Health and wealth: empirical findings and political consequences*

PREPARED FOR PERSPEKTIVEN DER WIRTSCHAFTSPOLITIK

OCTOBER 2005

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* The *European Community Household Panel Users' Database*, version of December 2003, was supplied by Eurostat. This paper derives from the project "The dynamics of income, health and inequality over the lifecycle" (known as ECuity III Project), which is funded in part by the European Community's Quality of Life and Management of Living Resources programme (contract QLK6-CT-2002-02297).

1. Policy issues

There is increasing concern that equity in health and health care in Europe may suffer as a result of the expansion of the European Union and the ageing of its populations. This is reflected, for instance, in the recent commitment at EU level of member states to set up national action plans to combat poverty and social exclusion. Earlier work from the ECuity network of researchers has had substantial impact on the health dimension of the indicators proposed in the Atkinson Report (Atkinson *et al*, 2002) which recently set out recommendations for the development of indicators of social inclusion in the European Union. These were developed in response to the 2000 Lisbon European Council meeting's resolution to "*promote a better understanding of social exclusion through continued dialogue and exchanges of information and best practice, on the basis of commonly agreed indicators*". The Social Protection Committee is now in charge of the implementation of measures to fight against poverty and social exclusion as approved in the European Council.

Europe has a long history of developing social protection systems which are rooted in the egalitarian tradition. Health care is no exception and most European Union member states have long achieved fairly universal coverage for their populations for a rather comprehensive package of health care services. Recent trends of rapidly ageing populations and expanding technological opportunities have not only challenged the affordability of these systems but also their commitment to equitable access for all, including socially disadvantaged groups. While this challenge is not unique to European countries, what is unique in the European setting is that the process of economic and monetary unification puts some pressure on countries to harmonize their social policies. At the special European summit in Lisbon in March 2000, for the first time, social policy was explicitly introduced as a distinct focus of

attention for European cooperation. It was agreed that common objectives for eradication of poverty and social exclusion would be adopted, that national policies would be designed to meet these, and that progress would be monitored. As a result of this trend towards European social policy harmonization, cross-country comparative information on social inequalities and exclusion (in terms of health or other dimensions) has gained additional relevance in Europe.

2. Evidence from the literature

Appropriate specification of the theoretical relationships between income, health and the inequality in each of these two key variables is crucial for any empirical attempts to shed light on the relationship between income and health inequalities. Recently, Contoyannis and Forster (1999a,b) have provided a theoretical model that generates testable predictions about the conditions under which changes in income level and inequality will generate changes in the level and inequality of health. They highlight the crucial role of the elasticity of health with respect to income. However, it is well known that the relationship between income and health is non-linear and that the association may partly be due to reverse causality and joint determination by unobserved third factors. Reliable estimates of the income elasticity of health therefore have to take account of this non-linearity and the potential of reverse causation.

2.1 The role of income in explaining health inequalities

The influence of material factors has played a fundamental role in research on health inequalities. The relationship between health and income has been highlighted by McKeown (1979) and his work on historical epidemiology. McKeown noticed that large declines in mortality had occurred in Britain prior to the development of key medical

interventions. McKeown's thesis is a diagnosis of exclusion (Evans et al., 1994). As no theory gave a reasonable explanation of the data he assumed that the decline in death rates must be due to the increase in income which led to better living standards and nutrition. Regardless of the manner in which the theory was developed, Evans et al. (1994) believe that McKeown's central point - that the major decline in morality from most infectious diseases predates effective therapy - remains unchallenged, a belief shared by Wilkinson (1996).

Wilkinson (1996) examines the historical link between income and health. The increasing and concave non-linear relationship revealed by the data seems to have shifted up over time, illustrating the strong correlation between average income and increasing health across all nations (see also, Preston, 1975). However he also found that the association between health and income at the aggregate level only applies up to around $5,000 annual per capita income in 1990. There is a large amount of evidence relating health to income across countries. The work of Adelman, over 30 years ago, recognised this fact. Adelman (1963) documented that there exists a negative long-run association between death rates and economic conditions. Pritchett and Summers (1996) find an association between wealth and health. Wealthier nations are healthier nations. They find that increasing a country's income will increase its health and their instrumental variable approach suggests that the income-mortality relationship is not an artefact of reverse causation.

These studies are part of a debate over the association between health and socioeconomic status (SES): in particular health and education (see e.g., Grossman, 2000, Smith, 2004) and health and income or wealth (see e.g., Smith, 1999, 2004). Evidence of a positive association between health and SES is well-documented across many societies and periods

(see e.g. Smith, 1999, Deaton, 2003). But the causal mechanisms underlying this relationship are complex and controversial. There can be a direct causal link from SES to health, for example, through the direct influence of material deprivation on lifestyles and on access to health care, or of education on the uptake and compliance with medical treatments. There can be a direct causal link from health to SES, for example, through the impact of health shocks on labour market outcomes such as unemployment, early retirement and earnings. But there may also be pathways that link health and SES through "third factors", for example time preference rates, that do not imply any causal link.

Fuchs (1974) found that there was no relationship between per capita income and age specific mortality rates across economically developed countries. Fuchs did find a relationship at the individual level between health and income, although he felt it was the result of reverse causation reflecting the fact that poor health created low income. Duleep (1995), using longitudinal data, found an individual-level non-linear relationship between income and heath. She tries to control for potential reverse causation by controlling for health conditions that may affect income. She concludes that there is some evidence for reverse causation but still finds a significant causal link between income and health.

Ettner (1996), using data from the US, has studied the link between income and health at the individual level. She acknowledges that simple correlations between income and health are not conclusive evidence of a causal link between the two. Much of the work in the sociological and epidemiological fields has focussed on either simple correlations or observed patterns controlling for known risk factors (Wilkinson, 1996, Marmot et al., 1978). As the evidence above suggests, there is a relationship between health and labour force participation, with the ability to command higher wages, leading to the problems of

reverse causality. Ettner models income as both exogenous and as simultaneously determined with health. When income is assumed to be exogenous she finds that income is positively related to self-assessed health and negatively associated with depressive symptoms, work limitations, functional limitations and bed days (Ettner, 1996). When she uses instrumental variable estimation she finds evidence that health and income are simultaneously determined. But the results still confirm that income exerts a significant and non-linear causal effect. These conclusions agree with those of Duleep (1995) and Fuchs (1974).

Adams et al. (2003) and the associated commentaries discuss the methodological issues involved in identifying causal effects of income on health. The problem facing such analyses is to overcome the biases, caused by reverse causality and selection, by identifying a source of exogenous variation in income. Meer et al. (2003) use inheritance as an instrument for wealth changes using the US Panel Study of Income Dynamics (PSID) from 1984-1999. They find a very small effect of changes in wealth, requiring a quarter million dollar change to achieve an effect of around 2 percentage points in the probability of excellent or good health. Frijters et al. (2005) use the unanticipated shift in permanent income for East German households, following the reunification of Germany, as a source of exogenous variation in income. Using the German Socioeconomic Panel (GSOEP) between 1991 and 1999 they find that, after controlling for heterogeneity, there is no evidence for a causal effect of income on health. Of course these findings do not rule out a cumulative and long-term relationship running from SES during childhood and early life to the gradient in adult health (see e.g., Case et al., 2002, Smith, 2004).

2.2 Health and earnings

There is little evidence concerning the impact of health on wages, particularly for developed economies. Very little evidence exists using recent European data. There are a number of reasons that health may have an impact on wages in a developed economy. Firstly, as noted by Mushkin (1962), Grossman and Benham (1974), Luft (1975) and Berkowitz *et al.* (1983), an increase in health leads to an increase in productivity, which should be reflected in an increased wage rate. Secondly, an employer may perceive health to be correlated with unobservable attributes that affect productivity and hence offer higher wages to healthier individuals. Thirdly, individuals may be discriminated against because they are unhealthy, irrespective of their productivity.

The existing literature has in general found a positive impact of healthiness on wages and/or income. However, the vast majority of work in this area uses cross-sectional data and various forms of instrumental variable techniques. These techniques require finding valid instruments which are uncorrelated with the error term and predict well the endogenous variables for each equation estimated. As noted by Haveman *et al.* (1994), this becomes more problematic as the number of equations increases.

Berkowitz *et al.* (1983) examine a model where health capital influences productivity as well as labour supply. Using US data on white males from the survey of disabled and non-disabled adults and eight dichotomous indicators of impairments, they find that six indicators have a negative effect on wages using *GLS*. Lee (1982) estimates a general simultaneous equations model with multiple discrete indicators for unobserved health capital. Using US data from the National Longitudinal Survey of Men for 1966, he finds that unobserved health capital has a positive impact on wages both before and after

accounting for endogeneity, with the coefficient 25% lower after accounting for the potential impact of wages on health. Lee's estimates also indicate a potential bias in estimates of the return to schooling when health is considered exogenous. Haveman *et al.* (1994) estimate a simultaneous equations model for work-hours, wages, and health, using a Generalised Method of Moments estimator to account for simultaneity and to allow weak restrictions on the covariance-structure of the model. Using longitudinal data on 613 white males observed over 8 years from the PSID, they find lagged ill-health (measured by a dichotomous indicator of work-limitations) to reduce wages and find a *larger* effect after accounting for endogeneity. This qualitative result was also found by Grossman and Benham (1974) using two-stage least squares.

Sundberg (1996) estimates a three–simultaneous-equations model of health, work hours and wages using Swedish data from 1991. She uses a self-assessed health variable and converts it into a continuous variable assuming a standard log-normal distribution for the latent index characterizing health. Using three-stage least squares Sundberg (1996) finds qualitatively similar results to Haveman *et al.* (1994), at least for men. For women the impact of self-assessed health on wages is insignificant. Using the first three waves of the British Household Panel Survey (BHPS), Walker and Thompson (1996) estimated a model of hourly wages which included measures of disability. Applying both *OLS* and procedures to account for selective participation, they found disability to reduce years of schooling, wages and the probability of labour force participation. They found disability to mainly affect participation rather than wages, and that once the endogeneity of schooling had been accounted for the effect of disability on wages was very small. Madden (1999) used cross-sectional data on 8747 couples from the UK 1995 Family Resources Survey, and attempts to decompose the healthy-unhealthy wage differential into productivity and discrimination

components. He finds that health status is endogenous in wage equations for males and females, and that having taken into account the direct effect of health status on productivity, discrimination is, in general, an insignificant component of the observed mean wage differential.

Contoyannis and Rice (2001) consider the effect of self-assessed general and psychological health on hourly wages using longitudinal data from the six waves of the BHPS. They employ single equation fixed effects and random effects instrumental variable estimators suggested by Hausman and Taylor (1981), Amemiya and MaCurdy (1986), and Breusch, Mizon and Schmidt (1989). Their results show that reduced psychological health reduces the hourly wage for males, while excellent self-assessed health increases the hourly wage for females. They also confirm the findings of previous work by Cornwell and Rupert (1988) and Baltagi and Khanti-Akom (1990), which suggested that the majority of the efficiency gains from the use of the instrumental variables estimators fall on the time-invariant endogenous variables, in their case academic attainment, and add further support to the hypothesis of a negative correlation between educational attainment and individual characteristics which affect wages.

2.3 Health and retirement

Health is undoubtedly an important factor in the decision to retire. Economic theory on the relationship between retirement and health assumes that agents have preferences over current and future leisure which depend in part on current and expected health status. Poorer health reduces the probability of continued work because it may increase the disutility of work; reduce the return from work (via lower wages); and entitle the individual to benefits and other non-wage income that is contingent on not working. A possible

counteracting effect is that poorer health may increase consumption requirements (for example via increased health care costs). However, if poorer health also reduces life expectancy, then the annualised consumption available from existing wealth is raised, and this may still lead to earlier retirement.

There is a growing literature on health and work, and for older workers the retirement decision is a key part of this. Health effects operate alongside the effects of the pensions and benefits system, and there is an enormous literature on the importance of these financial incentives in determining retirement behaviour. However, Lindeboom (2006) in a comprehensive review of the work in this area, argues that a number of empirical studies have suggested that health is the most important determinant of an older person's labour supply; a finding rejected by other studies, which point to problems in finding an appropriate measure of health and problems arising from the endogeneity of health in models of retirement.

There are many reasons why one may expect biases to arise when modelling the impact of health on the timing of the retirement transition. First, self-reported measures of health are based on subjective judgements and there is no reason to believe that these judgements are comparable across individuals. Secondly, self-reported health may not be independent of labour market status. Thirdly, since ill-health may represent a legitimate reason for a person of working age to be outside the labour force, respondents not working may cite health problems as a way to rationalize behaviour. Fourthly, for individuals for whom the financial rewards of continuing in the labour force are low there exists a financial incentive to report ill-health as means of obtaining disability benefits. This is often cited as the 'disability route into retirement' (Riphahn, 1997; Blundell, Meghir and Smith, 2002). For

example, in a study of social security benefit programmes in the Netherlands, Kerkhofs and Lindeboom (1995) show that recipients of disability insurance systematically overstated their health problems.

Bound (1991) identifies the bias that results from each of the above problems. Reporting heterogeneity resulting in a lack of comparability across individuals in self-assessed health (SAH) represents measurement error that leads to an underestimation of the impact of health on labour force participation. Conversely, endogeneity in the health-retirement relationship will lead to an overestimation of the impact of health. These biases will also have implications for the estimation of the impact of socio-economic characteristics that are correlated with SAH. Indeed, Bound argues that SAH is in part determined by socio-economic factors and that should the impact of health on labour market activity be correctly estimated the impact of economic variables may still be biased.

Bound (1991) also points out, however, that we cannot be sure that objective measures are any better predictors of the relationship between health and labour market status; objective measures of health are unlikely to be perfectly correlated with the aspect of health that affects an individual's capacity for work. As such, objective measures of health will suffer from an error in variables problem leading to downward biased estimates of the impact of health on retirement. Whereas the biases involved in using self-assessed measures of health act in a way so as to counteract each other, the bias associated with objective measures of health operates in one direction only and hence may be more problematic in empirical applications.

Empirical studies on the role of health in the retirement decision provide mixed conclusions about the endogeneity of SAH and the extent of the bias provided through measurement error. For example, while Kerkhofs, Lindeboom and Theeuwes (1999) find that the choice of health measure (SAH versus more objective measures) does affect the estimates of health on labour market outcomes, Dwyer and Mitchell (1999) conclude that SAH is not endogenous and their models of labour market retirement do not suffer significantly from measurement bias. Further, by applying a direct test for measurement error Au, Crossley and Schellhorn (2005) report significant error in their SAH variable. However, when this measure was used to predict retirement behaviour it gave similar results to those obtained from using a more objective measure of health and to those obtained through instrumental variable approaches.

Of further relevance is whether change in labour market status (into retirement) is best identified by a 'shock' to an individual's health or by a levels effect (for example, a slow deterioration in health status). It is often argued that modelling health 'shocks' is a convenient way to eliminate one source of potential endogeneity bias caused through correlation between individual-specific unobserved factors and health (see for example, Disney, Emmerson and Wakefield, 2004). This is due to the identification of a health 'shock' through, for example, differencing the data over consecutive time periods, which consequently implies eliminating unobserved individual effects. Disney, Emmerson and Wakefield (2004) find that health shocks are an important determinant of retirement behaviour in the UK., and that positive and negative health shocks tend to have symmetric effects.

Riphahn (1999) has also investigated the dynamic effect of health shocks on the employment and income of older workers. She finds significant effects of a health shock on leaving employment and finds small reductions in individual and equivalent household income. Another interesting fact is that health shocks seem to happen more often to those individuals/households which are already at the lower end of the income distribution before the health shock occurs. For the US, Bound et al. (1999) use three waves of the Health and Retirement Study to consider the retirement behaviour of men and women aged 50-62. They find that changes in health are as important as the long-term level of health in determining the retirement age.

2.4 Socioeconomic inequalities in health and health care in Europe

Van Doorslaer and Koolman (2004) have provided new evidence on the sources of differences in the degree of income-related inequalities in self-assessed health in thirteen European Union member states. They went beyond earlier work by measuring health using an interval regression approach to compute concentration indices and by decomposing inequality into its determining factors. Comparable data were used, taken from the 1996 wave of the *European Community Household Panel* (ECHP). Significant inequalities in health favouring higher income groups emerged in all countries, but were found to be particularly high in Portugal and – to a lesser extent – in the UK and in Denmark. By contrast, relatively low health inequality was observed in the Netherlands and Germany, and also in Austria, Belgium, Ireland, Italy and Spain, There was a positive correlation with income inequality *per se* but the relationship was weaker than in previous research. Health inequality is therefore not merely a reflection of income inequality. A decomposition analysis shows that the (partial) income elasticities of the explanatory variables are generally more important than their unequal distribution by income in explaining the cross-country

differences in income-related health inequality. Especially the relative health and income position of non-working Europeans, like the retired and disabled, explains a great deal of "excess inequality". Van Doorslaer and Koolman (2004) also find a substantial contribution of regional health disparities to socio-economic inequalities, primarily in the southern European countries.

Van Doorslaer, Koolman and Jones (2004) have presented new international comparative evidence on the factors driving inequalities in the use of GP and specialist services in 12 EU member states using data taken from the 1996 wave of the ECHP. They examined two types of utilisation (the probability of a visit and the conditional number of positive visits) for two types of medical care: general practitioner and medical specialist visits. They find little or no evidence of income-related inequity in the probability of a GP visit in these countries. Conditional upon at least one visit, there is even evidence of a somewhat pro-poor distribution. By contrast, substantial pro-rich inequity emerges in virtually every country with respect to the probability of contacting a medical specialist. Despite their lower needs for such care, wealthier and higher educated individuals appear to be much more likely to see a specialist than the less well-off. This phenomenon is universal in Europe, but stronger in countries where either private insurance cover or private practice options are offered to purchase quicker and/or preferential access. Pro-rich inequity in subsequent visits adds to this access inequity but appears more related to regional disparities in utilisation than other factors.

Despite decades of universal and fairly comprehensive coverage in European countries, utilisation patterns suggest that rich and poor are not treated equally. While in most countries general practitioner care is found to be distributed fairly equally and often even

pro-poor, the very pro-rich distribution of specialist care tends to make total doctor utilisation somewhat pro-rich. This phenomenon appears to be universal, but offering private insurance or private care options reinforces this tendency. A number of country-specific studies have provided further in-depth understanding of, for instance, the varying public-private insurance or patient arrangements in countries like Italy (Atella *et al*, 2004), Spain (Rodriguez and Stoyanova, 2004) and France, (Buchmueller *et al*, 2004).

3. Data and methods

3.1 The ECuity III Project

The "ECuity project" is a shorthand for a series of research projects carried out over the past decade and a half by collaborating European health economics research groups, that have been funded by the European Union (see http://www2.eur.nl/bmg/ecuity/). The previous findings of the ECuity project suggest that (a) while all countries in Europe show some income-related inequalities in health, some are faring much better than others, and (b) while most European countries have secured fairly equal access to a GP, if they continue to expand the options to "go private" alongside their essentially public health care systems, they are likely to exacerbate the pro-rich utilization patterns in volumes and mixes of specialty services which are already observed, even in countries where such private options are currently not (or hardly) available.

Going beyond the descriptive evidence by estimating effects using causal modelling, rather than merely teasing out associations, may become possible now that the full eight waves of the ECHP for fourteen EU member states are available. That is the ambition of the current phase of the project, the "ECuity III project". In order to help inform the policy debate

about how to secure health equity in our ageing European societies, it pays particular attention to the key decisions about income, health and health care in age groups around the retirement age, as these prove to be crucial for a better understanding of cross-country differences in inequalities.

3.2 The ECHP

The *European Community Household Panel Users Database* (ECHP-UDB) is a standardised annual longitudinal survey, designed and coordinated by the European Commission's Statistical Office (EUROSTAT). It provides 8 waves (1994 - 2001) of comparable micro-data about living conditions in the European Union Member States. The survey is based on a standardised questionnaire that involves annual interviewing of a representative panel of households and individuals of 16 years and older in each of the participating EU Member States (Peracchi, 2002). "National Data Collection Units" implemented the survey in each country. Approximately, 60,000 households and 130,000 adults across the European Union were interviewed at each wave. The survey covers a wide range of topics including demographics, income, social transfers, individual health, housing, education and employment. The information provided by the ECHP-UDB can be compared across countries and over time.

The first wave covered the EU-15 Member States with the exception of Austria, Finland and Sweden. Austria joined in 1995 and Finland in 1996. In the periods covering the first three waves, the ECHP ran parallel to existing national panel surveys in Germany, Luxembourg and the United Kingdom. From the fourth wave onwards, the ECHP samples were substituted by data harmonized ex-post from these three surveys. Hence, there were two versions of the ECHP database for Germany, Luxembourg and United

Kingdom. Although Sweden did not take part in the ECHP, the Living Conditions Survey is included in the UDB, together with comparable versions of the BHPS, the GSOEP and the Panel Survey for Luxembourg (PSELL).

3.3 Measurement and explanation of socioeconomic inequalities in health

Until recently research has focused on methods for the measurement and explanation of socioeconomic inequalities in health that have been designed for use with cross sectional data. Jones and López Nicolás (2004) explore what more can be gained by using panel data. Work on income mobility has focused on comparing the distribution of income using two perspectives, first of all a cross sectional or short-run perspective and secondly a long-run perspective where income is aggregated over a series of periods. If an individual's income rank differs between the short-run and the long-run there is evidence of income mobility. One way of measuring this phenomenon is through the index of income mobility proposed by Shorrocks (1978).

The aim of the paper by Jones and López Nicolás (2004) is to apply the same principles to income-related health inequality. They show that the long-run concentration index can be written as the sum of a weighted average of short-run concentration indices plus a term that captures the covariance between levels of health and fluctuations in income rank over time. This differs from income inequality in that income-related health inequality can be either greater or smaller in the long-run than the short-run but, once again, these changes can be measured through an index of health-related income mobility which is based on the familiar tools of the concentration index. The paper shows that this mobility index can be decomposed using the contribution of different factors through a regression model for health and this is illustrated using the GHQ measure of subjective well-being from the first

nine waves of the BHPS. This shows that, after nine waves, the weighted average of short-run measures underestimates the long-run measure by 15% for men and 5% for women

The distinction between the short-run and long-run will be of interest to policy makers whose ethical concern is with inequalities in long-run health. For example, the "fair innings" perspective suggests that equity should be defined in terms of a person's lifetime experience of health (Williams and Cookson, 2000]. In practice, this lifetime experience could be measured using DALYs (Murray, 1994) or QALYs (Williams, 1997).

4. New findings from ECuity III

4.1 Health-related attrition

Evidence of health-related attrition has been explored in the first eleven waves of the BHPS and the full eight waves of the ECHP and its consequences for models of the association between socioeconomic status and self-assessed health (see Jones, Koolman and Rice, 2005). Attrition may be important as there is a risk of *survivorship bias*: long-term survivors who remain in the panel are likely to be healthier on average than the sample surveyed at wave 1. To address this issue Jones, Koolman and Rice (2005) describe the pattern of health-related attrition revealed by the BHPS and ECHP data. Descriptive evidence shows that there is health-related attrition in the data, with those in poor initial health more likely to drop out. Econometric tests provide evidence of attrition bias in the panel data models of SAH. Nevertheless a comparison of estimates - based on the balanced sample, the unbalanced sample and corrected for non-response using inverse probability weights - does not show substantive differences in the average partial effects of the variables of interest – income and education. So, while health-related attrition exists, it

does not appear to distort the magnitudes of the estimated average partial effects of socioeconomic status. Similar findings have been reported concerning the negligible influence of attrition bias in models of various labour market outcomes, and the authors discuss possible explanations for their results.

4.2 Reporting bias and heterogeneity

There is a concern that ordered responses on health questions may differ across populations or even across subgroups of a population. This reporting heterogeneity may invalidate group comparisons and measures of health inequality. Lindeboom and van Doorslaer (2005) propose a test for differential reporting in ordered response models which makes a distinction between cut-point shift and index shift. The method is illustrated using Canadian National Population Health Survey data, and the McMaster Health Utility Index (HUI) is used as a more objective health measure than the simple 5-point scale of self-assessed health. They find clear evidence of cut-point shifting for age and gender, but not for income, education or language**.**

Hernández Quevedo, Jones and Rice (2005) explore reporting bias and heterogeneity in the measure of self-assessed health (SAH) used in the BHPS. The ninth wave of the BHPS includes the SF-36 general health questionnaire, which incorporates a different wording to the SAH variable used at other waves. Considerable attention has been devoted to the reliability of SAH and the scope for contamination by measurement error; the change in wording at wave 9 provides a form of natural experiment that allows them to assess the sensitivity of panel data analyses to a change in the measurement instrument. In particular, they investigate reporting bias due explicitly to the change in the question. They show how progressively more general specifications of reporting bias can be implemented using panel

data ordered probit and generalised ordered probit models. The results suggest that the distribution of SAH does shift at the ninth wave but there is little evidence that this varies with socio-economic characteristics at an individual level.

4.3 Long-run inequality and mobility in health limitations

A paper by Hernández Quevedo, Jones, López Nicolás and Rice (2005) contributes to the literature on income-related inequalities in health across European Union Member States. The analysis is based on the ECHP-UDB and uses two binary measures of health limitations for the full 8 waves of available data. Short-run and long-run concentration indices together with mobility indices are derived for indicators of severe health limitation and any health limitation. Results suggest the existence of "pro-rich" inequality in health across Member States in both the short-term and the long-term, with health limitations concentrated among those individuals with lower incomes. For many countries, short-run indices suggest that income related inequalities in health widen when a longer term view is taken.

The ECHP dataset contains information on a wide range of health and health related variables, from health outcomes to health care utilisation. Here the focus is on the information on health limitations, in particular responses provided to the question: "Are you hampered in your daily activities by any physical or mental health problem, illness or disability?". Three possible answers are available for the respondent: "Yes, severely", "Yes, to some extent" and "No**"**. The study focuses on two binary measures of health problems that have been derived from the responses to the health limitations question. From these responses, two dummy variables are constructed. The first, labelled HAMP1, represents an indicator of any limitations (severe or to some extent) versus no limitations; the second

(HAMP2) represents an indicator of severe limitations versus no limitations or limited to some extent.

Several conclusions can be inferred from this analysis. First, there is evidence that income-related inequalities in health limitations exist among all Member States included in the analysis, both in the short-term and long-term. These socioeconomic inequalities favour the rich over the poor in each society. Secondly, there is evidence that inequalities in health are increasing in almost all the countries studied. Thirdly, there is an important difference between long-term and short-term measures of inequality, even over the relatively short span of 8 years covered by the ECHP-UDB. This highlights the importance of utilising a longitudinal perspective where feasible when measuring and interpreting socioeconomic inequalities in health. The ranking of countries by long-run inequalities differs from that by overall health achievement; which takes account of the average level of illness in each country. This implies that an equity-efficiency trade-off has to be faced in evaluating their performance and comparing countries with diverse health and social welfare systems.

4.4 Mortality, lifestyle and socioeconomic status

Inequalities in health are partly explained by differences in lifestyle and living conditions, and lifestyle can vary between groups depending on economic circumstances. To better explain inequalities in health, it is appropriate to use a behavioural model, which contains socio-economic characteristics but also individual health decisions, and all potential determinants of health. Investments in health are assumed to be endogenous and to influence longevity. Balia and Jones (2005) investigate the relationship between individual socio-economic characteristic and mortality, emphasizing the role of lifestyles. The paper uses the British Health and Lifestyle Survey (HALS, 1984-1985) data and the longitudinal

follow-up of May 2003 to investigate the determinants of premature mortality risk in Great Britain. They find that lifestyles and unobservable individual heterogeneity strongly contribute to inequality in mortality, measured by the Gini coefficient, reducing the contribution of socio-economic factors. A statistically significant correlation exists between the unobservable factors affecting the mortality equation and those affecting some of the lifestyle equations. This motivates the assumption of enodogeneity of lifestyles and emphasizes the role of individual heterogeneity in a model of mortality. Contrasting with the more recent literature, which suggests that people in poor health select into unhealthy lifestyles (such as smoking), their model finds a strong evidence of selection of frailer individuals into non-smoking. Moreover, the evidence is that people who have a healthier style of life are less likely to die even if they are frailer. Individuals' choices about their lifestyle may induce variations in health status and affect premature mortality. Health-related behaviours mediate the relationship between mortality and socio-economic characteristics.

4.5 Health and wages

The impact of income and earnings on health has been well-examined in the health economics literature while the impact of health on wages has been less studied. Even rarer in previous work is the possible difference between the influences of health on wages for men versus women. Gambin (2005a) attempts to fill this apparent gap in the literature. She augments the well-established earnings function to include a number of health indicators and estimate equations for men and women using eleven waves of the BHPS. The paper considers a range of estimation procedures, including pooled ordinary least squares, random and fixed effects, and Hausman-Taylor instrumental variables approaches. The

impact of health is found to differ slightly by sex and is more strongly related to women's wages than men's.

As there is such a divergence between men and women in developed countries regarding both wages and health, studying the interaction of health and wages and how the relationship differs by gender is an important addition to our understanding of the complex relationship between health and labour market outcomes. The analysis in Gambin (2005b) draws on individual level data from up to eight waves of the ECHP. Estimation procedures are applied to unbalanced panels from 14 different countries. The samples consist of employed adults aged 24 to 64 years. The data is used in estimation of Mincer-type wage functions where the natural logarithm of an individual's hourly wage is function of a number of individual specific characteristics such as age, education, work experience, type of job, and health. Two health variables are included: self-assessed health status and an indicator of chronic illness or disability. The first estimates are obtained from pooled ordinary least squares. Further estimates are obtained from random effects and fixed effects panel models. A gender-related difference in the association between health and wages has been found in several of the countries examined, however these differences are not the same in magnitude. For a number of countries, there appears to be no significant gender difference. Overall, self-assessed health has greater effects on men's wages than women's, while chronic illness appears to be more significant for women. The larger "gender-gaps" seem to exist in France, Portugal, Spain and the United Kingdom.

4.6 Health and retirement

Along with most developed countries the UK is experiencing population ageing combined with, at least until very recently, increasingly early exit from the labour market of older

workers. Health is often cited as an important factor in determining the timing of retirement decisions and Roberts, Rice and Jones (2005) investigate this phenomenon using 12 waves of the BHPS. They track individuals deemed to be at risk of labour market exit from work to retirement. Using discrete-time transition models they estimate the impact of health on the retirement hazard while controlling for confounding factors including income and pension entitlement. In tracking the same individuals over time they attempt to overcome the problems of endogeneity and unobservable individual heterogeneity that plague investigations of these causal relationships. They use a variety of measures of health and also construct a health stock variable that has the advantage of removing measurement error that may be inherent in subjective measures of general health status. Emphasis is also placed on the possibility that the health of a spouse (or partner) may influence the timing of the retirement decision. Results show a positive effect of health on retirement.

4.7 The use of health care

Bago d'Uva (2005) models access to and utilisation of primary care using data from the BHPS for the period 1991-2001. A latent class panel data framework is adopted to model individual unobserved heterogeneity in a flexible way in which individual effects are approximated using a discrete distribution. This framework offers an alternative representation of heterogeneity, where individuals are drawn from a finite number of latent classes. Accounting for the panel structure of the data leads to a substantial improvement in fit, and permits the identification of latent classes of users of health care. Analysis by gender shows that men and women respond differently to some factors, in particular, to age and income. There is evidence of a positive impact of income on the probability of seeking primary care. This effect is especially significant in the case of women. For both genders, the marginal effect of income on the propensity to visit a GP is greater for

individuals who are less likely to seek primary care. A latent class aggregated count data model for the number of GP visits classifies individuals in three latent classes and shows a positive income effect particularly amongst those with lower levels of utilisation.

5. Concluding Remarks

Previous work has shown that significant inequalities favouring the better off exist in all European countries, both with respect to the use of health care and with respect to the distribution of health itself, and that the degree of inequality is particularly associated with the way each society treats its aged population in terms of both income and health protection (Van Doorslaer and Jones, 2004). The association between income and health is a consequence of (i) the impact of health and ageing on income, (ii) the reverse effects of income protection on health and health care use, and (iii) the joint determination of life cycle profiles of income and health by social and other factors.

As a result of the Amsterdam Treaty's requirement that "the EU Council adopt measures for the production of statistics where necessary for the performance of the activities of the Community" a new source of data has been created for all members of the enlarged EU, i.e. the 25 current members and the 2 candidate entrants (Bulgaria and Romania).: the EU *Survey on Income and Living Conditions* (or EU-SILC). Its first wave is to become available in 2006 and provide new and nationally representative household level data on income, labour, education, health status and housing for about 120,000 households in these countries. Health care utilization information is limited to questions about instances where specialist or dental care was not sought when it was needed. Data are collected in a rotating panel, implying that one quarter of the sample will be renewed each year, resulting in (a maximum of) four-year panel data observations, for most households. Data collection has

started in all countries in 2004 or 2005 and public use versions should be released two years after collection. This means that cross-sectional data for the countries that started the first wave in 2004 ought to become available at the end of 2006. By 2007, the first wave data for all countries should be released.

While the ECHP and the EU-SILC are attractive and useful for cross-country comparisons, they often lack country-specific institutional detail (e.g. on health insurance coverage) and as general socio-economic surveys can collect only limited health information. Researchers in several countries have access to other (panel) datasets and/or extended versions of the common core datasets that allow for analyses. Some countries can link survey data with mortality statistics, while other countries have either longer panels or have included more extensive health information. Still others have linkages with hospital registrations. Future research should address pertinent questions regarding the causal mechanisms underlying these systematic associations, by exploiting the significant variation in relative income and health positions, especially around the retirement age.

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