivalence scales that incorporate health care needs.

The *actual consumption approach* uses detailed data on the effective use of health care services by individuals (see, for example, Evandrou et al. (1993) and Sefton (2002) for the UK). A fundamental critique of this approach states that it ignores the greater needs that are associated with being ill (Aaberge et al., 2006). It implies that, ceteris paribus, sick people are better off than healthy persons just because they receive more-health care services. In fact, relevant research clearly demonstrates that poorer individuals tend to have lower health levels, and consequently greater needs for health care (see, for example, Hernandez-Quevedo et al. (2006) and Berloffa, Brugiavini and Rizzi (2006)).

Using the *insurance value approach*, one imputes the 'insurance value' of coverage to each person based on specific characteristics (such as age, sex, socio-economic status, etc). The insurance value is the amount that an insured person would have to pay in each category (e.g. age group) so that the third party provider (government, employer, other insurer) would have just enough revenue to cover all claims for such persons (Smeeding, 1982). It is based on the notion that what the public health care services provide is equivalent to funding an insurance policy where the value of the premium is the same for everybody sharing the same characteristics, such as age (Marical et al., 2006). Then, this value is added to each individual belonging to a particular group with predefined characteristics (such as age). Nevertheless, a problem remains since, in theory, different equivalence scales should be used in the two distributions (disposable income and disposable income plus the value of public health care services), the reasons being that the relative needs of individuals belonging to particular groups are unlikely to be similar for public health care services and the rest of the commodities used by the population.

Therefore, a third approach - which most probably would have been the most appropriate, had it not been marred by considerable informational requirements - is to use the insurance-based approach and *introduce an equivalence scale* that corrects for differences in health needs between individuals. The problem with this approach, however, lies in the choice of the equivalence scale. At present there is no attempt to construct sets of equivalence scale covering differences in needs for the entire population, although a number of empirical studies focusing on particular population groups or specific situations can be found in the literature (Jones and O'Donnell (1995), Klavus (1999), Zaidi and Burchardt (2005), Berloffa, Brugiavini and

Rizzi (2006); for a general critique of this approach see Radner (1997)). Nevertheless, the welfare foundations of a number of these studies are not always straightforward.

A number of empirical studies are devoted to the analysis of the distributional effects of public health care transfers using the insurance value approach. Smeeding et al. (1993) study the combined effect on income distribution of non-cash income given by health, education and public housing in seven countries (Australia, Canada, Netherlands, Sweden, U.K., U.S. and West Germany), using the LIS (Luxembourg Income Study) data set in the years between 1979 and 1983. They show that the households that benefit most out of these public transfers are the middle-aged families with children and the very elderly, while those who benefit proportionally less are the young single persons and younger families without children. The combination of the three non-cash transfers is found to have an equalizing effect on income distribution. A very significant role in this aggregate effect is played by public health care transfers in-kind and the main beneficiaries of these transfers are the elderly – a result common to all similar studies in the field. Garfinkel et al. (2006) supplement this analysis by using more countries (including also France, Belgium and Finland) and more recent LIS data (2002 or earlier).

Steckmest (1996) compares the distributional effects of health and education related non-cash benefits in four countries (Norway, United Kingdom, United States and Sweden). Adding education and health transfers to the disposable income of the population reduces inequality. Inequality declines are most pronounced in Sweden and the US, while the distributional effects of these transfers are somewhat lower in Norway and the United Kingdom.

The various national studies in this domain all confirm that according to the insurance value approach public health care expenditures have an equalising effect on the income distribution (see for Australia: Australian Bureau of Statistics (2001) and Harding et al. (2004); for France: Caussat et al. (2005); for Norway: Aaberge et al. (2006); for United Kingdom: Lakin (2004); United States: O'Higgins and Ruggles (1981) and Wolff et al. (2006)). The actual consumption approach was applied by Evandrou et al. (1993) and Sefton (2002) for the United Kingdom.

The fact that the insurance value approach and the actual consumption approach can lead to quite different results is illustrated by Marical et al. (2006) who carry out international comparisons of the distributive effects of public services in OECD

countries. For health care services both the insurance value and the actual consumption approach are employed in eight European countries. In general, inequality appears to decline after the inclusion of public health care services in the concept of resources. On average, the distributive effect of these transfers turned out to be considerably lower using the actual consumption approach than when the insurance-value approach was employed. It is worth noting that using the actual cost approach in two countries (Italy and Denmark) inequality appears to increase marginally after the inclusion of the value of health care services to the concept of resources.

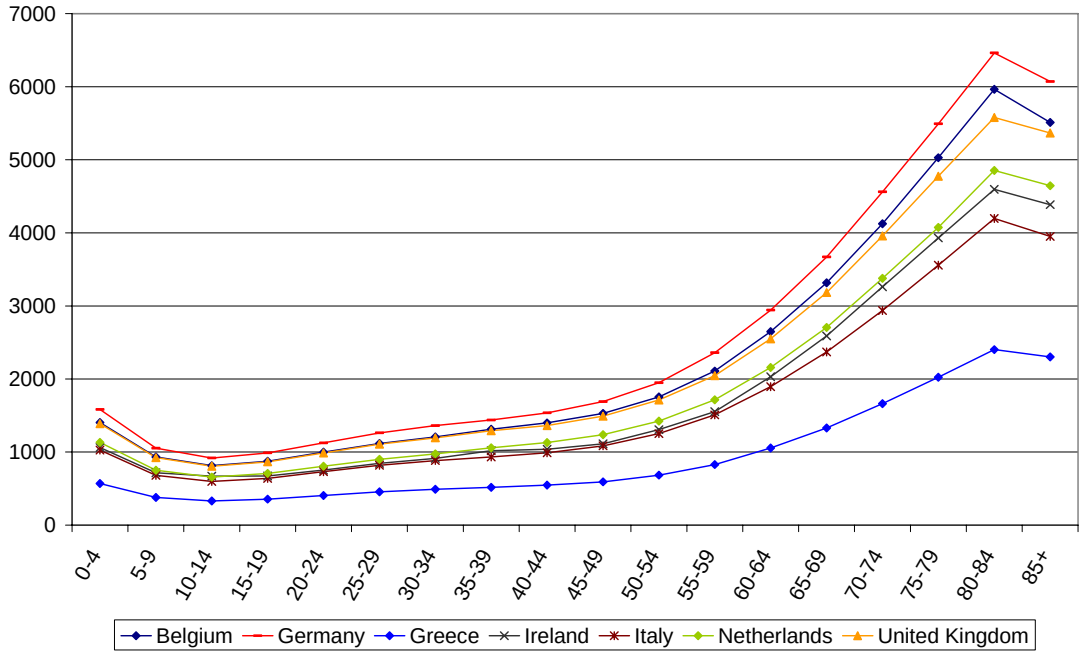
It should be noted that a number of studies examining various aspects of health-related inequalities but with a different focus can also be found in the literature. A considerable proportion of them are cross-country studies associated with the ECuity project of Eddy van Doorslaer and his collaborators. Issues such as inequalities in health care utilization, the impact of alternative funding systems, vertical and, particularly, horizontal aspects of equity associated with different organization of public health care systems mostly but not exclusively in Europe are among the issues covered in the corresponding papers (see, for example, van Doorslaer Wagstaff (1992), Wagstaff and van Doorslaer (1992), van Doorslaer et al (1997, 1999, 2000), Wagstaff et al (1999), van Doorslaer Koolmana and Jones (2004), van Doorslaer and Masseria (2005), Bleichrodt and van Doorslaer (2006), O'Donnell et al (2007)). Further, a number of epidemiological papers examine the impact of socioeconomic inequalities on health inequalities (see, for example, Mackenbach et al (2008) and the references cited there). A uniform result of such papers is that socioeconomic inequalities are closely related to health inequalities, although the association varies a considerably, depending on the mediating effects of the particular national health care provision system.

## 4. Data and methodology

The imputation method used in this paper is based on the risk-related insurance value approach. Each individual is assumed to receive a public benefit determined by the average spending on his/her age group, irrespective of whether use of public health services was actually made. Then, this benefit is added to the resources of the household that this individual belongs to and distributional comparisons are

performed. We employ static incidence analysis under the assumption that public health care transfers do not create externalities. No dynamic effects are considered in the present analysis. In other words, it is assumed that the beneficiaries of the public transfers are exclusively the recipients of the public health care services (and the members of their households) and that these services do not create any benefits or losses to the non-recipients (i.e. the taxes that finance the transfers are already there). Moreover, in line with the existing literature, it is assumed that the value of the transfer to the beneficiary is equal to the average cost of producing the public health care services.

**Graph 4. Public health care expenditures per capita for each age group in Euro.**




Source: Calculations based on OECD (2006)

We calculate per capita expenditures for each age group using the OECD Social Expenditure database (SOCX), which provides data that comparable across countries). The OECD Social Expenditure Database was set-up in the 1990s. It records spending items at a detailed level (see www.oecd.org/els/social/expenditure). The health care expenditures are taken from the OECD Health Data and include all public expenditure on health care. It

encompasses among other things expenditure on in-patient care, ambulatory medical services and pharmaceutical goods, prevention. They do not include non-reimbursed individual health expenditures or cash benefits related to sickness (OECD, 2007). A restriction of the SOCX database arises from the fact that existing differences in the demand for health care between men and women are not considered and there is evidence that spending patterns differ across sexes (Costello and Bains (2001), Carone et al (2005)). One important component of total public health expenditure is "research and development" (R&D). It may be argued that, however important this component may be for the future welfare of the population, it should not have been included in the fictitious non-cash income component derived from publicly provided health care. Nevertheless, the SOCX database does not allow the deduction of this component.

Table 3. National income data sets used in the analysis

| Country | Dataset | Reference year |
|---|---|---|
| Belgium (BE) | European Union - Statistics on Income and Living Conditions (EU-SILC) | 2003 |
| Germany (D) | German Socio-Economic Panel Study (SOEP) | 2001 |
| Greece (GR) | Household Budget Survey | 2004 |
| Ireland (IR) | Living in Ireland Survey | 2000 |
| Italy (IT) | European Union - Statistics on Income and Living Conditions (EU-SILC) | 2003 |
| Netherlands (N) | Socio-Economic Panel Survey | 2001 |
| United Kingdom (UK) | Family Resources Survey | 2003 |

The age pattern is the same as that used in Marical et al. (2006). The age pattern is derived by calculating per capita health care expenditures per age group as a proportion of total per capita amounts. These proportions are then applied to the SOCX health care expenditures for the year that corresponds to the year of the database used. The average amounts per age group are presented in the Graph 4 below. As anticipated, spending per capita is considerably higher for older people, which will be reflected in the empirical results of our analysis in the next section. The figures underlying this graph are, then, assigned to each individual belonging to the

corresponding age group in the data sets shown in Table 3 (along with the reference year).

## 5. Empirical results

This section presents the main empirical findings of the paper. We start by reporting the position of the beneficiaries of public health care subsidies in the income distribution when the population is grouped in quintiles according to their equivalised disposable income. Then, we proceed to the examination of the size of these transfers per quintile and their size as a proportion of the disposable income of each quintile. Finally and more controversially, we analyse their distributional effects. The distributions used are distributions of equivalised household disposable income per capita and they are derived using the "modified OECD equivalence scales" (Hagenaars et al, 1995) that assign weights of 1.00 to the household head, 0.50 to each of the remaining adults in the household and 0.30 to each child (person aged below 14) in the household.

Table 4 reports the relative mean per capita public health care expenditure per quintile, when the population members are grouped in quintiles according to their equivalised disposable income per capita. The figures reported in Table 4 are derived by dividing the mean transfer per capita for the entire population of a country by the corresponding mean transfer directed towards the members of the corresponding quintile.

**Table 4. Relative mean per capita public health care transfer per quintile**

| Quintile | B | D | GR | IR | IT | NL | UK |
|---|---|---|---|---|---|---|---|
| 1 (bottom) | 1.09 | 1.10 | 1.19 | 0.97 | 0.93 | 1.18 | 1.01 |
| 2 | 1.20 | 1.06 | 1.05 | 1.12 | 1.04 | 1.01 | 1.09 |
| 3 | 0.99 | 0.97 | 0.96 | 1.09 | 1.03 | 0.92 | 1.04 |
| 4 | 0.86 | 0.95 | 0.90 | 0.97 | 1.03 | 0.93 | 0.98 |
| 5 (top) | 0.86 | 0.93 | 0.91 | 0.85 | 0.98 | 0.97 | 0.86 |
| All | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

Taking into account the evidence of Graph 4 that the public health care transfers in-kind are disproportionately directed to the elderly, the results reported in Table 5 are likely to be determined to a considerable extent by the location of the elderly in the income distribution. Since in all countries under examination the elderly, are over-represented in the bottom half of the income distribution, the members of the top and the second richest (with the exception of the Netherlands) quintile appear to receive a lower average transfer in-kind than the average population member. On the contrary, in all countries the public health care spending per capita for the members of the two bottom quintiles (apart from Ireland and, particularly, Italy, in the case of the lowest quintile) is higher than the value of the average transfer per capita.

Table 5 reports the value of public health care transfers as a share of disposable income of the corresponding quintile quintile. Starting from the bottom line it can be argued that public health care transfers represent a very significant proportion of average disposable income. This proportion varies between 10.5% in the case of Greece and 16.4% in the case of Germany. The cross-country differences are largely in line with the evidence reported in Graph 1 and, to some extent, can be attributed to cross-country differences in the demographic structure of the population (Ireland), and the significance of private health expenditures (Greece, the Netherlands).

**Table 5. Value of public health care transfers as a share of disposable income per quintile**

| Quintile | B | D | GR | IR | IT | NL | UK |
|---|---|---|---|---|---|---|---|
| 1 (bottom) | 39.5 | 39.4 | 33.2 | 36.9 | 34.3 | 26.6 | 37.1 |
| 2 | 26.5 | 25.7 | 17.6 | 20.4 | 22.5 | 17.1 | 24.6 |
| 3 | 17.9 | 19.0 | 12.1 | 13.8 | 16.6 | 12.4 | 16.9 |
| 4 | 12.6 | 14.4 | 8.4 | 10.0 | 12.5 | 9.6 | 11.3 |
| 5 (top) | 8.2 | 8.2 | 4.7 | 5.9 | 6.7 | 6.2 | 5.7 |
| All | 16.4 | 16.5 | 10.6 | 12.6 | 13.7 | 11.6 | 14.2 |

In all countries the corresponding public transfers as a share of disposable income decline sharply as we move from the bottom to the top quintile of the income distribution. These transfers are as high as 40% of the income of the bottom quintile in Belgium and Germany. In all other countries, apart from the Netherlands, the

relevant figure is between 33% and 37%. At the other end of the income distribution, i.e. in the case of the top quintile, public health care transfers in-kind are between 4.7% (Greece) and 8.2% (Germany and Belgium) of the quintile disposable income.

Up to this point, the empirical results reported here are rather uncontroversial. The estimates reported beyond this point are in line with the methodology adopted in several empirical studies as well as international organizations, however, they are not immune to the criticism that they use conditional equivalence scales while they implicitly compare distributions under different institutional settings (with and without public health care services).

**Table 6. Changes in quintile shares**

| Quintile | B | D | GR | IR | IT | NL | UK |
|---|---|---|---|---|---|---|---|
| 1 (bottom) | 1.5 | 1.4 | 1.3 | 1.5 | 1.1 | 1.2 | 1.3 |
| 2 | 1.1 | 0.9 | 0.8 | 1.1 | 1.0 | 0.7 | 1.1 |
| 3 | 0.4 | 0.5 | 0.2 | 0.1 | 0.5 | 0.2 | 0.5 |
| 4 | -0.6 | -0.3 | -0.4 | -0.5 | -0.2 | -0.4 | -0.4 |
| 5 (top) | -2.4 | -2.6 | -2.0 | -2.2 | -2.4 | -1.7 | -2.6 |

Table 6 reports the changes in the quintile income shares as we move from the distribution of disposable income to the "augmented income distribution" that contains both disposable income and imputed values of publicly provided health care services in-kind (without adjustment of the equivalence scale and after the ensuing re-rankings). The results are quite similar across countries. The income share of the two top quintiles declines while that of the three bottom quintiles rises. In particular, the income share of the top quintile declines the most – between 1.7% in the Netherlands and 2.6% in Germany and the UK – while the income share of the bottom quintile rises the most – between 1.1% in Italy and 1.5% in Belgium and Ireland.

**Table 7. Changes in inequality indices**

| Index | B | D | GR | IR | IT | NL | UK |
|---|---|---|---|---|---|---|---|
| Gini | -15.1 | -13.5 | -10.2 | -12.6 | -10.9 | -10.6 | -12.3 |
| Atkinson 0.5 | -28.5 | -25.1 | -19.7 | -23.7 | -20.8 | -20.0 | -23.7 |
| Atkinson 1.5 | -46.6 | -31.5 | -21.8 | -36.0 | -27.0 | -24.5 | -27.9 |

Moving a step forward we can estimate the differences in the aggregate levels of inequality of the two distributions (disposable monetary income and augmented income distribution). The corresponding estimates are reported in Table 7. For the purposes of this exercise, we rely on two widely used indices of inequality, namely the Gini index and the Atkinson index. The value of the inequality aversion parameter in the latter is set at (e=0.5 and e=1.5). Both indices satisfy the desirable properties for an inequality index (anonymity, mean independence, population independence, transfer sensitivity). Higher values of e make the Atkinson index relatively more sensitive to changes closer to the bottom of the distribution while, in practice, the Gini index is relatively more sensitive to changes around the median of the distribution (Cowell, 2000; Lambert, 2001).

In all countries after the inclusion of the in-kind transfers to the concept of resources the reported declines in inequality are very substantial. They are proportionally smaller when the Gini index is used as an indicator of inequality (between 10% and 15%) and larger when the value of inequality aversion parameter is equal to e=1.5 in the case of the Atkinson index (between 21% and 47%). Linking the evidence of Graph 1 and Tables 4, 5 and 7 it can be argued that in the case of the Gini index cross-country differences are closely related to the size of the aggregate in-kind public health care transfers, while in the case of the Atkinson index – particularly at high levels of the inequality aversion parameter – the allocation of the transfer across quintiles plays a far more significant role in explaining cross-country differences.

**Table 8. Changes in the structure of inequality (decline in the contribution of the "between groups" component of MLD to aggregate inequality)**

| Partition criterion | B | D | GR | IR | IT | NL | UK |
|---|---|---|---|---|---|---|---|
| Household type | -1.6 | 0.0 | -1.1 | -0.4 | 0.5 | -0.4 | -2.2 |
| Socioeconomic group of HH head | -0.4 | 0.1 | -0.2 | -0.7 | 0.8 | -0.9 | -1.9 |
| Educational level of HH head | -1.8 | -0.4 | -0.8 | 0.0 | -1.1 | -1.7 | -1.3 |
| Age of HH member | -2.0 | -0.3 | -1.2 | -0.9 | 0.5 | -0.3 | -1.9 |

Finally, Table 8 reports changes in the structure of inequality when the value of public health care services is included in the concept of resources. For the purposes of the analysis, the population is grouped into mutually excluding and exhaustive groups using four alternative criteria - household type, socioeconomic group and educational level of the household head and age of the household member - and inequality is decomposed into inequality emanating from differences "within groups" and inequality due to differences "between groups", using as index of inequality the Mean Log Deviation (otherwise known as the "second Theil index" – Theil (1967), Shorrocks (1984)).

In all countries after the inclusion of public health services in the concept of resources inequality declines both "within" and "between" groups. In most countries and according to most partitions of the population the proportional reductions in "between groups" inequality are larger that the declines in "within groups inequality". As a result, the contribution of "between groups" inequality to aggregate inequality also declines. This pattern is most profound when the population is partitioned according to the age of the household member and the educational level of the household head, although the pattern is not uniform across countries.

## 6. Conclusions

Most of the existing comparative studies of inequality and its determinants ignore incomes in-kind. Theoretically, full income, which counts in kind transfers, is a superior measure of a household's command over resources than is the conventional measure of cash disposable income. One of the most important public in kind transfers available to all or the majority of the citizens in most developed countries are in the field of health care. The present paper investigated the short-run effects of including in-kind public health care transfers in distributional studies, using a risk-related insurance value approach and under the assumption of that these transfers do not create externalities, combining the information of existing national income databases with external information on spending per age group taken from the databases of the OECD.

Although using the insurance-based approach, all population members benefit from public health care transfers, our estimates show that in all countries under examination these transfers are directed disproportionally to population members located close to the bottom of the income distribution (primarily elderly persons). Cross country differences are evident and can be attributed to different demographic structures across countries, cross-country differences regarding the public-private mix in the financing health care services as well as differences in the share of health care spending in GDP. The move from the distribution of disposable income to the "augmented" income distribution that includes cash incomes as well as the value of public health care services is associated with a considerable increase in the share of resources of the bottom quintiles of the population (and a corresponding reduction in the share of the richest quintile) and a very substantial declined in measured inequality levels.

Despite this evidence, our results cannot be considered as water-tight. The reason is that, due to lack of alternatives, in both distributions (cash incomes and "augmented" distribution) we used the same set of equivalence scales, thus, implicitly assuming that health care needs are distributed in a similar pattern as all the other needs for goods and services. Although this assumption is not uncommon in similar empirical studies, it is far from uncontroversial. Moreover, our study focused exclusively on the short-run effects of publicly provided health services, leaving out of the picture taxes and social insurance contribution that finance

spending for these services. It can be argued that a far more interesting question is to examine the distributional effects of public health care services in a life-cycle framework, including in the analysis taxes and social insurance contributions. However, the data requirements for such an analysis are really formidable and, to our knowledge, no such attempts have been undertaken so far, even in countries with very rich administrative data (some studies attempting to simulate such effects tend to confirm the progressively redistributive nature of public health care transfers – see, for example, Ter Rele (2007) and the reference cited there).

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