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ARE THE HEALTHIER WEALTHIER OR THE WEALTHIER HEALTHIER?

The European Evidence

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ABSTRACT: Are the healthier wealthier or the wealthier healthier? – Evidence from Europe presents an extensive and updated survey of the research findings on socio-economic inequalities in health in six European countries (Denmark, Finland, France, Greece, Netherlands and United Kingdom).

Three main questions are the focal points of this book: First, how does individual socio-economic and/or occupational status affect the physical and mental health and sense of well-being of older individuals of working age? Second, how does individual socio-economic and/or occupational status affect the ability of older workers to participate in the labour market? And third, how might policy initiatives be developed to enhance the effectiveness of welfare services for the older workforce?

The primary focus of this work is to cover all the research done so far, including unpublished papers and those written in the national language of respective country. Each chapter reviews the empirical research carried out for that country, describes the available data, comments on the adopted estimation strategies and discusses methodological limitations of the reviewed studies, hence critically assessing their reliability. The results are surveyed and interpreted within their specific institutional context in order to facilitate comparison with the international evidence published in mainstream journals and surveyed in one of the chapters. This way, the reader is able to identify the knowledge gaps in each country and to also assess what could be learned from that particular country's experience.

KEYWORDS: Socio-economic status, Health status, Labour market participation, Older workforce, Lifestyle behaviours

JEL-codes: I11, I12, I18, I31, I32

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TIIVISTELMÄ: Tämä kolmevuotiseen EU-rahoitteiseen tutkimushankkeeseen liittyvä kirja esittää laajan ja ajantasaisen katsauksen tutkimustuloksiin sosioekonomisen ja ammatillisen aseman vaikutuksista ikääntyvän työvoiman terveyseroihin kuudessa Euroopan maassa (Alankomaat, Iso-Britannia, Kreikka, Ranska, Suomi ja Tanska).

Socio-economic and occupational effects on the health inequality of the older workforce (SOCIOLD) -nimisen tutkimushankkeen pääkysymyksiä ovat yksilöllisen sosioekonomisen ja/tai ammatillisen aseman vaikutus ikääntyneiden työikäisten henkilöiden fyysiseen ja henkiseen terveyteen ja hyvinvoinnin tunteeseen sekä heidän sosioekonomisen asemansa ja terveytensä vaikutus työkykyyn ja täten työhön osallistumiseen. Syvempi tietämys sosioekonomisen aseman, terveyden ja työmarkkinakäyttäytymisen välisistä riippuvuuksista parantaa Euroopan ikääntyvälle työvoimalle suunnattujen hyvinvointipalvelujen parantamiseen pyrkivien politiikka-aloitteiden kehittämismahdollisuuksia.

Kirjaan on pyritty ottamaan mukaan kaikki tähänastinen tutkimus, sisältäen myös julkaisemattomat ja kunkin maan omalla kielellä kirjoitetut tutkimukset. Luvuissa käydään läpi kussakin maassa tehty empiirinen tutkimus, kuvaillaan saatavilla olevaa dataa, kommentoidaan käytettyjä estimointimenetelmiä ja käsitellään tarkasteltujen tutkimusten metodologisia rajoituksia arvioiden siten kriittisesti niiden luotettavuutta. Tuloksia tarkastellaan ja tulkitaan niiden omassa institutionaalisessa viitekehyksessä, jotta helpotettaisiin niiden vertaamista kansainväliseen tutkimukseen, jota on käyty läpi yhdessä kirjan luvuista. Tällä tavoin lukija voi tunnistaa aukot kunkin maan tiedoissa ja myös arvioida, mitä voitaisiin oppia kunkin maan kokemuksista.

AVAINSANAT: Sosio-ekonominen asema, Terveys, Työhön osallistuminen, Ikääntynyt työvoima, Elämäntapa

JEL-koodit: I11, I12, I18, I31, I32

Preface

Are the healthier wealthier? Or does the direction of causality go the other way around, implying that the wealthier tend to be healthier? These are intriguing questions of high policy relevance, not least in face of ageing European populations.

This study reviews the literature and provides an important benchmark for our current research-based knowledge on these matters. It draws together both international and national empirical research within this particular field. It also evaluates critically the available evidence from a methodological point of view. Equally important, it emphasises the policy implications that can be derived from the existing research, while at the same time pointing to remaining knowledge gaps that need to be filled with a view of offering policy makers better guidance in these matters.

The review of literature at hand is part of a three-year research project titled *Socio-economic and occupational effects on the health inequality of the older workforce – SOCIOLD* and funded by the European Commission under grant no. QLRT-2001-02292.

I wish to congratulate the project partners and, especially, the editors – Ali Skalli, Edvard Johansson and Ioannis Theodossiou – for an excellent work.

Helsinki, March 2006

Sixten Korkman

Authors' foreword

"Socio-economic and occupational effects on the health inequality of the older workforce – SOCIOLD" is a three-year EU financed research project that started on January 1, 2003. It involves six European countries: Denmark, Finland, France, Greece, Netherlands and the United Kingdom.

The overarching objective of SOCIOLD is to study the effect of individuals' socio-economic and/or occupational status on their physical and mental health and sense of well-being, with special emphasis on older individuals of working age. It also aims at analysing the specific effects of, respectively, the socio-economic status and the health history of older workers on their ability to participate in the labour market. A better understanding of the association between socio-economic status, health status and labour market participation behaviour is, indeed, necessary for the development of policy initiatives aiming at enhanced effectiveness of the welfare services for the older workforce in an era of an ageing population in Europe. More information on the SOCIOLD project is available at the project's web-site www.abdn.ac.uk/sociold.

This volume is based on a cooperative endeavour of the researchers associated with the SOCIOLD project. It provides a comprehensive review of the international literature, as well as of the current state of knowledge in each partner country concerning the socio-economic inequalities in health in general and among older workers in particular. It thus draws a baseline for the targeted research agenda of the SOCIOLD partners. The reviews presented in this book highlight what can be learned from the research that has so far been conducted in each country. It also identifies the knowledge gaps and their potential explanations either in terms of institutional settings or in terms of data limitations and methodological difficulties.

On behalf of all partners we would like to thank DG-Research of the European Commission for providing funds (grant no QLRT-2001-02292) to carry out the SOCIOLD research project. We also want to thank the Scientific Officer at DG-Research responsible for the SOCIOLD project, Dr. Kevin McCarthy, and the External Expert, Professor Panos Tsakloglou, for their very helpful and insightful comments. We are also grateful to Rita Asplund at ETLA for her very friendly assistance in the editorial work and to Tuula Ratapalo,

also at ETLA, for her excellent work in preparing the final layout of this volume.

Paris, Helsinki and Aberdeen, March 2006

Ali Skalli, Edvard Johansson and Ioannis Theodossiou.

Contents

CHAPTER 1
Are the Healthier Wealthier or the Wealthier Healthier? The European Evidence 1
Ali Skalli, Edvard Johansson, Ioannis Theodossiou

1.1 Introduction 2
1.2 Why is it Important to Investigate the Relationship Between HS and SES? 2
1.3 The Received Wisdom on Health Inequalities 6
1.4 Problems with the Analysis of the Association Between HS and SES 8
1.4.1 The Measurement Issue 9
1.4.2 Methodological Issues 11
1.5 Outline of the Book 13
1.5.1 The Association between Socio-economic Status and Health 13
1.5.2 Intermediate Factors Causing Socio-economic Health Differences 15
1.5.3 The Selection Issue 18
1.5.4 Socio-economic Status and Health Relationship: The Case of the Older Workforce 19
1.5.5 Labour Market Participation 20
1.6 Conclusions 22
References 24

CHAPTER 2
International Studies on the SES–Health Relationship 31
Athina Economou, Agelike Nikolaou, Ioannis Theodossiou

2.1 Introduction 32
2.2 General Methodology 33
2.2.1 Health Status Indicators 33
2.2.2 SES Indicators 37
2.2.3 Problems in the Analysis of the SES–Health Relationship 42
2.3 International Studies on the SES–Health Relationship 51
2.3.1 Theoretical Background 51
2.3.2 Empirical Evidence 54
2.4 Conclusions 63
References 65

CHAPTER 3
Socio-Economic Status and Health – Bits of Evidence from Denmark 73
Tor Eriksson

3.1 Introduction 74
3.2 Mortality and Morbidity in Denmark: Some Key Facts 75
3.2.1 Time-series Changes and International Perspectives 75
3.2.2 Cross-sectional Pictures 76
3.3 Studies of the Health and Socio-economic Status Relationship 79
3.4 Concluding Remarks 82
References 83

CHAPTER 4
A Review of the Finnish Literature on the Relationship Between Socio-economic Status and Health 85
Edvard Johansson

4.1 Introduction 86
4.2 Socio-economic Status, Occupational Status and Health Status in Finland 87
4.2.1 Measurement of Socio-economic Status 87
4.2.2 Measurement of Health Status 89
4.3 Social Security and Institutional Arrangements in Finland 91
4.3.1 The Pension System 91
4.3.2 Health Care 93
4.3.3 The Unemployment Benefit System 97
4.4 The Relationship Between Socio-economic Status, Access to Health Care and Health Expenditure 98
4.5 The Relationship Between Socio-economic Status and Health Status 100
4.5.1 General Studies 100
4.5.2 Studies Focussing on the Elderly Workforce 106
4.6 Concluding Remarks 107
References 109
Appendix 4A.1: The Available Data Sources and Questionnaires 113
Appendix 4A.2: Data used in the Literature 115

CHAPTER 5
Socio-economic Inequalities in Health: A Review of the French Literature 117
Jean-Michel Etienne, Ali Skalli

5.1 Introduction 118

5.2 Health Measures and Socio-economic Indicators 120
5.2.1 The Measurement of Individuals' Health 120
5.2.2 The Measurement of Socio-economic Status 122
5.3 The Institutional Framework 125
5.3.1 Pensions 125
5.3.2 Unemployment Benefits 127
5.3.3 The Health Care System 128
5.4 Health Expenditures and Access to Health Care 130
5.4.1 The Impact of Socio-economic Status on Health Expenditures 131
5.4.2 The Impact of Health Expenditures on Health 135
5.5 The Association between Health and Socio-economic Status 137
5.5.1 Methodological Issues 138
5.5.2 The French Evidence 141
5.5.3 The Specific Case of the Older Workforce 147
5.6 The Income Inequality Hypothesis 150
5.7 Concluding Remarks 152
References 154
Appendix 5A.1: Selected French Datasets 162
Annex 5A.2: Data used in the French literature on the association between health status and socioeconomic status 166
Annex 5A.3: Data used in the French literature on the association between health spending and socioeconomic status 170

CHAPTER 6
The Case of Greece 173
Stavros Drakopoulos, Athina Economou, Eleni Kli, Agelike Nikolaou, Ioannis Theodossiou

6.1 Introduction 174
6.2 General Methodology 175
6.2.1 Health Status Indicators 175
6.2.2 SES Indicators 177
6.2.3 Problems Regarding Health Indicators 179
6.2.4 Greek Datasets 180
6.3 The Greek Institutional Setting 181
6.3.1 The Health Care System in Greece 181
6.3.2 Social Insurance in Greece 183
6.3.3 The Retirement System of Greece 185
6.3.4 Hygiene and Safety at Work 186
6.4 Empirical Findings 187
6.4.1 Methodological Shortcomings 188
6.4.2 Mortality and SES 188

6.4.3 Physical Health and SES 189
6.4.4 Mental Health and SES 191
6.4.5 Mediating Pathways in the SES–Health Relationship 191
6.4.6 Health Status and Health Care Provision in Greece 192
6.5 Conclusions 193
References 194

CHAPTER 7
The Case of the Netherlands 199
Inge Groot, Arjan Heyma

7.1 Introduction 200
7.2 The Dutch Institutional Setting 200
7.2.1 The Dutch Health Care System 200
7.2.2 The Dutch Social Security System 205
7.3 The Relation Between Socio-economic Status and Health 208
7.3.1 Nature and Extent of Socio-economic Health Differences 208
7.3.2 Socio-economic Health Differences for the Elderly 211
7.3.3 Explaining the Differences 214
7.4 Relation Between Health and Labour Participation 223
7.4.1 Nature and Extent of the Relation Between Health and Labour Participation 223
7.4.2 Explaining the Relationship Between Health and Labour Participation 223
7.5 Conclusions 226
References 230
Table 7A.1 Available data sources 235
Table 7A.2 Literature review 236

CHAPTER 8
Poverty, Unemployment and Health: Evidence from the United Kingdom 245
David Cooper, W. David McCausland, Ioannis Theodossiou

8.1 Introduction 246
8.2 UK Institutional Setting 248
8.2.1 Health Care Provision for the Aged 249
8.2.2 Social Security System in the UK 249
8.2.3 The UK Pension System at Present 250
8.2.4 The UK Unemployment Benefits System 252
8.3 Health in a Social Context 256

8.3.1 Psychological Health and the Social Environment 256
8.3.2 Health Defined 257
8.3.3 Measures of Health 258
8.4 Socio-economic Status Defined 260
8.4.1 Measures of Socio-economic Status 260
8.5 The Relationship between SES and Health 262
8.5.1 Introduction 262
8.5.2 Socio-economic Status and Health Inequalities 263
8.5.3 Inequalities, Immortality and Morbidity Explained 265
8.6 Relationship Between Health and Labour Market Activity 268
8.6.1 Introduction 268
8.6.2 Health and Labour Market Activity for Older Individuals 269
8.6.3 Health Factors in the Older Workforce and the Elderly 269
8.6.4 Health and the Older Work Force 270
8.6.5 Health Factors and the Old and Retired Population 274
8.7 Methodological Issues 276
8.8 Conclusions 277
References 279
Appendix 8A.1 UK Data Sources 284

CHAPTER 1

Are the Healthier Wealthier or the Wealthier Healthier? The European Evidence

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1.1 Introduction

This book reviews the literature on the association between socio-economic status (SES hereafter) and health status (HS hereafter) with special emphasis on the older labour force for a number of European Union countries – namely, Denmark, Finland, France, Greece, the Netherlands and the UK. The main focus of the review is to gather existing empirical evidence on (i) the relationship between income inequality or poverty and physical or mental health, (ii) the relationship between individual socio-economic status indicators, including income and occupational status, and the individual health status, and (iii) the interrelationship between SES, physical and mental health and labour market participation. In particular, this review focuses on the evidence regarding the older workforce – that is, the 50 to 65 age group and, when possible, its implications in terms of retirement behaviour.

This review sheds light on those aspects that can reasonably be thought of as being important components of the association between SES and HS but have, nevertheless, not been researched in some of the European countries. For instance, despite the concern with the ageing population in Europe, the repercussions of early exit from the labour market in light of the SES–HS nexus have not been examined in all countries. If such knowledge gaps do exist, then one also has to address the question of whether this is due to data limitations, methodological difficulties or simply to a lack of interest.

The starting point is a discussion of the reasons why the relationship between HS and SES is so important to quantify. It is then shown that there is no real consensus among researchers on the mechanisms underlying it. Rather, what the literature shows is that the relationship between HS and SES is so complex that it raises important methodological difficulties which we discuss in detail. In the subsequent sections important studies are summarised and their findings contrasted and discussed.

1.2 Why is it Important to Investigate the Relationship Between HS and SES?

Economic inequalities are a common characteristic of market economies (Atkinson *et al.,* 1995; Atkinson, 1996). As such, their sources as well as their consequences are of major concern not only to academia but also to policy makers. Identification of the sources of inequality is more than a requirement if correction mechanisms are to be designed in order to

reduce economic inequalities. Indeed, while the theoretical debate is on whether or not redistributive mechanisms are likely to reduce market efficiency, policy makers seem to agree upon the idea that redistribution should compensate at least for differences in initial endowments, that is, in inequality factors which are out of the individuals' control (Piketty, 1997). To illustrate this point, suppose that part of the population is endowed with poor health due to either genetic factors or because of a poor early childhood environment. It is very likely that the performance in the labour market of this part of the population will be less successful than of healthy individuals and, hence, their level of earnings and wealth accumulation over the lifetime will be lower (Kaestner and Corman, 1995; Currie and Hyson, 1999; Smith, 1999). Thus, health endowments could influence one's socio-economic status. This means that one way of reducing economic inequalities could be, for instance, a policy aiming at equalising access to health care. Indeed, policy makers could target economic inequalities *per se* but they could also aim at reducing health inequalities which, in turn, would increase the earnings power of the poorer section of the population. However, the design of a combined but also well-balanced policy is possible only if the association between health and socio-economic inequalities is well understood.

From an economic point of view, inequality is not necessarily bad. Some inequality in outcomes might provide individuals with incentives to perform better. In contrast, inequality in opportunities may result in persistent inequalities in outcomes. As such, this might have remarkable economic and social implications. First, the required redistribution mechanisms could turn out to be very costly (Bourguignon, 1999). Second, most of the time, inequality in opportunities is considered to be an indicator of social progress, that is, of how the outcome of economic growth is shared among the members of the society (Atkinson *et al.*, 2001). Third, it might have serious repercussions on the social environment in terms of crime level, educational inequality and, more generally, individuals' well-being in society (Waildman and Andrew, 2001; Frey and Stutzer, 2002). Indeed, suppose that part of the population suffers from poor socio-economic status either due to the absence of adequate wealth or poor earnings power in the labour market. Individuals from this part of the population are most likely to adopt risky behaviour such as smoking, alcohol consumption or a sedentary life-style. They are also most likely to be less aware of the importance of hygiene or preventive health care (Ruhm and Black, 2002). Moreover, depending on the institutional framework of the health care system, they might have limited access to health care or have access to only low quality care. This suggests that socio-economic status may influence one's health status. It also implies

that one way of reducing health inequality could consist, for example, in designing redistributive mechanisms to reduce economic inequality. This connection between health inequality and economic inequalities, in turn, implies that any policy aiming at reducing the former should also affect the latter.

Furthermore, governments intervene specifically in the health sector either directly through the provision of funding, or indirectly through regulation, and the policies underlying such intervention must balance efficiency concerns with equity, a conflict which, in turn, has serious implications for the performance of the health sector. On the one hand, the importance of the health sector is such that any wasteful use of resources can be a serious burden on the public sector and the economy as a whole (European Competitiveness Report, 2004, Chapter 3). On the other hand, health has a significant role in determining economic growth via its impact on labour productivity (Bloom *et al.*, 2004).

However, the health sector also affects the competitiveness of the overall economy. This influence may occur via two channels. The first is the effect of tax rates and insurance contributions on labour costs. The second is the effect of taxation and national and/or occupational insurance schemes on job mobility and hence on labour market flexibility. This highlights the role of institutions. For instance, problems of supplier induced demand are very likely to result in over-consumption of health care services and, hence, in unnecessarily high increases of labour costs relative to the health-related increases in productivity. Likewise, job mobility is likely to depend on the method of health care funding. Workers' propensity to move jobs is certainly related to their fear of losing insurance coverage or of facing higher insurance prices or lower benefits (Holtz-Eakin, 1994; Gruber, 1998).

A further reason why the policy implications of the association between SES and HS should be investigated is the issue of ageing. Any improvement of the health of the adult population increases the size of the population and hence influences the dependency ratio (Bloom *et al.*, 2004). However, whether this influence is positive or negative depends on the part of the adult population that mainly experiences the improvements in health. Indeed, the dependency ratio will decrease only if health improvements result in an increase of the available labour force. In contrast, if the improvements in health are mainly experienced by those adults who have past retirement age due, for instance, to an increase in life expectancy, this may actually cause the dependency ratio to rise. This is clearly relevant given the current trends towards an ageing population in Europe. A relatively stable or even declining workforce in

most EU member states has to finance the health care for increasing numbers of elderly citizens. The increase in the numbers of retired people also creates an increasing burden on the countries' pension systems, since fewer workers are contributing per retirees claiming. It is, therefore, important to identify the determinants of labour market participation behaviour of the older workforce. Economic theory suggests that socio-economic status is one of these determinants, but there is also evidence that health is one of the main factors that affect the choice of retirement date (McGarry, 2002; see also Mein *et al.*, 2000).

One important implication of all this is that if both the health and labour market participation decisions of the older workforce are severely affected by poor socio-economic conditions, then higher economic inequalities may turn out to require a substantial increase in public expenditure on the older workforce. Furthermore, not only does early retirement imply a lower financial contribution from these individuals to the social security system, but it is also the case that a low health status, together with a poor socio-economic status, might result in an increase of transfer income that must be distributed to such individuals, which, in turn, affects the cost of welfare provision. The size of the impact of the socio-economic and occupational differences in health is therefore crucial, not only for the understanding of the development of age-related diseases and disability, but also for how these may be avoided by controlling contributory socio-economic factors. There is, indeed, clear evidence that in many countries, health care expenditures on the elderly are now growing much faster than GDP (Fuchs, 1998). Needless to say, such policies might require changes to the level of targeted spending and the volume of protective legislation.

Because of the dynamic nature of the association between HS and SES, its importance is very likely to be age-specific. Therefore, its implications for the older workforce cannot be inferred from general analyses, but rather from studies that specifically focus on the older workforce. First, it might simply be the case that only after a reasonably long working career do the health consequences of a poor socio-economic status become really disabling (Budetti *et al.,* 2001). Second, there are cohort effects in the sense that the current health status of the older workforce, as compared to that of younger individuals, is the outcome of decisions that have been made in a different economic and institutional environment (Deaton and Paxson, 2001). Third, neither the health nor the socio-economic status of children is the outcome of their own decisions or behaviour. In contrast, as individuals become older, they make decisions which condition their health as well as their socio-economic status (Smith, 1999; Venti and Wise, 2002). Consequently, both early childhood

factors, which are out of individuals' control, and the sequential decision process they have adopted throughout their life-cycle determine individuals' health and socio-economic status at the later stages of working life (Smith, 1999; Grossman, 1972).

1.3 The Received Wisdom on Health Inequalities[1]

Evidence on socio-economic differences in mortality can be traced back to the eighteenth century. But empirical research in this area shows that such inequalities are still very high nowadays (e.g. Couffinhal *et al.*, 2005). This justifies the large body of literature aiming at identifying the main determinants of socio-economic inequalities in health. Historically, the origin of socio-economic inequalities in health was attributed to individuals' living conditions and habits. Only in the twentieth century have researchers considered the role of working conditions and access to health care, all these factors being potential explanations of why the poor are endowed with poorer health than the rest of the population. In the early eighties, however, the publication of the Black report (Black *et al.*, 1982) cast doubt on this 'absolute poverty' model (Wilkinson, 1986). Not only did social inequality in mortality not decrease in Great Britain between 1931 and 1981, but it even increased, despite the improvement of general living conditions as well as working conditions and despite the establishment in 1948 of the National Health Service, which offered British citizens equal access to health care. In addition, socio-economic inequalities in health do not reduce to simple health differentials between the poor and the wealthy or between manual and non-manual workers. There is, indeed, a real social gradient in health which cannot be solely explained by material living conditions, the risk of death being continuously decreasing along the social hierarchy.

One of the hypotheses favoured in the Black report is that of selection: inequalities in mortality are not due to the effect of socio-economic status on health, but are rather due to the effect of health on socio-economic status and social mobility. A number of studies, however, have shown that only a limited part of the inequality in mortality is explained by such an effect. For instance, Fox and Goldblatt (1986) as well as Marmot (1986) have shown that differences in mortality are of the same magnitude whether one considers individuals' occupation at their time of death or the one they held many years prior to death. Actually, the de-

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[1] Most of the material in this section is from Couffinhal *et al.* (2005).

bate among researchers is not clear yet: While there is agreement that health status has an effect on the probability of withdrawal from the labour market, the results regarding the effect of health on wages are still mixed (Currie and Madrian, 1999).

The lack of clear environmental explanations of why there are health status differences across social classes has induced researchers to consider behavioural explanations instead. Studies of the European Working Group on Socio-Economic Inequalities in Health (Mackenbach *et al.*, 1997; Kunst *et al.* 2000) have shown that while EU member countries differ in the extent of socio-economic inequality in mortality, the latter also increases with the social gradient in life-styles (alcohol consumption, smoking, dietary habits, sedentary life-style, etc.). However, the conclusions of the Whitehall study (Marmot, 1986) instead cast doubt on the importance of these behavioural explanations. Indeed, it shows that health status differences between British civil servants remain after a number of life-style factors are controlled for. Likewise, in a later study by Marmot (2000), only one third of the variance in mortality due to coronary diseases has been shown to be attributable to smoking, cholesterol, blood pressure, sedentary life-styles and height.

Interestingly enough, a number of researchers have explored the idea that the effects of environmental and/or behavioural factors cumulate over one's life-cycle. Only by accounting for these cumulative effects would one be able to explain both health and socio-economic statuses (Blane, 1999). In this view, the causes of health differences at adult age should be searched for in individuals' early childhood environment. Health during childhood has important consequences for individuals' working careers (Wadsworth, 1986). Likewise, the living conditions of children, or even the intra-uterine environment, have important consequences for their health at adult age (Smith, 1999; Wadsworth, 1999).

It is probably the failure of the dominant model to produce convincing explanations of the social gradient in health that led a number of social epidemiologists to engage in a different research path, exploring the so-called social determinants of health (Marmot and Wilkinson, 1999; Berkman and Kawachi, 2000). The idea is that it is not the absolute level of living which matters for individuals' health, but rather the relative level. To be more specific, feelings of hierarchical domination, loss of autonomy, etc. are important sources of stress and mental bad-being. Generalisation of this hypothesis implies that, depending on how societies are socially structured, lack of social cohesion might induce psycho-social stress which, in turn, has important consequences on mental health, cardio-vascular diseases and, more generally, on the sensitivity of individuals to illnesses.

A remarkable feature of the literature on the association between health and socio-economic status is that since the publication of the Black report, relatively little attention has been paid to the health system as a potential determinant of socio-economic inequalities in health. One explanation for this is the almost common belief that health care has little impact on the health of the population. In general, such a belief is based on McKeon's (1979) historical observation that the causes of death, which diminished the most during the 18th and 19th centuries are exactly those for which no medical progress has been made. However, a number of authors have observed that although the health systems offer theoretically equal access to health care, there remain real social differences in care use. If such differences do subsist, then they might affect the socio-economic inequalities in health. Even residual differences are likely to have much larger effects in a context of technological and medical progress than the larger differences which prevailed when medical practice was modestly efficient (Wilkinson, 1986). In addition, the consequences of social differences in care use are likely to be aggravated if the wealthier benefit more from technical progress than the poorer (Deaton, 2002).

Thus, despite researchers' efforts to explore a large variety of potential determinants of socio-economic inequalities in health, none of the proposed explanations has been powerful enough, or gained unanimity. Similar to physicists before Newton who, although they knew that apples fall, did not know the reasons why, we do know that there is a strong association between HS and SES, but not really how to explain the mechanisms of this association. We are aware that such an association is very complex but we do not really know how to account for its complexity. As the next section will show, the latter issue raises enormous methodological difficulties which researchers have to tackle.

1.4 Problems with the Analysis of the Association Between HS and SES

A number of difficulties arise when analysing the relationship between individuals' health and their socio-economic characteristics. First, there is the measurement issue; namely, the search for the best way to capture the variety of dimensions of health and of socio-economic status. Second, due to the complex nature of the relationship between SES and HS, what is the best way to econometrically investigate the effect of SES on health?

1.4.1 The Measurement Issue

Health Indicators

According to Blaxter (1989), measures of morbidity should reflect the existence of well-defined diseases, either physical or mental, functional limitations such as the disability to perform ordinary life tasks, and self-assessment of health status. The subsequent review of the literature for the six European countries involved in the SOCIOLD project shows that self-reported health is rather widely used. Although self-reported health has the advantage of being significantly correlated with mortality, even when other objective health indicators are controlled for (Goodman, 1996; van Doorslaer *et al.*, 1997; Vistnes, 1997), a number of authors have argued that it may be endogenous to individual labour market outcomes (Bound, 1990; Waidmann *et al.*, 1995). Others have also shown that relative deprivation, due to income inequality, may induce individuals to report lower health status (see Mellor and Milyo, 2000, for a discussion).

An alternative to self-assessed health is the use of objective information on diseases. Such information could be exploited in different ways. In some cases, individuals simply report the set of illnesses they suffered from and that medical doctors have diagnosed. Examples of studies relying on this type of information are Wu (2001), Smith (1999), Currie *et al.* (2003) and Glied and Lleras-Muney (2003). Alternatively, the available information on morbidity is utilised by medical professionals for construction of an appropriate index. Vital risk and disability risk are constructed in this way. Vital risk measures the extent to which individuals' health status is likely to affect their life expectancy. Disability risk reflects the extent to which individuals' ability to function is affected by their health status. Taken together, vital risk and disability risk allow prediction of the so-called relative ageing index which is inferred from comparing individuals' morbid age to actual age.

Instead of relying on morbidity measures, a number of studies are based on mortality data and use estimates of life expectancy. However, some authors argue that due to advances in medical technology, there is the possibility that some individuals show a high life expectancy even if their health status is poor (Verbrugge, 1984; Riley, 1991). This is probably why a number of life expectancy measures have recently integrated some assessment of quality of life (Bossuyt and Van Oyen, 2001). One such measure is the so-called disability-free life expectancy where a distinction is made between years lived with no activity limitation and years of activity limitation.

The Measurement of Socio-economic Status

Socio-economic status is commonly thought of as the rank order position of individuals in the social distribution of economic endowments. However, which variable is the best measure of individuals' economic endowments is unfortunately a question with no easily forthcoming answer. For example, Smith and Kington (1997) argue that "income in a single year may not adequately measure the financial resources available to an individual over the lifetime in which decisions affecting health are made" (p. 157). Perhaps more importantly, the use of income raises the issue of reverse causality. Ross and Wu (1996), for instance, highlight the difficulty of identifying a clear causal relationship between health and income. They argue that deterioration in the health status is likely to result in lower income which, in turn, might lead to a worsening of health status. These arguments have led several authors to argue that wealth is a better measure of economic capacity than income (McDonough *et al.*, 1997; Feinstein, 1993; Smith, 1999). Feinstein (1993) suggests that "the problem of reverse causality is less likely to afflict household wealth than household income measures, primarily because wealth accumulates over time and hence is less affected by a single episode of sickness" (p. 285). Yet, as noted by Feinstein (1993) himself and others (Smith, 1999; Levy, 2000), very serious negative health shocks could result in a decline in wealth.

In addition, there is a variety of other aspects of socio-economic status which should also be considered. Educated individuals may be expected to have better health, as they are able to take more informed decisions compared to their less educated counterparts. Unfortunately, reverse causality is still an issue since bad health status during one's childhood is likely to negatively influence educational investments, which might result in lower investments in health. In fact, all alternative indicators of SES are correlated with income or education and, as such, suffer from similar limitations and specific analytical difficulties. Examples of such correlates are occupation and employment status. As argued by Nelson (1994), measures of socio-economic status that rely on the occupational status are likely to be biased, reflecting the gender and race segregation component of occupational distributions. Likewise, Chenu (2002) notes that the employment status allows one to capture neither the situation of individuals who earn very high incomes from other sources than their own labour, nor that of individuals whose social status is so precarious that they are durably stuck out of employment.

Further specific problems arise when one focuses on the older workforce or, more generally, on the elderly. In general, the distribution of educational attainments is much less dispersed within this group of indi-

viduals than for the rest of the population. In addition, the relatively high number of retirees means that occupations and employment status are no longer relevant indicators of the socio-economic status for these individuals. Furthermore, given their position in the life-cycle, the elderly are more likely than younger individuals to own some wealth, which consequently stands out as a much more important component of their resources than income.

1.4.2 Methodological Issues

The above discussion suggests that health and socio-economic status influence one another and, hence, that they are linked by a bi-directional association (Ross and Wu, 1996; Ettner, 1996). This makes the analysis of the association between SES and health much more difficult than one would expect a priori (Bhargava, 1997, 2003). Indeed, to fully understand this association and, hence, to infer policy implications from it, one needs to identify its underlying *causal* effects. This raises methodological difficulties, which can be dealt with only if suitable data are available and if appropriate statistical techniques are used (see, for instance, Adams *et al.,* 2003). In general, three types of views on this issue can be found in the literature. First, there are studies where no specific direction of the association is dominant. These studies typically rely on descriptive statistical tools such as cross-tabulations or factor analysis. The second type of studies emphasises the so-called causation mechanism, that is, the effect of socio-economic status on health. In contrast, studies focussing on the so-called selection mechanism examine the current socio-economic status as the outcome of the health accumulation process. Causality *per se* could, of course, be accounted for by first modelling one of the two possible pathways and then treating the right-hand-side variable as an endogenous variable. This simple econometric tool, however, raises identification problems, which require data that provide suitable instruments and/or allow exploitation of the longitudinal dimension. But, the fact is that the specific causation mechanisms linking health and socio-economic status are far more complex than what this methodology would imply.

First, identification is much more difficult than this due to the existence of confounding mechanisms, that is, economic, institutional and social factors interfering with both sides of the SES–HS association. One example of such confounding factors is individuals' time discounting behaviour, which might affect their socio-economic status via, say, their educational choices, as well as their health status via life-style behaviour

such as smoking and alcohol consumption (Fuchs, 1982; Barsky *et al.*, 1997; Meer *et al.*, 2003). Ideally, one would like to explicitly account for the dynamic nature of the association between HS and SES (see, for instance, Lynch *et al.*, 1997). That is, how long-term patterns of life-style and psychosocial factors may influence adult health.

Second, it is not clear whether the health–socio-economic nexus depends on health status or not. It might, indeed, be the case that the socio-economic status of poor healthed individuals would differ from that of the healthy ones even if the latter had the same bad health status. In this case, one would argue that selectivity mechanisms are at play and, therefore, poor health and good health individuals cannot be treated as a homogeneous group (Illesley, 1985).

Third, the impact of SES on HS might not be a direct one but rather conditional on a number of other factors. One example of such intermediate factors is health expenditures, the amount of which might depend on SES and, at the same time, influence HS (O'Malley *et al.,* 2001; Newhouse, 1994). Another example is that of life-style characteristics (Ruhm and Black, 2000). Indeed, it might be the case that the lower is the SES, the more likely is the adoption of risky behaviour such as smoking and alcohol consumption. Risky behaviour might, in turn, yield a poorer health status.

The complex nature of the bi-causal relationship between health and socio-economic status becomes even more complicated due to the existence of potential non-linearities. The literature shows, indeed, clear evidence that the relationship between health and socio-economic indicators such as income is not linear (Rodgers, 1979; Gravelle, 1998; Wolfson *et al.,* 1999; Mellor and Milyo, 2001). Given that simultaneity, confounding mechanisms and intermediate factors should be accounted for, testing and accounting for the non-linearity hypothesis make the analysis much more difficult to perform.

In addition to these intrinsic difficulties, there are at least two further hurdles in cross-country comparisons. The first one is internationally comparable measurement of socio-economic inequalities in health (van Doorslear *et al.*, 2000).[2] The second one relates to the link between the HS and SES and the institutional environment in which it takes place. There is, for instance, evidence that in some countries, social welfare policies provide a satisfactory explanation of differences in the age pat-

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[2] See also the UK review (Chapter 8) for a discussion of the comparability criteria that health inequality indices must satisfy.

tern of unemployment (DiPrete *et al.*, 1999). One would, therefore, expect these also to have an impact on the labour market participation behaviour of the older workforce. Another example concerns the role of the health insurance system. Indeed, as one could infer from the Dutch review (Chapter 7), the absence of co-payments in the health insurance system of the Netherlands gives rise to no structural socio-economic differences in care access and use. In contrast, co-payments in France induce patients to subscribe to complementary private insurance contracts. However, such decisions are conditional on SES and are significant determinants of health care use.

1.5 Outline of the Book

This section explores how the available European evidence on the SES–health relationship helps in identifying the prevailing knowledge gaps. Therefore, it raises two questions. First, are there any specific results not available in the literature which can be obtained from the subsequent chapters reviewing national evidence? Second, are there any issues considered as important in the literature which are not addressed in the national studies reviewed in respective country specific chapter?

1.5.1 The Association between Socio-economic Status and Health

A large number of studies highlight the existence of a clear association between socio-economic and health status. The review of international studies provided in Chapter 2 shows that such an effect persists irrespective of the way health is measured. Both Bartley and Owen (1996) for the UK and Crossley and Kennedy (2002) for Australia suggest that health significantly influences one's occupational status. Yet, while the former use long standing illness as the health indicator, the latter consider self-assessed health status. The same patterns emerge when considering mortality instead of morbidity measures. For instance, Kunst *et al.* (1998) show that there are socio-economic differences in mortality risks in the eleven European countries they examine.

The national studies show that a higher socio-economic status is associated with better health. However, it is worth mentioning that the various aspects of this association are not equally detailed across countries. In Denmark (Chapter 3), for instance, the main preoccupation is that of a relatively low life expectancy, given the fact that the country is one of

the richest in Europe. Hence, the focus is on socio-economic differences in life expectancy. In Greece (Chapter 6), it appears that the scarcity of appropriate data compels researchers to restrict their analyses to either specific diseases or to narrow aspects of physical health, such as injuries.

A number of descriptive analyses have been conducted in the six European countries covered in the SOCIOLD project. The results suggest that there are strong socio-economic differences in health status. This holds true for all indicators of socio-economic status, namely income, wealth, education, occupation and employment status, and also for all measures of health, that is, for objective morbidity measures, self-assessed health, as well as mortality and life expectancy. Interestingly, the reviewed studies also display two important patterns which are in line with the international literature. First, the social gradient of health inequality is age-dependent. While the differences are rather small for the young and the elderly, they become most significant for middle age groups. Such a pattern is in line with evidence from the United States (Robert and House, 1996). The Dutch (Chapter 7) and Finnish (Chapter 4) reviews, in particular, provide interesting discussions of this issue. Second, there are gender differences in the association between HS and SES. However, it does not emerge from the national reviews that the health state of one gender is systematically more affected by the socio-economic status than that of the other. For instance, while the Danish report (Chapter 3) indicates that the relationship between wealth and admission to a psychiatric hospital or ward is more pronounced for men, the French review (Chapter 5) finds the relationship between physical incapacity and unemployment to be more pronounced for women than for men.

While illustrative as such, the correlations highlighted in descriptive analyses are not informative about the mechanisms underlying the association between HS and SES. On the one hand, one might argue that any change in individuals' economic resources may influence the resources devoted to health accumulation either via the use of health care or the adoption of risky life-style behaviour. This view implies that there is a causation mechanism going from SES to health, possibly through intermediate factors. On the other hand, it is reasonable to assume that healthier people can work longer or harder leading to higher earnings and, hence, higher wealth accumulation power. In this view, based on the so-called selection mechanism, health is seen as a determinant of individuals' economic endowments. However, it might also be the case that some 'third' factors simultaneously determine both health and socio-economic status.

1.5.2 Intermediate Factors Causing Socio-economic Health Differences

There is a large body of literature documenting the social health gradient while assuming that the causal effect is from socio-economic status to health (see Chapter 2 for a detailed review of the international literature). The perhaps most influential investigations in this area of research are the two so-called Whitehall studies which rely on samples of British civil servants and which have been conducted some 20 years apart. Chapter 8 provides a detailed discussion of this issue. Both studies have documented an inverse relationship between employment grade and poor health outcomes, including mortality from a variety of diseases.

As noted by Smith (1999), one possible explanation of the observed impact of socio-economic status on health relies on the effect of psychosocial factors such as work-related stress and social support networks. For instance, the Whitehall studies suggest that monotonous work over which a worker has little control contributes to the development of a coronary heart disease among both males and females. Studies examining the effect of psychosocial factors are documented in the reviews for France (Chapter 5), Greece (Chapter 6), the Netherlands (Chapter 7) and the UK (Chapter 8). However, according to the Dutch report, the evidence seems to be mixed, at least for the elderly. While Broese van Groenou and Deeg (2000) show that controlling for psychosocial factors does not reduce the socio-economic differences in mortality for the Dutch elderly, Stronks *et al.* (1998) find that for the Dutch aged 15 to 74, inequalities in perceived health would decrease by approximately 10–15%, if low socio-economic groups were exposed to stress to the same extent as the highest stratum.

A second possible explanation of the social health gradient relies on the impact of exposures to bad times, especially during childhood or even intra-uterine life. The most important contribution to this area of research is the work by Barker (1997), which shows that health in later life is heavily influenced by the intra-uterine life environment. Apart from one study reviewed in the Dutch report (Chapter 7), which investigates the influence of the socio-economic status of the parents, similar studies do not appear to be available for the other surveyed countries.

A third explanation relies on the idea that the impact of socio-economic status on health is mainly determined by the accumulation of advantages and disadvantages through the life course. This appears to be the implicit hypothesis underlying most of the empirical studies modelling current health as a function of indicators of current socio-economic

status. Models of this type have been estimated for all six countries. Without exception, all studies reveal a strong effect of socio-economic status on health. Whether measured by income (France, UK), education (Denmark, Finland, France, Greece, UK), social mobility (Netherlands), occupation (Finland, France, UK) or employment status (France, UK), a higher socio-economic status positively influences self-assessed health and life expectancy, and negatively impacts morbidity and mortality risks. Perhaps even more interestingly, the effects seem to be robust to the variety of covariates that are controlled for, albeit to a different extent. For instance, although the estimated relationships show strong effects of SES on health for both males and females and for different age groups, in general they are not equally pronounced for all categories.

A fourth explanation has been proposed by Wilkinson (1996). The argument is that it is not the distribution of individual attributes or behaviour that matters, but rather how societies are economically and socially structured. A corollary of this view is that the level of income inequality in a society should have a direct effect on its average health. This view has received empirical support in a number of American studies having obtained a negative correlation between the levels of income inequality in American states and the proportion of their inhabitants reporting good health. Mellor and Melyo (2001) review this literature. However, they also argue that the highlighted correlations are statistical artefacts due to the aggregation of data at the state level. They also show that state-level income inequality measures have no effect on individuals' health. Though provocative, this literature raises a number of methodological problems which are pointed out by Smith (1999). In addition, there is a need for further evidence from other countries concerning the above relationship. Unfortunately, very seldom has this issue been addressed in the reviewed countries. Only van Doorslaer (2001) seems to have provided evidence for a strong positive correlation between income inequality and health inequality in the Netherlands (Chapter 7). Likewise, only one French study (Jusot, 2003) highlights this aspect, reporting a positive correlation between income inequality and mortality.

The difficulty that arises when estimating the causal effect of SES on HS relates to the endogeneity of the former. The usual way to deal with this endogeneity bias is to estimate simultaneous equation models while instrumenting the endogenous variable by use of a variable which could reasonably be excluded from the health equation on theoretical or statistical grounds. In particular, this variable should be correlated with health only via its impact on the socio-economic variable under consideration. While such a strategy is straightforward when health is measured by means of a continuous index, it is difficult to implement when health is

coded as a qualitative indicator, ordered or not. Furthermore, national data sets do not necessarily offer valid instruments that allow researchers to appropriately account for endogeneity. In Chapter 2, a number of studies adopting this approach are documented. Examples are Ettner (1996) and Crossley and Kennedy (2002), which both conclude that OLS estimates are in general downward biased. In contrast, apart from the UK (Chapter 8) and a Danish study (Chapter 3) by Arendt (2002), the instrumental variables approach has not yet been explored in the other SOCIOLD countries.

In the above discussion, three factors have been presented as the main explanations of how socio-economic status influences health: psychosocial, early childhood environment, and life-time factors. However, this list is not exhaustive. The social health gradient could also be explained by poor life-style behaviour or insufficient access to health care.

Life-style behaviour might affect the SES–HS relationship as an intermediate factor if a poor socio-economic status results in psychosocial effects which encourage risky health behaviour such as smoking, alcohol consumption or sedentary life-styles. It might also be the case that low educational achievements result in a lack of awareness of the possible incidence of such behaviour on health. According to the second Whitehall study, the male smoking gradient decreased from 34 per cent to 8 percent when moving from the lowest to the highest employment grade.

A number of studies have explored the effect of socio-economic status on the likelihood of risky behaviour. Examples are Hunt (2002) and Metcalfe *et al.* (2003), which are discussed in Chapter 2. They both report that unhealthy behaviour is more likely to be adopted by individuals in low social strata. However, for health behaviour to be considered as an intermediate factor, it must also have an impact on health. This latter causal effect is taken to hold true despite the mixed evidence. For instance, one of the conclusions of the first Whitehall study was that not much of the health gradient could be explained by poor life-style behaviour. Metcalfe *et al.* (2003) found a clear effect of life-style behaviour on health in the case of men only.

Though not equally covered across the six SOCIOLD countries, the issue of health related behaviour is documented in every national review. The results are mixed, however. For instance, while in Denmark (Chapter 3) a number of studies conducted for the Life Expectancy Commission systematically highlight notable social differences in life-style behaviour, the two Dutch studies (Chapter 7) that address this issue found that controlling for health behaviour did not result in a change in socio-economic differences in mortality.

Access to health care can be seen as an intermediate factor if the two following conditions are met. First, health care use is lower for individuals with a poor socio-economic status, either because they are not aware of its importance or because they have less access to it or have access to low quality health care only. Second, lower use of health care results in relatively poor health. Under these conditions, one could expect that any effort towards equalising access for all to health care should result in a weaker social health gradient.

The international literature suggests that there are socio-economic differences in care utilisation (O'Malley *et al.,* 2001; Newhouse, 1994). However, it must be pointed out that the role of health care as an intermediate factor is very sensitive to institutional characteristics, namely, the design of the national health system as well as the health insurance system. Some examples from the national reports clarify this point.

In Denmark (Chapter 3), one study states that there are rather minor differences between socio-economic or educational groups with respect to contact frequencies with public general practitioners. This seems to be due to access to low-cost or free health services provided by the Danish public health care and hospital system, together with the fact that the Danish earnings distribution is relatively compressed and, hence, the prevalence of poverty is low.

In contrast, in France (Chapter 5), although the coverage rate of the public insurance system is 100%, patients have to contribute partially to the payment of health care expenses either via out-of-pocket money or by subscribing to complementary private insurance contracts. The large body of existing literature in France shows that (i) socio-economic status is a major determinant of the probability of being privately insured, (ii) subscription to a private insurance contract positively influences the use of health care, and (iii) in addition to the influence of private insurance, there is a direct effect on health.

It is worth noting that the effect of health care utilisation on health status is in general taken to hold true. Only one study has questioned this issue (Couffinhal *et al.*, 2002). Interestingly enough, it finds no strong effects of health care utilisation on health.

1.5.3 The Selection Issue

As mentioned earlier, selection refers to a reverse pathway. It refers to the effect of the health status on the socio-economic status. Compared to the causation mechanism, selection has not been the subject of many

studies (see Chapter 2). One example is the work by Wu (2001), which focuses on the effects of exogenous health 'shocks' on income, wealth, and consumption behaviour. He shows that severe health problems affect negatively household wealth and that these effects are larger for women than for men.

Similarly, not all the national studies from the reviewed countries document analyses of this type, and when they do very little evidence is provided. The French chapter, for instance, reviews four studies which show that poor health influences negatively (i) workers' insertion into the labour market, (ii) employment status, (iii) the intensity of job search, and (iv) income.

The issue is how one could assess the relative importance of the causation and the selection mechanism. Adams *et al.* (2003) conducted a Granger causality test using US panel data. The results suggested that there is a causal effect running from SES to mental and chronic illness diseases, but not to mortality or to new appearing physical health conditions. Interestingly, this approach has also been replicated using British and Swedish panel data sets by Adda *et al.* (2003) who obtained similar results. It appears that this is the only European study, as the national review chapters document no other similar analyses.

1.5.4 Socio-economic Status and Health Relationship: The Case of the Older Workforce

Despite the increasing share of older people in the national workforces, only a rather limited number of studies focus specifically on the older workforce. This is unfortunate, as one message from the international review in Chapter 2 is that the available evidence raises challenging questions that are worth exploring. For instance, American as well as British studies suggest that there are limited differences in health due to the occupational status of the older individuals (50 and older). In contrast, the evidence regarding educational differences within the older workforce is mixed. For instance, while van Rossum *et al.* (2000) report strong education-related differences in health, Goldman *et al.* (1995) find an insignificant effect of education. Why would health be so differently sensitive to different socio-economic indicators? Does this reflect a peculiarity of this age group, or are there other specific effects depending on whether or not individuals have withdrawn form the labour market? If the answer to the latter question is positive, then how do health and socio-economic conditions contribute to the retirement decision?

Actually, it is rather difficult to identify the actual effect of socio-economic differences on the health of the older workforce. As pointed out in the Dutch report (Chapter 7), the older workers from a rather homogeneous group in terms of health status since almost everyone is suffering some kind of health problem. In addition, since retirement causes a drop in income, a relatively high proportion of early retirees might also induce some homogeneity in terms of socio-economic status. Furthermore, there is a selectivity effect at force. If the socio-economic status influences the health of older individuals then, as many researchers have observed, the elderly are likely to be healthier than the average individual in the population, since the healthiest survive while individuals with poor socio-economic statuses die younger.

Unfortunately, the national reports from the six SOCIOLD countries reveal that the case of the older workforce has been given very little attention by researchers in Europe. However, the existing evidence does suggest that health inequality among the older workforce has an important socio-economic component. The Dutch report (Chapter 7), for instance, documents several studies focusing on individuals aged 55 and older. One of these studies explores the effect of SES on mortality and highlights socio-economic differences that are more pronounced for men below the age of 65 and for women aged between 65 and 75, compared to the remainder. Another Dutch study found significant influences on the prevalence of cardiovascular diseases for women but not for men. Similar gender related differences are also reported in one of the two studies reviewed in the French report (Chapter5). However, more important is the following result found in one of them; that is the effect of health on the unemployment risk is much weaker for older members of the workforce (52 and older) than for younger ones. In particular, psychosocial dimensions of health have apparently almost no influence on the unemployment risk for the elderly.

1.5.5 Labour Market Participation

If bad health affects labour market participation behaviour negatively, and if the social–health nexus is stronger for older people, then one of the probably most important links between socio-economic status and early retirement behaviour could be clearly established. Therefore the question is: How strong is the effect of health on participation decisions, especially for the older workforce? This issue is addressed in a number of studies. However, such an effect is not easy to evaluate as it might also be the case that participation influences health. For this reason, a num-

ber of authors explore the idea that people out of the labour force are not exposed to work-related psychosocial factors and might, therefore, show better health than working individuals.

Studies examining the pathway from health to participation typically rely on the idea that individuals make a trade-off between the utility of retiring and labour market participation. Utility maximising individuals therefore choose to retire when they expect to be better off out of the labour market. Clearly, the utility in retirement is positively influenced by the retirement package obtainable from welfare provision institutions. Financial incentives are thus seen as the main explanation for labour market participation behaviour. In this view, a low health status encourages early retirement not only by raising the value of leisure time but also by raising the value of non-labour income based on generous health related benefits.

The effect of health on participation has not been investigated in all six SOCIOLD countries. However, the available evidence seems to strongly suggest that either health status or changes in health status influence the retirement decision of the older workforce. For instance, evidence from Finland (Chapter 4) suggests that a low health status affects negatively the probability of ending up with an unemployment pension and/or an old-age pension, but, as one would expect, influences positively the probability of retiring with a disability pension.

It also seems that there are even fewer studies examining the pathway from labour market participation to health. Two interesting Dutch studies (Chapter 7) illustrate how health declines as the number of months worked increase, and how working speeds up the process of health deterioration. Yet, one study from France (Chapter 5) establishes that individuals not participating in the labour market present a higher mortality risk than participants, and that the link between mortality and participation is sensitive also to a variety of individual characteristics such as age, gender, marital status, education and occupational status.

Clearly, although interesting, the evidence discussed above is not sufficient to understand the complex nature of the association between health and participation. Further investigation and methodological research is needed.

1.6 Conclusions

A striking feature of the empirical literature on the association between health and socio-economic conditions is its rapid growth. This reflects the large number of issues to be addressed in this field of economics and the challenges confronting the researchers. Despite the variety of results already accumulated, many questions remain unanswered and many methodological difficulties remain unresolved. So far, it is established that morbidity- and mortality-based measures of health are linked to all dimensions of socio-economic aspects of life through a robust relationship. Some of the intermediate factors that intervene in this relationship have also been identified. However, the debate among researchers is still ongoing on whether health is influenced by individuals' economic endowments *per se* or by how (un)equally they are distributed to the members of the society. In addition, it is difficult to discriminate between the causation and the selection view of this association. The investigators are still puzzled by the importance of so-called confounding factors that might simultaneously influence both sides of the association between HS and SES. These knowledge gaps are particularly wide regarding the older workforce, as the available evidence focusing on this labour force segment is very limited. This is unfortunate since western countries are in need of policy recommendations to face the challenge of ageing.

Thus, an important question is whether the evidence available in the six countries reviewed in this volume fills some of these knowledge gaps. In view of the information presented in the subsequent chapters, the answer is that while the research has improved the understanding of the relationship between HS and SES, there are many topics which are still not well researched. On the one hand, only a sub-set of the topics that are typically covered in the international literature are not well researched in the reviewed countries and, thus, are missing in the national studies. This implies that further research is required in these European countries, at least. On the other hand, specific topics are covered in detail in the countries involved. For instance, the Danish evidence shows that a high standard of living and relatively low income inequality do not imply lower mortality rates. The British experience suggests that widening access to health care does not necessarily result in a reduction of the social gradient of health inequalities. These examples and others suggest that the role of institutions must be clearly evaluated. The reviewed countries have different unemployment benefits, pensions and public health systems, and the results reported in each chapter must be read in view of the institutional framework from which they emerged.

While the role of institutions could be a fruitful area of research in itself, a number of knowledge gaps remain to be filled. Only in France and in the Netherlands has the relationship between income inequality and health been investigated. In addition, in most of the reviewed countries, analyses of the specific case of the older workforce and of the association between health and labour market participation simply do not exist. More generally, issues like causality and endogeneity are very seldom addressed. Probably, beside a number of methodological difficulties, the most important reason for these limitations is the lack of appropriate data. Clearly, analysing properly the relationship between health and socio-economic status requires panel or longitudinal data with a sufficient number of time-observations. This might be helpful for a better understanding of the dynamic nature of the health accumulation process and its relation with the socio-economic status. It could also help in addressing the causality issue, or simply in eliminating part of unobserved individual heterogeneity.

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CHAPTER 2

International Studies on the SES–Health Relationship

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2.1 Introduction

An interesting area of applied research in health economics is the investigation of socio-economic status (SES) inequalities in health. Research on this issue "… concerns the interaction between a health production function and a health demand function and has been a highly distinctive research area within health economics" (Culyer and Newhouse, 2003, p. 5). Economists have recognised that inequalities in the access to health care is not enough to account for the inequalities in the health of the populations (Pincus *et al.*, 1998). Social, economic, and labour market characteristics and life-style behaviours can also explain a great deal of disparities in health. The study of the determinants of individual health status can provide significant guidance to policy makers concerning the policies aiming at eliminating health inequalities (Evans and Stoddart, 1990; Adler *et al.*, 1993).

The objective of this literature survey is to provide a critical review of the available evidence regarding the relationship between the various socio-economic, occupational and health status indicators. It summarises the existing theoretical and empirical findings, the indicators applied and the methodological problems encountered in empirical research. This way, the study aims at identifying knowledge gaps, opportunities for future research and guidelines for policy interventions.

Emphasis is given to the studies dealing with the older workforce, that is, individuals between 50 and 65 years of age. To the knowledge of the authors such studies are limited in the literature. However, the problem of the ageing workforce elevates the importance of the SES–health relation, since it is possible that specific SES characteristics might affect in different ways the health status of the older workers in comparison to the younger members of the workforce. For example, unemployment may have more harmful effects on the health of the older workers compared to their younger counterparts, since unemployed among the older age groups face more restrictions on their re-employment opportunities.

The structure of the chapter is as follows. Section 2.2 summarises the indicators applied and the methodological shortcomings encountered in the literature. Section 2.3 reviews the basic theoretical and empirical findings and, finally, Section 2.4 concludes.

2.2 General Methodology

2.2.1 Health Status Indicators

In this section, the different dimensions of individual health status that have been the focus of interest in the existing studies are presented and discussed. Health status is a multi-dimensional concept and the issue of its approximation gives rise to debates among researchers. Perhaps the most accurate definition of health state is the one given by the World Health Organisation, namely "health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". In empirical research, health status indicators reflect the existence or absence of well-defined diseases (either physical or mental), functional limitations such as the ability to perform ordinary life tasks and self-assessments of health status (SAHS). Along with mortality levels, these are the four dimensions of health usually met in applied research. Table 2.1 presents the health status approximations that are frequently used in the literature:

Table 2.1 Health status indicators

Mortality	➢ Overall mortality rates ➢ Cause-specific mortality rates ➢ Age-specific mortality rates ➢ Potential years of life lost (PYLL) ➢ Index of dissimilarity (ID) ➢ Standardised mortality ratios
Physical health	➢ Self-rated overall health ➢ Fair/poor self-rated health ➢ Physical functioning (activities of daily living) ➢ Ill health status ➢ Specific medical indications (e.g. malaise symptoms, stroke) ➢ Obesity ➢ Disability status
Mental health	➢ Cognitive functioning (e.g. difficulties in remembering things) ➢ Psychological morbidity symptoms (e.g. stress, depression, and anxiety)
Health-related behaviours	➢ Smoking ➢ Consumption of alcohol ➢ Physical activity ➢ Dietary habits ➢ Preventive medicine (e.g. routine check-ups)

Mortality Indicators

Mortality is a dimension that has frequently been the subject of scientific research, mainly because it is considered to be an objective measure of population health. Furthermore, this is due to the relative availability of data in comparison to the remaining health status dimensions. Many authors measure mortality in terms of mortality rates of the population[1], by age groups[2] or by causes of death.[3] Mortality by causes of death (for example, deaths from malignant neoplasms, cardiovascular diseases, pneumonia, chronic liver diseases, motor vehicle accidents, suicide, homicide, and infant mortality) is usually applied in order to be able to examine whether or not SES affects the preventable causes of death (Ruhm, 2000).

Other studies have used mortality ratios adjusted for certain psychological symptoms, for example perceived control (Bosma *et al.*, 1999). Standardised mortality ratios are frequently met in the literature (Kunst *et al.*, 1998). The World Health Organisation (WHO) gives an enlightening definition of standardised mortality ratios: "the number of deaths in a given year as a percentage of those expected (expected is defined as standard mortality of the reference period, adjusted for age and sex)".

The number of Potential Years of Life Lost (PYLL) is an indicator of premature mortality that is often met in the literature (Wagstaff *et al.*, 1991). The most common definition of PYLL is "the number of years of life "lost" when a person dies "prematurely" from any cause – before age 75" (Canada Statistics). However, slight differences regarding the upper limit that one considers as a premature age of death are observed in applied research. Researchers should take into account the observed growth in life expectancy when regarding the adoption of an upper age limit (Or, 2000).

Physical Health Status Indicators

Physical health status is measured in many ways, depending on the approximations of physical health and the availability of public sources (Duncan *et al.*, 2002). The most common methods are the measurement

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1 Goldman *et al.*, 1995; Ruhm, 2000; Sacker *et al.*, 2000; Duncan *et al.*, 2002; Mellor and Milyo, 2003.

2 Martelin 1994; Van Rossum *et al.*, 2000.

3 Ruhm, 2000; Kivimäki *et al.*, 2002.

of self-rated overall health[4], self-reports on fair/poor or ill health status[5], malaise symptoms[6], existence of limiting longstanding illness[7] or specific medical conditions (namely diabetes, heart conditions, strokes, cancers, diastolic blood pressure, forced expiratory syndrome per second, plasma cholesterol concentration and serum total cholesterol concentration, ischaemia and angina), obesity (based on body mass index scores), disability status and functional status limitations[8]. Lynch *et al.* (1997) used as indicator of health status an index of 'reduced physical functioning' based on self-reported scores on the activities of daily living (such as cooking, shopping), the independent activities of daily living (such as managing money), and the physical performance scale (developed by Nagi in 1976). Hospital admissions during the past period and absence from school or work have also been utilised to approximate individual health (Kuh and Wadsworth, 1993).

The health utility index (HUI), developed at McMaster University, is a complex health status indicator of overall functional status, but it has the advantage of accommodating eight domains: vision, hearing, speech, ambulation, dexterity, emotion, cognition, and pain (Humphries and van Doorslaer, 2000). The HUI assigns a single numerical value, between 0 (perfect health) and 1, for all possible combination scores on these domains.

Mental Health Status Indicators

The effects on mental health of individual SES characteristics have been long ago recognised by the non-economics and the psychology literature (Jahoda, 1982). Only recently, the economics literature started to focus on the SES effects on psychological health status. Warr (1987) emphasised the multi-dimensional character of mental health state and presented five major components: (i) *Affective well-being* in which two dimensions are identified, namely 'pleasure' and 'arousal'. The overall 'degree' of a specific effect (e.g. full of energy, cheerful, happy, relaxed, fatigued, depressed, tensed,

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4 Blakely *et al.*, 2000; Grundy and Holt, 2000.

5 Kuh and Wadsworth, 1993; Gerdtham and Johannesson, 1999; Wagstaff *et al.*, 2001; Blakely *et al.*, 2000; Mellor and Milyo, 2003.

6 Ecob and Davey Smith, 1999; Hunt, 2002.

7 Bartley and Owen, 1996; Ecob and Davey Smith, 1999.

8 Kuh and Wadsworth, 1993; Goldman *et al.*, 1995; Smith and Kington, 1997; Wamala *et al.*, 1997; Grundy and Holt, 2000; Van Rossum *et al.*, 2000; Everson *et al.*, 2002; Kivimäki *et al.*, 2002; Metcalfe *et al.*, 2003; Wu, 2003.

afraid, etc.) is derived by the combining the scores reported in both dimensions; (ii) *Competence* involving individual psychological equipments that help in dealing with pressures met in different spheres of life (e.g. personal life, employment, etc.). Empirical studies often relate this feature to people's ability to cope with their problems, cognitive skills, etc. (Warr, 1987); (iii) *Autonomy* "… involves a combination of moderate levels of independence from, and interdependence with, other people" (Warr, 1987, p. 39). As Warr (1987) argues many studies link this specific aspect of mental health with individual internal locus of control. The latter is related to individual beliefs that future outcomes are the results of own actions and not due to lack, fate or other external factors; (iv) *Aspiration* which is related to individual motives, goals and efforts to achieve these goals; and (v) *Integrated functioning* to which Warr (1987) refers as a multi-dimensional feature related to individual mental health as a whole, merging from the interrelations between the previously mentioned mental health components.

Indeed, researchers consider such measures, like locus of control, orientation towards the future and copying styles, as significant personality characteristics (Bosma *et al.*, 1999). Another interesting indicator, not frequently encountered in research, is health-related locus of control, namely the degree to which the respondents think they control their own health (Ferrie *et al.*, 1995). Widely used determinants in applied research are symptoms of stress, depression and anxiety (Everson *et al.*, 2002; Metcalfe *et al.*, 2003), which sometimes are reported in relation to specific facets of life, such as job-related stress and depression or job satisfaction (Griffin *et al.*, 2002; Kivimäki *et al.*, 2002; Metcalfe *et al.*, 2003; Wamala *et al.*, 1997). Other studies utilise more integrated measures of mental health. Theodossiou (1998) approximated overall psychological well-being with six different measures of mental distress: strain, able to enjoy day-to-day activities, able to face up with problems, confidence, thinking of being a worthless person, and happiness. Cognitive functioning (e.g. self-reported difficulties in remembering things and forgetting the position of things, paying attention, finding the right words), psychological functioning (in terms of depression, hostility and optimism) and social functioning (frequency of social contacts per month) are also met in the literature (Lynch *et al.*, 1997; Wamala *et al.*, 1997).

Health-related Behaviours

Health-related and life-style measures are frequently encountered in applied research.[9] The complexity related to their use is derived by the fact

[9] Ferrie *et al.*, 1995; Wamala *et al.*, 1997; Ruhm, 2000; Hunt, 2002; Metcalfe *et al.*, 2003.

that they act as confounders on the SES–health relation (namely, confounders are both associated with the observed independent variable and are actually causing the outcome). Smoking and consumption of alcohol, physical activity at work and/or leisure, height-adjusted weight and obesity, dietary habits (namely, the consumption of fruits and vegetables, grams of fat consumed daily), routine check-ups (like mammogram and pap smear for women and digital rectal exam for men) and reproductive history (e.g. early menarche, high parity, early menopause) are measures frequently encountered in empirical research. When treated as control variables, the majority of them have repetitively been found to have a strong effect on various aspects of health status. For example, the positive relationship between mortality and alcohol consumption has been emphasised in many studies (Vogel, 2002; White *et al.*, 2002). But the literature also indicates that they are related to SES characteristics as well, e.g. unemployment state may cause an increase in smoking and alcohol consumption.

2.2.2 SES Indicators

"In general, measures of socio-economic status are meant to provide information about an individual's access to social and economic resources" (Duncan *et al.*, 2002, p. 5). Several SES indicators are utilised in the empirical research of SES inequalities in health. The economic components of SES, especially wealth, seem to have the biggest explanatory power on the observed health inequalities (Duncan *et al.*, 2002).

Income

Perhaps the most commonly used SES indicators are different approximations of income[10], such as:

- *Personal or median income of the members of the household.*
- *Income quintiles/quartiles:* frequently applied in order to control for the relative economic position of an individual or a household and to catch any possible non-linearities in the income–health relationship.
- *Equivalised household income:* defined as the household income adjusted for differences in family size, with the use of an appropriate equivalence scale, so that the incomes of one family are com-

[10] Goldman *et al.*, 1995; Ecob and Davey Smith, 1999; Blakely *et al.*, 2000; Grundy and Holt, 2000; Ruhm, 2000; Van Rossum *et al.*, 2000; Crossley and Kennedy, 2002; Duncan *et al.*, 2002.

parable with the incomes of another family of different size (Ecob and Davey Smith, 1999).

- *'Income/needs' ratio:* is an indicator of economic hardship, usually approximated by objective measurement, namely the relation between household income and a certain official poverty threshold level (Duncan *et al.*, 2002; Goldman *et al.*, 1995; Lynch *et al.*, 1997). Financial hardship can also be approximated by subjective self-reports on the lack of money to cover necessary material needs (Kuh and Wadsworth, 1993).
- *Wealth*: income is the flow of resources from a job, transfer programmes, or some other sources. On the other hand, wealth is defined as the stock of assets of economic resources that an individual or a household possesses at a given point in time. Since the economic status of individuals and households depends upon both income and wealth, income *per se* is considered as an imperfect measure by many researchers and wealth is suggested to be included also in the econometric analysis (Duncan *et al.*, 2002; Smith and Kington, 1997; Wu, 2003).

As Duncan *et al.* (2002) have highlighted, a problem frequently encountered by researchers is the difficulty to disentangle health selection and social causation mechanisms; that is, whether income causes a direct effect on health or, at the same time, health causes an effect on income. This is the reason why longitudinal surveys are most helpful in assessing the relationships of interest, since they can facilitate the monitoring of changes in SES over time.

Several researchers[11] have employed supplementary approximations that reveal individual economic position or are indicative of individual standard of living:

- Private health insurance.
- Out-of-pocket medical expenses.
- Private school.
- Housing tenure.
- Housing equipment/amenities (such as the existence of running hot water, sole use of bathroom or kitchen, etc.).
- Domestic crowding (number of people per room).

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[11] Kuh and Wadsworth, 1993; Martelin, 1994; Goldman *et al.*, 1995; Theodossiou, 1998; Ecob and Davey Smith, 1999; Wagstaff *et al.*, 2001; Wu, 2003.

Income Inequality Measures

Income inequality indicators (such as the Gini coefficient and the Robin Hood Index) are widely applied in the literature although they constitute a matter of debate among researchers regarding their effect on health (Blakely *et al.*, 2002; Kennedy *et al.*, 1996). Wagstaff *et al.* (1991) reviewed the six measures of inequality that have been used to date in the literature on inequalities in health:

- The range
- The Lorenz curve and the associated Gini coefficient [12]
- The pseudo-Lorenz curve
- The index of dissimilarity (ID)
- The slope index of inequality (β)
- The concentration curve and the associated health concentration index

From all these six measures, Wagstaff *et al.* (1991) concluded that only the slope index of inequality and the concentration index meet the "minimal requirements of an inequality measure" (p. 550), namely they take into account the SES effects on health inequalities, the experiences of the whole population and they are sensitive to changes between different SES groups of individuals.

Occupational Status Indicators

Individual occupational status is a significant determinant of the observed inequalities in health. Occupation constitutes an income resource for the individual, defines partly its social status and it is also an indicator of the mental and physical hazards the employees can face in their working environments (Duncan *et al.*, 2002). It covers a wide range of indicators that can be roughly categorised as follows:

- *Individual labour force status:* individual position in the workforce, namely whether the person is employed, unemployed or out of the labour force. Numerous studies have used as indicators the rates of employment, unemployment, and economic inactivity of

[12] The Lorenz curve was developed by Max O. Lorenz as a graphical representation of income inequality. It can be used to measure inequality of other distributions as well. In this case, the researchers use the health Lorenz Curve.

their sample.[13] Special emphasis is given by researchers to indicators expressing unemployment since its effect on health continuously draws the interest of researchers. For example, Grundy and Holt (2000) utilise the proportion of working life spent unemployed; and Wu (2003) controlled for forced retirement due to poor health in order to examine the reverse causation between SES and health.

- *Individual occupational class:* frequently categorised between manual and non-manual classes, white-collars and the remainders, employment grade (Ferrie *et al.*, 1995), etc. Individual occupation is considered by many researchers as indicative of social class (Grundy and Holt, 2000). Others control for the last or the current occupation[14], for paternal occupation in an attempt to capture the dynamic aspect of the relation[15], or for spousal occupational class (Martelin, 1994).
- *Job characteristics:* researchers often employ specific work-related features in order to assess their impact upon health. Such indicators are employment experiences, job strain, job-related decision latitude, work demands (e.g. degree of responsibility at work, task difficulty and mental load) and job control (decision authority and skill discretion).[16] Metcalfe *et al.* (2003) estimated the health effects of job stability based on the job change frequency since the entry of the respondent in the labour force. Another interesting indicator that was proposed by Kivimäki *et al.* (2002) is the 'effort-reward imbalance' indicator expressing both effort at work (pace at work, physical and mental load) and on rewards (satisfaction with income, fairness of supervision, job security, and promotion prospects).

In general, occupational status indicators should be treated with caution, because they are subject to reverse causation problems in which poor health leads to declines in occupational status (Duncan *et al.*, 2002).

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[13] Bartley and Owen, 1996; Theodossiou, 1998; Ruhm, 2000; Blakely *et al.*, 2002; Hunt, 2002.

[14] Wamala *et al.*, 1997; Sacker *et al.*, 2000; Van Rossum *et al.*, 2000; Crossley and Kennedy, 2002; Duncan *et al.*, 2002; Metcalfe *et al.*, 2003.

[15] Kuh and Wadsworth, 1993; Bosma *et al.*, 1999; Metcalfe *et al.*, 2003.

[16] Griffin *et al.*, 2002; Kivimäki *et al.*, 2002; Wamala *et al.*, 1997.

Educational Level Indicators

Educational level indicators act also as confounders on the SES–health relationship. Education can influence health indirectly through the operation of the economic and occupational status of individuals. In detail, education constitutes an investment in human capital (Becker, 1962; Mincer, 1958) and determines returns to education, namely individual earnings and, to a certain extent, the work conditions. Yet, education is expected to have an independent effect on individual health through its effects on life-style and health-related choices, since better-educated individuals adopt healthier life-styles (Duncan *et al.*, 2002). In addition, it is argued that higher education lowers rates-of-time discount and increases self-efficacy (a concept describing the individual's control over his/her own behaviour) (Fuchs, 2004).

The most often used indicator is the level of educational attainment[17] based on the answers of the respondents or on official public data, and the parental education (Kuh and Wadsworth, 1993). In addition, Wamala *et al.* (1997) used Hollingshead's (1975) index of social position, an aggregated sum of educational and occupational measures.

However, since education is typically completed in early adulthood, it captures neither differential on-the-job training and other career investments during adulthood, nor the changeability of individual economic status during adulthood (Duncan *et al.*, 2002), which has recently been shown to have adverse implications for health (McDonough *et al.*, 1997).

Demographic Indicators

The demographic indicators controlled for in the existing literature are also used in order to minimise confounding and mediating effects. The demographic indicators that are used most often (usually in the form of dummy variables) are age[18], gender[19], ethnicity (usually classified as black, white and Hispanic)[20], marital status (e.g. married, divorced single, etc. or the time spent in one of these categories)[21], number of dependent chil-

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17 Smith and Kington, 1997; Wamala *et al.*, 1997; Ruhm, 2000; Van Rossum *et al.*, 2000; Duncan *et al.*, 2002.

18 Theodossiou, 1998; Grundy and Holt, 2000; Ruhm, 2000; Metcalfe *et al.*, 2003.

19 Theodossiou, 1998; Blakely *et al.*, 2002; Crossley and Kennedy, 2002.

20 Theodossiou, 1998; Ruhm, 2000; Blakely *et al.*, 2002.

21 Smith and Kington, 1997; Grundy and Holt, 2000; Hunt, 2002.

dren (Theodossiou, 1998), the number and health of close family members (Smith and Kington, 1997), region of residence based on its prosperity (Grundy and Holt, 2000) or level of urbanisation (Bosma *et al.*, 1999), and the Gender Role Orientation measure (based on Bem, 1981), which assigns to the individual personality characteristics that are considered to belong culturally exclusively to one of the genders (Hunt, 2002).

Their effect on health state is consistently supported by empirical evidence. For example, Collins and Coltrane (1992) argue that marital status is an important confounder in the SES–health relationship because it can be predicted by socio-economic status. Gardner and Oswald (2002) claim that marriage has a protective effect on individual health status, due to its anti-stress behaviour. Furthermore, marriage can motivate individuals towards the adoption of healthier life-styles in comparison to single individuals, and it can also facilitate the provision of better health care from the spouse in time of illness. However, marriage can be accompanied with increased home duties and children responsibilities that can hamper one's health. In order to test for this effect, Björkstén and Talbäck (2001) controlled in their analysis for the 'workload index at home'.

2.2.3 Problems in the Analysis of the SES–Health Relationship

In health economics empirical research, one encounters various problems when investigating the relationship of interest. The basic problems are:

- *Measurement issues:* a debate among researchers has aroused regarding the appropriate indicator to capture the multi-dimensional character of health.
- *Econometric specifications:* the complex nature of the SES–health relationship raises the question of utilising an appropriate econometric modelling. Latent econometric modelling is applied in most studies. However, four interrelated issues intervene and complicate this procedure:
  - ✓ *Causality:* several studies focus on establishing a causal effect of SES upon health. However, due to the complex relationship, establishing a causality is far more complex than utilising a simple regression model.
  - ✓ *Selection:* selection arises when the sample is selected by some non-random mechanism, for example, do individuals in lower SES groups exhibit worse health state or do they suffer from pre-existing impaired health?

- ✓ *Endogeneity:* the existence of a simultaneous bi-directional relationship, namely the effect of health upon individual SES, complicates the econometric procedures and necessitates the use of advanced econometric tools.
- ✓ *Dynamic nature:* The SES–health relationship is not a static one. Economic disadvantages can accumulate over the life course and affect future health state. At the same time, health impairments during early stages in life can prevent future accumulation of wealth. The endogeneity problem can be addressed with data exploiting the longitudinal dimension of the relationship that may reveal both the direction of the relationship and the multiple mediating pathways that operate on it.

Measurement Issues

Some researchers concentrate more on the methodological problems concerning the determination of SES, occupational and health status indicators and the effectiveness of each of the different measures applied in the health inequalities literature. Sacker *et al.* (2000) argued that differences in mortality inequalities exist between the two genders, but the size of these differences depends on the measure of social inequality used.

Many studies have actually highlighted the methodological problems that can arise due to individual self-assessment of health (Ward *et al.*, 2002). Humphries and van Doorslaer (2000) documented that income-related health inequality is likely to be greater when measured by self-assessed ill health than when measured by the 'l-health utility index'. Since the latter is considered as being a more objective index, the overall conclusion is that subjective measures tend to overestimate 'true' inequality (p. 667).

The variation of responses on the self-rated health of different socio-economic groups is a problem underlined by researchers (Blakely *et al.*, 2002). It is argued that less advantaged social groups might have lower health expectations and this can bias the findings (Grundy and Holt, 2000). Crossley and Kennedy (2002) examined the reliability of SAHS based on the pattern of responses of different SES and age groups and the possible changes in these responses after repeated questioning. They argued that differences in SAHS do exist across different SES and age groups. Specifically, older people had generally poorer SAHS and a higher propensity to change their responses in comparison to the remaining younger age groups.

Furthermore, the order of responses on self-reported health might differ across populations and sub-populations invalidating comparisons (Lindeboom and van Doorslaer, 2004). Indeed, the use of different threshold

levels by individuals can lead to biased answers, even when their 'objective' level of health is the same. As the authors underline age, sex, education, language and personal experience of illness contribute to this problem. They examine two different types of 'reporting heterogeneity': (i) the cut-point shift based on which individual responses affect health status thresholds resulting in a change of the relative positions of the health status thresholds among individuals, and (ii) the index shift according to which individual responses lead to a parallel shift of health status thresholds leaving unaltered the relative position of each individual. Their study provided evidence for the existence of both types of heterogeneity for the sub-groups stratified by age and gender, whereas no evidence was found for sub-groups based on income, education and language.

Econometric Specifications

In empirical analyses, there is an extensive use of survey-based data, where the dependent qualitative variable, namely health status, is a categorical variable. Thus, in most such cases, the standard linear regression model is not applicable. Yet, linear regression is applied when the health indicator of interest is a continuous variable such as mortality levels or morbidity indexes (Hunt, 2002; Metcalfe *et al.*, 2003). The empirical models involve an inherently unobservable latent concept, the individual health status, which is assumed to be continuous but is approximated by binary or multinomial indicators. The models utilised for econometric investigation are the logit[22]and probit[23] models. Cox event-history regression models are often applied in order to relate socio-economic status with mortality (Duncan *et al.*, 2002). Statistical analysis of time failure data is used in the health literature to estimate the determinants of the time which elapses before a health related event occurs.[24]

The association between SES and health status has been the focus of interest in many studies, and a large discussion was dedicated to the causal mechanisms in this relationship. The terms 'causal' and 'selection' effects or mechanisms are met in studies. Adams *et al.* (2003) state that "links from SES to health innovations are termed causal mechanisms, while links from health to SES are termed selection or reverse causation mechanisms.

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[22] Kuh and Wadsworth, 1993; Ferrie *et al.*, 1995; Goldman *et al.*, 1995; Wamala *et al.*, 1997; Theodossiou, 1998; Bosma *et al.*, 1999; Ecob and Davey Smith, 1999; Blakely *et al.*, 2000; Blakely *et al.*, 2002; Griffin *et al.*, 2002; Metcalfe *et al.*, 2003.

[23] Mellor and Milyo, 2003; Wu, 2003; Buckley *et al.*, 2004.

[24] Lynch *et al.*, 1997; Bosma *et al.*, 1999; Sacker *et al.*, 2000; van Rossum *et al.*, 2000; Duncan *et al.*, 2002; Kivimäki *et al.*, 2002.

Apparent associations due to measurement errors, such as overstatement of the SES of the healthy or under-detection of illnesses among the poor, are called artefactual mechanisms" (p. 6).

Studies address the selection–causation problem by examining the presence or absence of a particular aggregate pattern of health status (Lynch *et al.*, 1997). Goldman (1994) argues that this technique is flawed, since the researchers cannot disentangle all the possible resulting patterns of health status due to selection. Fuchs (2004) proposes repetition of the analysis with disaggregated data in order to test the underlying mechanisms in the SES–health relationship.

Econometric theory suggests that the appropriate way to investigate the causal relationship between the variables of interest is to use the instrumental variables approach. Ettner (1996) applied an instrumental variable model, where income was instrumented with variables (namely, the state unemployment rate, work experience, and both own and spousal educational level) that are assumed to be correlated with income but not correlated with the health status indicators controlled for in the study. However, the apparent weakness of the instruments used invalidates the findings. Another approach applied is Granger's methodology to test for the causal effect of SES on health status and vice versa (Adams *et al.*, 2003; Adda *et al.*, 2003). Yet, Granger causality is not a test for causality *per se*. It is rather a test of the precedence of one variable from another variable of interest. On the other hand, Hausman (2003) argues that structural modelling estimation is more appropriate in order to infer causality. The endogeneity of the relationship between SES and health status is not adequately covered by the existing literature, to our knowledge. Nevertheless, the literature findings support the existence of a bi-directional association between SES and health status (Bartley and Owen, 1996; Lindeboom and Kerkhofs, 2002; Wu, 2003).

In survey-based data, a problem encountered most often by applied researchers is the sample selection bias caused by the truncation of the sample, since there may be systematic differences between the characteristics of the individuals who responded and those who did not respond to the questions of interest. Heckman's full information maximum likelihood method is often used to control for selection effects. Thus, for example, Andrén and Palmer (2001) used this approach to investigate the relationship of past history of health status and earnings while controlling for the endogeneity of employment status.

The examination of the impact of SES characteristics on health inequalities encounters a lot of complexities arising from the multidimensional nature of the relationship. The relation between low socioeconomic status and poor health is well established but until recently, the

existing studies have failed to capture the dynamic aspect of this relationship (Lynch *et al.*, 1997). The limitation of cross-sectional studies is that they do not account for the ways that long-term patterns of life-style and psychosocial factors may influence adult health. Bartley *et al.* (1997) argue that a life-course approach is a pre-requisite in order to understand socio-economic inequalities in health. They state that "this is needed in order to take into account the complex ways in which biological risk interacts with economic, social, and psychological factors in the development of chronic disease" (p. 1).

The dynamic impact of SES on health can be captured by the inclusion in the model of past values of the SES indicators (Blakely *et al.*, 2000). However, one should consider the appropriate number of lagged values of SES indicators that are to be included in the model, in order to have reliable results. The role of life-course factors on variations in health status is better demonstrated with the use of panel data, which combine the cross-sectional and the longitudinal information from the sample and allow the researchers to detect the course of socio-economic conditions of a sample of individuals through time (Grundy and Holt, 2000; Ruhm, 2000).

Questionnaires

Table 2.2 exhibits some of the questions often included in survey questionnaires. Questions on malaise symptoms, prevalent diseases and functional limitations are widely applied in empirical research (Ecob and Davey Smith, 1999; Goldman *et al.*, 1995; Grundy and Holt, 2000; Lynch *et al.*, 1997; Smith and Kington, 1997). However, the self-assessed health status (SAHS) question is the one most often met in the literature.[25] The responses are scored on a five-point Likert scale from 1='excellent' up to 5='poor'. The SAHS question is also met with an additional age benchmark (Crossley and Kennedy, 2002): "Compared to people of your own age, would you say that your health over the last 12 months has on the whole been excellent, good, fair, poor or very poor?" Other studies (Ferrie *et al.*, 1995; Bosma *et al.*, 1999) include controls for a less commonly encountered psychological aspect, namely locus of control. In the study of Bosma *et al.* (1999), locus of control is measured with an eleven-item Dutch version of Rotter's locus of control scale. Statements as the following were used: "I often feel a victim of circumstances". The answers

[25] Gerdtham and Johannesson, 1999; Humphries and Van Doorslaer, 2000; Crossley and Kennedy, 2002.

range from 1='strongly disagree' to 5='strongly agree' and afterwards the scores are summed up.

Researchers often use health status related questions not for the derivation of a health indicator but to distinguish the sample between 'healthy' and 'non-healthy' individuals in order to avoid health selection effects (Duncan *et al.*, 2002).

Table 2.2 Questions met in the SES–health literature

AUTHORS	QUESTIONS
Crossley, F. and Kennedy, S. (2002).	i) "In general, would you say that your health is: Excellent? Very good? Good? Fair/ poor?" (Australian National Health Survey, Australian Bureau of Statistics). ii) Short Form 36 Health Status Questionnaire (in Ware *et al.*, 1993).
Duncan *et al.* (2002).	"Do you have any possible or nervous conditions that limit the type of work or the amount of work that you can do?"
Ecob, R. and Davey Smith, G. (1999).	i) "Within the last month have you suffered from any problems with difficulty sleeping, trouble with eyes, nerves, always feeling tired, difficulty concentrating?" ii) "How often do you feel that you are under so much strain that your health is likely to suffer?" iii) "How often do you feel bored?" iv) "How often do you feel lonely?" v) "Do you have any long-standing illness, disability or infirmity? Does it limit your activities in any way compared with people of your own age?" (Health and Lifestyle Survey Questionnaire, England and Wales).
Gerdtham, U.-G. and Johannesson, M. (1999).	i) Rating scale question: The respondents were asked to mark with an arrow the point they felt that illustrated their current health status on a vertical scale with labeled anchors of "death" (0) and "full health" (100). ii) Time trade-off question: "Imagine that you get to know that you have 20 years left to live. In connection with this, you are also told that you can choose to live these 20 years in your current health state, or that you can choose to give up some life years to instead live for a shorter period in full health. Indicate with a cross on the line below the number of years in full health that you think is of equal value to 20 years in your current health state".
Goldman, N., *et al.* (1995).	i) SAHS question. ii) Presence of functional limitations: receiving assistance with ADLs; limitations with ADLs, but receiving no assistance; work-related limitations but no ADLs; disability free. iii) Existence of specific medical conditions (ever or during the past year): heart attack, stroke, hypertension, diabetes, etc. (Longitudinal Study of Aging, USA).
Griffin, J.M., *et al.* (2002).	i) "At home, I feel I have control over what happens in most situations": "disagree strongly, disagree moderately, disagree slightly, agree slightly, agree moderately, agree strongly". ii) Stress at work questionnaire based on Job Content Questionnaire (Karasek *et al.*, 1985). iii) "Have you recently: Been thinking of yourself as a worthless person? Felt that life is entirely hopeless? Felt that life isn't worth living? Found at times you couldn't do anything because your nerves were too bad?"

	iv) “Have you recently: Lost much sleep over worry? Felt constantly under strain? Been getting scared or panicky for no good reason? Found everything getting on top of you? Been feeling nervous and strung up all the time?”
Grundy, E. and Holt, G. (2000).	i) “Over the last 12 months would you say that on the whole your health has been: good; fairly good; or not good?” (British General Household Survey) ii) Questions on 13 domains of disability (ONS Disability Surveys)
Kivimäki, M., *et al.* (2002).	Example questions: i) “How mentally straining do you consider your work?” ii) “Do you learn new things in your work?” iii) “How great is the strain due to haste in your work?” iv) “If changes or reorganization take place at your workplace, how great is the risk of getting laid off?” (Questionnaire from the Research Institute of Physical Culture and Health, Finland).
Lynch, J.W., *et al.* (1997).	Prevalent diseases: Whether the respondents currently had or ever had heart trouble, chest pain, hypertension, stroke, breathing difficulties, chronic bronchitis, diabetes, asthma, arthritis, back pain, cancer.
Metcalfe, C., *et al.* (2003).	Job satisfaction: i) “How do you feel about your present job?” Occupational stability: ii) “How many times have you changed your job since leaving school? iii) “When did you last change your job?”
Ruhm, C.J. (2000).	Exercise question: “During the past month, did you participate in any physical activities or exercises (other than your regular job duties) such as running, calisthenics, golf, gardening, or walking for exercise?” (Behavioral Risk Factor Surveillance System, Center for Disease Control and Prevention, USA).
Smith, J.P. and Kington, R. (1997).	“How difficult is it for you to: Walk across a room? Dress, including putting on shoes and socks? Bathe or shower? Eat? Get in and out of bed? Use a toilet? Walk several blocks? Climb a flight of stairs? Pull or push large objects like a living room chair? Lift or carry weights over 10 pounds, like a heavy bag of groceries? Pick up a dome of a table?” (Asset and Health Dynamics among the Oldest Old, USA)
Theodossiou I. (1998).	i) “Have you recently felt constantly under constrain?” ii) “Have you recently been loosing confidence in yourself”? iii) “Have you recently been thinking of yourself as a worthless person?” iv) “Have you recently been able to enjoy your normal day-to-day activities?” v) “Have you been able to face up with problems?” vi) “Have you recently been feeling reasonably happy, all things considered?”
Wamala, S.P., *et al.* (1997).	i) “What is your current occupation? If no longer employed, state your previous job”. ii) Dietary habits assessed from a 88-food item frequency questionnaire: “Have you ever dieted in your life time? If so, how many times?” (Willet *et al.*, 1995).
Wu, S. (2003).	i) SAHS question. ii) Since (Wave 1 interview date) have you or your husband/wife/partner used up any of your investments or savings to pay for expenses, not counting any money or assets you have given away to your children or others?” (Health and Retirement Study, USA)

Available Datasets

Socio-economic and occupational effects on health inequalities have been for a long time now in the centre of the research interest of many scientific fields, mostly in medical and epidemiological sciences. In some developed countries, there is a sufficient amount of data and national surveys are performed in regular time periods. However, these countries constitute the exception since, for most countries, research in this field constitutes a challenge mainly because of the data scarcity observed. The basic databases utilised in the literature are presented below. The list below clearly shows that one of the reasons why applied research has flourished mainly in the USA and the UK, is the fact that data sources are plentiful in these countries and offer the opportunity for constructive research. Therefore, a challenge researchers frequently encounter is the limited availability of appropriate data, which hampers the progress of research.

- **International Organisations**
  - ✓ *World Health Organisation (WHO):* its database comprises data for 191 countries regarding financial and health-related information. However, the reliability and comparability of data between different countries is an issue that should be taken into consideration when databases with macro-level data at the country level are utilised (Kunst *et al.*, 1998).
- **USA**
  - ✓ *Current Population Survey:* it is a large monthly survey covering all US states. A wide variety of SES data are collected, whereas information on SAHS started being collected in 1995 (Blakely *et al.*, 2000, 2002).
  - ✓ *United States Bureau of the Census:* a national big data source that contains data on fatalities (Vital Statistics of the United States) and on demographic and educational variables of the population (Statistical Abstract of the United States).
  - ✓ *Centers for Disease Control and Prevention:* it performs the Behavioral Risk Factor Surveillance System and collects information on lifestyle factors and preventive medical care for repeated cross-sections of individuals (Mellor and Milyo, 2003; Ruhm, 2000).
  - ✓ *Alamenta County Study:* it is a survey conducted in California in four stages (1965, 1974, 1983, 1994). This study contains information on income and various health and functioning indicators for a representative sample of adults (Lynch *et al.*, 1997).

- ✓ *Panel Study of Income Dynamics:* it is an ongoing longitudinal study of a representative sample of individuals and households and follows up mortality, educational, occupational, and incomes characteristics of the respondents.
- ✓ *Asset and Health Dynamics Survey:* a longitudinal study collecting information on health, economic status (wealth and income), and demographic structure (the number and health of close family members) indicators.
- ✓ *Health and Retirement Study:* a panel of approximately 7,000 households with detailed information on health status, retirement decisions, wealth, work history, family composition, and health insurance (Wu, 2003).
- ✓ *Longitudinal Study of Aging:* another survey conducted in the USA, with the sample aging over 70 years. The study contains valuable information regarding the social environment, economic resources, health status, mortality, disability, and morbidity of the respondents (Goldman *et al.*, 1995).

- **Australia**
  - ✓ *National Health Survey:* it is conducted by the Australian Bureau of Statistics and the sample includes approximately 23,800 households (Crossley and Kennedy, 2002; Humphries and van Doorslaer, 2000).

- **UK**
  - ✓ *British Household Panel Study:* follow-up ongoing micro level study. It is part of the European Community Household Panel (ECHP), which observes a representative sample of individuals and their households and includes sufficient information on their health status (physical and mental) and on occupational, educational and SES characteristics. The dynamic character of the survey gives the opportunity to researchers to capture the accumulated effect of socio-economic inequalities on health status (Theodossiou, 1998).

- **Netherlands**
  - ✓ *Rotterdam Study:* a prospective cohort study that covers a sample of 7,983 persons aged over 55, living in one defined geographic area in Rotterdam (Van Rossum *et al.*, 2000).
  - ✓ *GLOBE study:* a postal survey that was conducted in 1991 with a sample of 18,973 individuals aged 15 to 74 (Bosma *et al.*, 1999).

- **Sweden**
  - ✓ *Stockholm Female Coronary Risk Study:* it surveys a representative sample of the population and gathers information on the psychosocial and biological risk factors that might be linked to the risk of coronary heart disease for female respondents (Wamala *et al.*, 1997).

In addition, Greek data are included in a number of international data sets. This, the World Health Organisation offers a free database (The European Health for All Database (http://www.euro.who.int/hfadb) containing a variety of health-related information on more than fifty European countries. Under the National Organisations subtitle the World Bankprovides the Health, Nutrition, and Population Statistics database which constitutes a continuously updated source of data on health, nutrition and population indicators for a wide range of countries from 1960 onwards (http://devdata.worldbank.org/hnpstats). Eurostat provides the European Community Household Panel (ECHP) survey which is a longitudinal panel survey that starts in 1994 and covers a wide range of topics related to income, health, demographic and occupational characteristics, etc. for a representative sample of households and individuals in 15 European countries.

2.3 International Studies on the SES–Health Relationship

2.3.1 Theoretical Background

Grossman (1972) was the first to construct a model on the demand for health *per se* buildt on the theoretical framework of the human capital theory (Becker, 1962). He views health as a stock of durable capital that produces an output of 'healthy time' which is treated as: (i) a *consumption commodity*, which enters directly the individual's utility function, and (ii) an *investment*, which determines the total amount of time that the individual can spend in producing labour income, commodities and be engaged in non-market activities. Based on Grossman's approach, individuals do not demand medical services *per se*, but 'good health'. Therefore, the demand for medical services should be investigated after deriving the individual's demand for health *per se*.

Grossman's initial hypothesis was that the initial stock of health depreciates over time with an exogenous rate (δ_i) and it can increase with investment in health. Thus, the length of life is an endogenous variable;

namely, death occurs when the stock of health reaches a certain minimum. The intertemporal utility function of a typical consumer is:

$$U = U(\phi_0 H_0, ..., \phi_n H_n, Z_0, ..., Z_n) \quad (1)$$

where H_0 is the inherited stock of health, H_i (i = 1,…,n) is the stock of health in the i^{th} period, φ_i is the service flow per unit of health stock, $h_i=\varphi_i H_i$ is total consumption of medical services and Z_i (i = 1,…,n) is the consumption of another commodity besides health in the i^{th} period. The constraints of the net investment in the stock of health capital (2), the gross investment in the health household production function (3), and the gross investment in other commodities household production function (4) are:

$$\Delta H = H_{i+1} - H_i = I_i - \delta_i H_i \quad (2)$$

$$I_i = I_i(M_i, TH_i; E_i) \quad (3)$$

$$Z_i = Z_i(X_i, T_i; E_i) \quad (4)$$

where I_i is gross investment in health capital, δ_i is the depreciation rate for the i^{th} period (assumed to be exogenous), M_i is medical care, X_i are inputs in the production of the commodity Z_i, TH_i and T_i are time inputs for producing health and other commodities respectively, and E_i is the stock of human capital, which is assumed to increase the efficiency of the inputs in the production of health capital. Although Grossman treats medical care as the most important input in the production of gross investment in health capital, he also recognises the importance of other inputs (such as housing, diet, smoking, alcohol consumption, and other life-style behaviours).

The budget constraint (5) in Grossman's model equates the present value of outlays on goods to the sum of the present value of discounted income earnings and the initial assets:

$$\sum_{i=0}^{n} \frac{P_i M_i + V_i X_i}{(1+r)^i} = \sum_{i=0}^{n} \frac{W_i TW_i}{(1+r)^i} + A_0 \quad (5)$$

where P_i and V_i are the prices of medical care (M_i) and the goods input (X_i), W_i is the wage rate, TW_i are hours of work, A_0 are the discounted initial assets and r is the interest rate. The time constraint (6) implies that the total amount of time for any i^{th} period (Ω) is allocated between the hours worked (TW_i), the time spent ill (TL_i), the time spent for gross investment in health (TH_i), and the time spent for the production of the other commodities Z_i (T_i):

$$TW_i + TL_i + TH_i + T_i = \Omega \quad (6)$$

Grossman's predictions are often investigated in both theoretical and empirical research. At the theoretical level, most researchers built their models on Grossman's theoretical framework. A prediction of Grossman's model is that if the rate of depreciation is increasing with age, after some stage of the life-time, as age increases the demand for health would decline. Furthermore, under the assumption of an inelastic curve of the marginal efficiency of the health capital schedule, expenditures on medical services rise with age. Ehrlich and Chuma (1990) extended Grossman's model and showed that the demand for health is derived in conjunction with the demand for longevity and the related individual consumption plan. They predict that "…individuals with higher endowed wealth and health will seek a higher compensating premium for participating in activities detrimental to health" (p. 775). However, the formulation of individual health capital is not solely a function of individual investments. It depends also on health investments made at the household level (Jacobson, 2000). Moreover, theoretical predictions indicate that individual members of families who are divorced or in conflict, exhibit lower health state in comparison to the rest (Bolin *et al.*, 2002).

An increase in the wage leads to an increase in both the health capital stock and the demand for medical services (Grossman, 1972). In line with the above, Dustmann and Windmeijer (2000) constructed a life-cycle model for the demand for health, and argued that the intertemporal wage profile matters for the formulation of individual health capital. In detail, individuals substitute time devoted in health enhancing activities for time in labour market activities during high-wage periods of the life-cycle. The model predicts that individuals with a higher intertemporal wage profile are those with higher health capital, even if they temporarily experience low wages. Leung *et al.* (2004) argue that as the wage gap between the two genders narrows, those mostly disadvantaged in terms of health are women due to the substitution of time for health enhancing activities with time for work.

Higher levels of education are associated with greater demand for health capital, provided that better educated individuals are more efficient producers of health (Grossman, 1972). Lastly, under the hypothesis that educated people are more efficient producers of health, the more educated the individual is, the bigger is the optimal stock of health capital that he or she would demand. Basov (2002), argues that education affects the demand for health only in the case of individuals with poor initial health. Based on a life-cycle model of human capital accumulation she argues that when individual health is high enough, the investment in education is independent of health. In contrast, for low levels of health,

investment in education is positively related with health. As the author underlines, the basic drawback of her model is that it does not allow for ageing. Finally, Contoyannis and Jones (2004) argue that unobserved characteristics underpin the role of life-style factors in the SES–health relationship. Economists have tried to confront the above theoretical findings with empirical evidence. In the following sub-section, the empirical literature findings are presented.

2.3.2 Empirical Evidence

The association between SES and health has been the subject of interest in numerous studies (Lynch *et al.*, 1997; Mackenbach 1994, 1995). The relation between the various SES indicators and individual health is well established in a cross-section framework (Wamala *et al.*, 1997; Duncan *et al.*, 2002). Many researchers have mentioned the 'dose-response relationship', namely that individuals belonging to the highest levels of SES report the best health, those at the next level are experiencing slightly worse health and so on (Everson, *et al.*, 2002). However, the longitudinal nature of the relationship constitutes a challenge for applied researchers mainly due to limited availability of data for a reliable time period.

Most of the literature findings confirm the existence of a strong SES–health relationship independently of age (Lynch *et al.*, 1997; van Rossum *et al.*, 2000). To our knowledge, the majority of the existing studies do not address the issue of the older workforce. However, the ageing of the population and the constantly increasing share of older people in the national workforces, as well as the consequent economic implications increasingly lead researchers to focus on this specific age group (Grundy and Holt, 2000).

Mortality and SES

Several authors have addressed the question whether or not SES differences affect mortality levels, and the evidence is quite consistent (Goldman *et al.*, 1995; Gardner and Oswald, 2002). Van Rossum *et al.* (2000) found that men in the highest SES had a 5-year survival probability of 93%, while this probability was 84% for their counterparts in the lowest SES.[26] These findings are in line with Martelin (1994), who argues that

[26] Men of the highest SES were defined in this study as 65-year-old professionals with an academic degree and equivalent household income in the highest quintile, whereas men of the lowest SES as 65-year-old, with primary education and equivalent household income in the lowest quintile.

the SES mortality differences between the 'privileged' and the 'underprivileged, group[27] are up to 4 or 5 years in the life expectancy of those aged 60, and 2 or 3 years at the age of 75 for both sexes. In addition, social environment indicators (e.g. frequency of contacts with friends, social events, living arrangements, etc.) were found to have an impact upon mortality while the effects of marital status is not clear-cut (Goldman *et al.*, 1995). On the contrary, Gardner and Oswald (2002) argue that marriage has a stronger positive effect on the length of life than a high income.

The evidence at the macroeconomic level is rather controversial. Economic growth, approximated by per capita GDP, has been found to affect mortality levels both in a positive (Hitiris and Posnett, 1992) and in a negative direction (Or, 2000). In addition, evidence indicates that economic recessions, approximated by state unemployment rates, are accompanied by an improvement in the health of the population in the USA (Ruhm, 2000). A number of studies have centred on the comparison of SES and occupational inequalities in health between different countries. Mortality differentials by occupational class among men were detected in a cross-comparison study of eleven European countries (Kunst *et al.*, 1998).[28] Indeed, it seems that white-collar workers are in advantage in comparison to workers in lower occupational classes (Or, 2000).

The literature findings highlight the existence of gender differentials in the SES–mortality relationship. In particular, it has been found that income and occupational status affect more the mortality level of men than of women (van Rossum *et al.*, 2000). Indeed, it seems that women's health is affected more by factors outside the working sector, such as low income and large family size (Duncan *et al.*, 2002). In line with the above, Sacker *et al.* (2000) found that social position measures based on occupational position had greater explanatory power on the health of men, while measures based on individual life-style outside the workplace had a stronger impact on the health of women.

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[27] The 'privileged group' consists of those with higher education, with occupation as upper white-collar employees, the highest income and good housing, whereas the 'underprivileged group' comprises the unskilled workers, with basic education, lowest income and poor housing conditions.

[28] Denmark, England and Wales, France, Finland, Ireland, Italy, Norway, Portugal, Spain, Sweden, and Switzerland.

Physical Health and SES

Various studies have documented the SES and physical health status association. Grundy and Holt (2000) confirm the negative effects of low SES on SAHS and on disability status. Blakely *et al.* (2002) provided additional evidence on the negative relation of economic inequality and SAHS in a state-level study in the USA. Applied research has also analysed repeatedly the SES effects upon obesity, since the latter is reported to be a risk factor for cardiovascular and other physical diseases, as well as for psychosocial problems. Indeed, studies indicate that dietary habits and psychosocial factors (like job strain, social support, self-esteem, etc.) explain 53% of the low SES–obesity association (Wamala *et al.*, 1997). Other studies confirm the existence of a SES gradient based on education upon obesity and SAHS (Everson *et al.*, 2002; Buckley *et al.*, 2004). However, it is argued that income has the greatest explanatory power in ill health inequalities, since it accounts for 60% of inequality in ill health, followed by the effects of housing status inequality (14%) and respondent's education (6%) (Wagstaff *et al.*, 2001). The relationship between income and the different health measures is almost linear, except in the case of very high and low incomes where diminishing returns of health are reported (Ecob and Davey Smith, 1999).

There is also evidence that occupational status (indicated by manual vs. non-manual jobs) affects physical health (Metcalfe *et al.*, 2003). Furthermore, occupational status as an indicator of working conditions is an important predictor of illness absence incidence rates (Benavides *et al.*, 2003). Even the anticipation of job change and job insecurity feelings seem to have a negative impact upon the individual health status for both genders (Ferrie *et al.*, 1995). Furthermore, it is argued that low job stability induces males to adopt unhealthy life-styles, but this is not the case for female workers (Metcalfe *et al.*, 2003). Work-related health problems are met widely nowadays in industrialised countries and provide an interesting area of research. The impact of work, home, and leisure factors on self-reported musculoskeletal problems and on physical health was examined from a sample of 93 women working in metal companies and food industries in Sweden (Björkstén and Talbäck, 2001). The authors failed, however, to find SES effects on musculoskeletal problems, but they argued that "… economic decline and its consequences may have both a direct and an indirect impact on the deterioration of general health" (p. 102).

Gender differentials similar to the ones found for the SES–mortality relationship are also documented in this strand of the literature. In particular, employment indicators and the region of living (e.g. living in a

prosperous region) have a stronger effect on the health of men, while for women family-related factors (e.g. marital status and fertility history) exhibit the greatest explanatory power upon health inequalities (Grundy and Holt, 2000). Furthermore, the treatment of illness also seems to be affected by gender. Specifically, it seems that in case of illness, males rely on their spouses whereas females rely more on other family members (Joseph and Cloutier, 1990).

Psychological Health and SES

Various studies have expanded their research to the SES determinants of psychological health status. Psychological health is usually approximated by the incidence and frequency of symptoms of stress, depression and anxiety. The findings of four different studies[29] exhibit a striking similarity regarding the effects of low SES, approximated by education and income, on depression scores (in Everson *et al.*, 2002).

To our knowledge, the majority of the research examines either the effect of employment status or the effect of work-related characteristics on mental health. The evidence indicates that the negative state of mental health is strongly affected by labour market status. Flatau *et al.* (2000) argue that the investigation of the relationship between individual mental health status and unemployment can shed light on the 'personal costs' of unemployment and, furthermore, on the issue of voluntariness of unemployment. Rantakeisu and Jönsson (2003) provide strong evidence on the existence of both a psychosocial and an economic need for employment. They argue that the perceived employment commitment, the perceived economic concern and economic security have significant positive effects on the mental health state of the unemployed. In fact, studies provide evidence that unemployment is not predominantly a voluntary phenomenon. Joblessness seems to have a higher negative impact on mental health (a marked rise in anxiety, depression, loss of confidence and self-esteem) than employment in low-paid jobs. Furthermore, also gender differences exist regarding the effect of unemployment on health; unemployment affects the mental health of males significantly more than of females (Theodossiou, 1998).

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[29] The Alamenta County Study (Berkman and Breslow, 1983); The Kuopio (Finland) Ischemic Heart Disease Risk Factor Study (Salonen, 1988); The Detroit Study (Williams *et al.*, 1997); The Consumer's Survey (Toussaint *et al.*, 2001), in Everson *et al.* (2002).

A set of specific job characteristics has been found to have an impact on individual mental health state. Metcalfe *et al.* (2003) show that low job stability is associated with the adoption of unhealthy life-styles, which in turn leads to further deterioration in health status. In contrast, some studies show that increased occupational stability negatively affects the health status of the workers. Kivimäki *et al.* (2002) show that the job strain is greater for employees with unchanged occupational positions in the preceding five years, which in turn affects their mental health status. A further deleterious occupational factor for health status seems to be low control at work, in terms of increased anxiety and symptoms of depression (Griffin *et al.,* 2002).

SES Inequalities on the Health of the Older Workforce

Policy makers in most industrialized countries are concerned the negative economic consequences that arise from an ageing population. The continuously increasing share of older individuals in the work-force, raises important concerns to policy makers regarding the economic impact of the population ageing on health services and care for the aged. Further, the change of age composition of populations towards the aged will reduce the population of working age, increase the share of the dependent elderly transfers (Rogers *et al.*, 2000).

Many industrialised nations develop policies that aim at providing motives to older workers to remain in the workforce (Cai and Kalb, 2005). The lower age limit for a person belonging to the older workforce is 40 to 50 years-of-age (Stoney and Roberts, 2003). Some researchers argue that the financial benefits induced by government policies to facilitate the stay of older individuals in the workforce can exceed the benefits arising from the policies aimed at improving population health (Walker, 2004). However, health status appears to be a strong determinant of labour supply, even after controlling for the endogenous nature of the relationship (Cai and Kalb, 2005). Despite the above, other studies argue that the social security reforms that aim to increase the labour market participation of older employees can have a deleterious effect on their health status, since increased work efforts can deteriorate health (Lindeboom and Kerkhofs, 2002). A better understanding of the interrelationship between SES and health is a pre-requisite for effective policy initiatives.

Findings from both theoretical and empirical research indicate that as age increases health status worsens (Grossman, 1972; Goldman *et al.*, 1995; Crossley and Kennedy, 2002). Various aspects of health and health-related behaviours vary with age (Hunt, 2002). It has been argued that

SES inequalities in health are small in early adulthood, increase during the middle ages and finally decrease (House *et al.*, 1994). Indeed, the strongest relationship between various measures of health and SES is found for middle age groups (Theodossiou, 1998; Ecob and Davey Smith, 1999). Furthermore, SES inequalities in health status continue to operate at old age (Goldman *et al.*, 1995; Smith and Kington, 1997; Grundy and Holt, 2000). The evidence suggests that for the elderly, especially after the age of 75, the SES effect on health inequalities weakens significantly (Martelin, 1994; Ecob and Davey Smith, 1999; O'Reilly, 2002). However, van Ourti (2003) argues that SES inequalities in health vary significantly with respect to whether one is below or above the threshold of 65 years-of-age, although he also points out that these observed differences may be due to attrition and differential mortality observed across income groups.

The Black Report (1992) states that "… at older ages, classification by occupational class becomes less meaningful" for health inequalities (in O'Reilly (2002), p. 197).This is in line with the findings of other studies (Kunst *et al.*, 1998; van Rossum *et al.*, 2000). Educational level, on the other hand, has been found to play a significant role for health risks in some studies (van Rossum *et al.*, 2000) while others (Goldman *et al.*, 1995) argue that at later stages of the life-cycle, education effects on health diminish.

Furthermore, it is argued that older workers are not only at greater risk of losing their job, but they are those mostly affected by unemployment since age limitations hamper the probability of re-gaining employment (Stoney and Roberts, 2003). Such limitations involve employers' negative perceptions regarding older workers' cognitive capacity, health status, adaptation to change, etc. (Benjamin and Wilson, 2005). The evidence supports the argument that low job stability affects significantly the mental health of individuals older than 50 years in comparison to the remainders (Metcalfe *et al.*, 2003). In continuation, involuntary job loss was found to be associated with a deterioration both in the physical health state of older workers (Gallo *et al.*, 2000) and in those spouses' mental health state who were financially satisfied before the job loss occurred (Siegel *et al.*, 2003). The evidence also supports the existence of a positive relationship between job loss and subsequent alcohol use among baseline non-drinkers in the older workforce (Gallo *et al.*, 2001). In addition, retirement decisions can damage mental health state through increased depression symptoms after a long period of 'continuous' retirement (Kim and Moen, 2002).

The Causality Issue

The issue of establishing a causal relation between SES and health status has been the focus of applied research. However, the direction of causality is often difficult to establish and the fact that health and SES may be jointly determined compounds the problem. Some studies provide limited evidence of reverse causation between SES and health (Lynch *et al.*, 1997). On the contrary, Goldman *et al.* (1995) found evidence of an association between disability status at the baseline and subsequent disability implying that causation runs both ways in the SES–health relationship. Ettner (1996) addressed the issue of causality in the relationship between physical and mental health status and income by applying the instrumental variable approach. She argued that the income effect is stronger than the traditionally observed effect when assuming exogeneity of the income indicator. The analysis of Adams *et al.* (2003) rejected the existence of causation from SES to mortality and to new-appearing health conditions, whereas a causal path from SES to some mental and chronic diseases was detected. Therefore, the authors argued that the evidence regarding the correlation between SES and mortality is not stemming from a direct causal relationship but rather from the impact of SES and of unobserved effects on individual health status. Evidence of endogeneity arises also from studies that have examined the reverse relation between health and SES. In particular, severe health problems affect negatively household wealth, these effects being stronger for women than for men (Wu, 2003).

Wu (2003) states that the effects of health shocks on income are pertinent only when one controls for the transitions into and out of the labour force. Indeed, the evidence is in support of the 'healthy worker effect'; that is, poor health becomes a barrier to employment especially during economic downturns when jobs are scarce (Burkhauser *et al.*, 2001). Furthermore, the 'healthy worker effect' seems to operate more strongly in manual compared to non-manual occupations (Bartley and Owen, 1996). In addition, even the earnings profiles were found to be affected by previous history of illness (Andrén and Palmer, 2001).

Confounders on the SES–Health Relationship

The complexity of the SES–health relation arises, up to a point, due to several confounders that are related to both sides of the relation. The most usual confounders treated in the literature are:

- *Genetic endowments:* although not frequently applied, genetic endowments have been found to affect the individual health status (Smith and Kington, 1997)

- *Psychological health status:* many mental health symptoms are linked to physiological states; for example, anxiety may be reflected in muscular tension (Warr, 1987). Bosma *et al.* (1999) verified that individual perceived control (e.g. the existence of feelings of powerlessness or fatalism) play a mediating role in the SES–mortality relation: "… SES seems to be related to mortality partly because people with a low SES more often perceive low control. Adult socio-economic conditions further contribute to beliefs of low control" (p. 1469).
- *Life-style characteristics:* health-related behaviours, such as alcohol drinking, smoking and dietary habits act as possible confounders as well. Studies indicate that negative health-related behaviours are linked to both job-related features and health (Or, 2000; Metcalfe *et al.*, 2003).
- *Demand for health care services:* evidence on both health status and income characteristics that are related to the demand for health care services is also provided by applied research (Santos Silva and Windmeijer, 2001). At the macro-level, per capita health spending has also been found to affect negatively mortality levels (Hitiris and Posnett, 1992).

The Dynamic Relation between SES and Health

Undoubtedly the relationship between SES and health status is a dynamic one. "A number of pathways between early life and adult health are operating and show the need for a lifetime research perspective on health" (Kuh and Wadsworth, 1993, p. 916). For example, "… repeated exposure over time to the negative consequences associated with poorer socio-economic circumstances leads to significantly worse health outcomes, both physical and mental" (Everson *et al.*, 2002, p. 893).

Indeed, studies provide consistent evidence that people who had a poor start in their life cannot avoid entirely negative health implications. Bosma *et al.* (1999) argue that low social class in childhood is related to poor adult health, irrespective of the individual SES during adulthood. On the other hand, findings of other studies indicate that if individuals are living under more favourable socio-economic conditions in later life, adverse health consequences can be partly offset (Kuh and Wadsworth, 1993). Furthermore, significant and graded associations exist between the number of periods of economic hardship that the individual faces and almost all measures of physical and mental functioning (Lynch *et al.*, 1997).

Individual Income vs. Income Inequality

Milyo and Mellor (1999) suggest that the appeal of the 'income inequality hypothesis' is primarily generated from the fact that it has serious implications regarding the redistributional character of public policy. However, there is an arising debate among economists regarding the impact of income inequality on population health, namely the health effects arising from relative versus absolute differences, and both of these hypotheses have their supporters.

Wagstaff and van Doorslaer (2000) provided a critical assessment of the relevant literature on income inequality hypotheses: (i) the *Absolute-Income Hypothesis*, (ii) the *Relative-Income Hypothesis*, (iii) the *Deprivation Hypothesis*, (iv) the *Relative-Position Hypothesis*, and (v) the *Income-Inequality Hypothesis*. The authors argue that only individual-level data are capable of providing sufficient information in order to discriminate and, therefore, compare the effectiveness of each of the above hypotheses. "…because it is only at this level of aggregation that one can observe relationships that are consistent with one hypothesis and not with another" (p. 564). They argue that the existing literature provides sufficient evidence to support the Absolute-Income Hypothesis and little evidence in favour of the Income-Inequality Hypothesis.

Gravelle (1998) attributes the evidence on the relationship between income inequality and health at the population level to a statistical artefact. Specifically, she argues that "… artefactual correlation at population level between population mortality and income dispersion will always occur if the effect of individual income on the individual risk of mortality is smaller at higher incomes than at lower incomes. This will be so even if there is no underlying relation between the distribution of income and the risk of mortality at the level of the individual" (p. 4).

Some studies provide limited evidence on the income inequality and health relationship (Humphries and van Doorslaer, 2000; Blakely *et al.*, 2002) while other have established a more solid relationship (Kennedy *et al.*, 1996). Milyo and Mellor (1999) argue that many relevant studies are wanting in various ways and that if the 'income inequality hypothesis' holds, then changes in income inequality should subsequently generate changes in the health status of the population. Their study failed to provide findings in favour of the income inequality hypothesis. Other studies, however, attribute the observed relationship to mediating pathways such as society's social capital (Kawachi and Kennedy, 1997; Kawachi *et al.*, 1997) or psychosocial pathways, such as the existence or absence of social cohesion (Wilkinson, 1997).

In general, it is logical to infer that the on-going debate regarding the capability of aggregate-level data to capture the SES effects on health inequalities, has not reached any definite and reliable conclusions. It seems, so far, that individual-level data are more efficient in capturing health inequalities, since most studies find a significant correlation between income inequality and different aspects of health status, but this relationship attenuates significantly when individual income and other characteristics are controlled for (such as education or individual risk factors).[30]

2.4 Conclusions

SES inequalities on health status attract the interest of economists as new evidence is coming up that verifies the role of economic and social characteristics for individual health state. The key conclusions of the reviewed studies can be summarised as follows:

- The literature provides consistent evidence that low SES has a detrimental effect upon health no matter how SES or health is approximated. Income and wealth are the economic components of SES with the strongest effect on health. The SES effects on health are different for males and females. Females seem to systematically underestimate their health status. Furthermore, occupational factors affect the health of males, whereas factors outside the workplace have the strongest impact on females' health.
- The empirical studies suggest that income inequality affects health only indirectly, through its impact on individual income. Many researchers argue that individual-level data are more appropriate for disentangling the complex nature of the relationship between SES and health. Their argument is grounded on the fact that in population-level data, the SES–health relationship can be spurious and causality cannot be infered since many other factors may mediate and invalidate the findings.
- The matter of confounding mechanisms in the relationship of interest is important. Such confounders (e.g. mental health) have been investigated in applied research and they have been found to have both a direct and an indirect effect on health, through their impact on SES.

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[30] Muller, 2002; Osler *et al.*, 2002; Sturm and Gresenz, 2002; Shibuya *et al.*, 2002.

- The evidence appears to suggest that long-term exposure to negative economic conditions can lead to worsened health. The dynamic paths that operate in the relationship of interest are not well understood. The limited availability of data hampers the progress of research in this area.

A very important issue also arising from this complex nature is the bi-directional character of the relationship. The argument that not only SES affects health but also health affects SES is supported by the evidence. In tackling the issue of endogeneity, the major difficulty is the correct implementation of the instumental variable approach regarding the appropriateness of the chosen instruments. The consistent evidence on the effect of SES inequalities on individual health raises the issue of policy prescriptions. If economic factors have an impact on individual health, this should concern both public policy authorities and health care services. Emphasis should be given to determinants of the health of the older workforce. The evidence indicates that impaired health is a determinant of labour force participation of the older workers. SES inequalities have a deleterious effect on the health of this group, which is more severe than the one observed for younger workers.

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CHAPTER 3

Socio-Economic Status and Health – Bits of Evidence from Denmark

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3.1 Introduction

Denmark has in common with the other Nordic countries a relatively extensive welfare state, which also encompasses a mainly publicly financed health sector that provides basically free hospital and health care services to all citizens.[1] The social security net is well developed and covers the whole population and is, moreover, quite generous by international standards. Labour force participation rates among the older workforce is relatively low due to extensive early retirement programmes, which have led to a significant gap between legal/contractual and actual retirement age. In view of these facts, an examination of the link between health and socio-economic status in Denmark reveals some surprising patterns. One is that despite the relatively equal income distribution, there are considerable differentials in morbidity and mortality between socio-economic groups. Another striking observation is that, given that Denmark is among the richest countries in the world, life expectancy is nevertheless relatively low and in particular has increased only little during the last three decades.

As a consequence, the Danish debate and research concerning socio-economic differences in health is to some extent intertwined with the atypical development of life expectancy in the previous 30 year-period specific to Denmark. Thus, I will discuss them both in parallel. There has been relatively more discussion about the lack of a significant increase in life expectancy as compared to the one observed in other advanced market economies. As witnessed by the length of this review, Danish research on the question of socio-economic differences in health has in general been rather thin on the ground.

What research there is on health and socio-economic status is mainly documenting the relation according to various dimensions. Considerably less work has been aimed at unravelling causality issues; in fact only a recent PhD-thesis addresses the issue of the potential endogeneity of socio-economic status indicators. Studies making use of longitudinal data have predominantly been interested in the role of differences in life-style in understanding subsequent health outcomes.

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[1] The Danish institutional setting is similar to the Finnish one. For a survey of the Finnish institutional setting, see the Chapter 4 on Finland.

3.2 Mortality and Morbidity in Denmark: Some Key Facts

3.2.1 Time-series Changes and International Perspectives

In Europe, a characteristic feature of the Nordic countries is clearly their higher degree of income and education equality. However, current evidence suggests, albeit with some caveats, that despite the egalitarian policies pursued in these countries, social inequalities in morbidity and mortality are quite substantial in Northern Europe; see Cavelaars *et al.* (1998) and Mackenbach *et al.* (1997, 1999) for three cross-country comparisons. As we will see below, Denmark is no exception.

According to the WHO's World Health Report from 1999, which provides a comparison of Western European countries regarding their life expectancy at birth in 1978 and 1998, Danish males' life expectancy increased from 71 to 73 years in the 20 year-period (Table 3.1). While Denmark ranked somewhere in the middle in 1978, as a consequence of her low growth in life expectancy, Denmark fell down to second

Table 3.1 Life expectancy at birth in selected European countries 1978–2003

	Males 1978	Males 1998	Males 2003	Females 1978	Females 1998	Females 2003
Austria	69	74	76	76	80	82
Belgium	69	74	75	76	81	82
Denmark	**71**	**73**	75	**77**	**78**	80
Finland	68	73	75	77	81	82
France	70	74	76	78	82	84
Germany	69	74	76	76	80	82
Greece	72	76	76	76	81	81
Iceland	73	77	78	79	81	82
Ireland	70	74	76	75	79	81
Italy	70	75	78	77	81	84
Luxembourg	68	73	76	75	80	82
Netherlands	72	75	76	79	81	81
Norway	72	75	77	79	81	82
Portugal	67	72	74	74	79	81
Spain	71	75	76	77	82	83
Sweden	72	76	78	78	81	83
Switzerland	72	75	78	79	82	83
United Kingdom	70	75	76	76	80	81

Source: WHO World Health Report 1999, and www.who.int, for the 2003 figures.

lowest in 1998 (only Portugal had a lower life expectancy of males). For Danish women the picture is even more gloomy; starting out in the upper half of the league (77 years) and adding only one year to life expectancy, they end up last in 1998 (apart from the Danish women, only Portuguese and Irish women's life expectancy is below 80 years at the end of the nineties). In most other countries (save the Scandinavian), the increase in females' life expectancy during the period has been in the 4–5 years range. Standardised mortality rates (for 25–74 year-olds) paint a similar picture. The standardised mortality rate for Danish women is highest in Western Europe and it is also among the highest for men. Five years later, in 2003, the gloomy Danish picture has not changed much, in comparison to other countries.

Naturally, such a remarkably dismal performance with respect to life expectancy, especially in view of the fact that Denmark is one of the richest countries in the world, has generated a lively discussion about the causes of this development (or rather lack thereof). Thus, in the early 1990s, the Ministry of Health and Social Affairs appointed a commission to analyse the reasons for the stagnating life expectancy figures, and in 1998, the commission was re-appointed in view of the poor performance of life expectancy relative to other countries also during the nineties.

3.2.2 Cross-sectional Pictures

Mortality indices by socio-economic groups, males and females, 1991–93, show that among men, mortality is highest for unskilled manual workers and lowest for higher level white collar workers (Tables 3.2 and 3.3. The skilled manual workers' mortality rate is lower than that of lower level white collar workers, but higher than that of medium level white collar workers. For women, the differences are considerably smaller and the socio-economic differences in mortality are less pronounced. Thus, for them the two highest mortality rates are found at the ends of the socio-economic spectrum: among high level white collar and unskilled blue collar workers.

Life expectancy differences across regions are quite small; only Copenhagen stands out as different from the other counties with a considerably lower life expectancy for males and also a somewhat lower life expectancy for females.

Table 3.2 Morbidity and mortality indices by socio-economic group and gender, 1991–93

	Morbidity men	Morbidity women	Mortality men	Mortality women
All, 20-64	**100**	**100**	**100**	**100**
Self-employed:				
Farmers	94	97	74	113
Other	100	101	101	107
Higher level salaried employees	79	82	72	102
Middle level salaried employees	92	93	90	89
Other salaried employees	99	97	110	98
Skilled blue collar workers	106	108	98	99
Unskilled blue collar workers	117	112	125	108

Source: Statistics Denmark, 1996 (Statistisk tiårsoversigt – Tema om sundhed og sygdom – socialt set).

Table 3.3 Morbidity and mortality indices by education and gender, 1991–93

	Morbidity men	Morbidity women	Mortality men	Mortality women
All, 20-64	**100**	**100**	**100**	**100**
Only basic compulsory education	113	111	119	113
Basic vocational education	111	110	118	100
Vocational education	99	95	94	85
Short tertiary education	89	84	79	77
Master or equivalent	73	83	60	73
Post-graduate education	65	69	60	69

Source: Statistics Denmark, 1996 (Statistisk tiårsoversigt – Tema om sundhed og sygdom – socialt set).

Studies carried out for the Life expectancy commission(s) show (note, all relationships listed below are, unless otherwise is pointed out, based on simple cross-tabulations) that:

(1) For males in the labour force (age 30 to 64) there is a clear positive relationship between socio-economic status and expected proportion of remaining life without serious, long-duration illness. A corresponding, although less pronounced, pattern is also found for females (Brønnum-Hansen, 1998/99). Worth noting is, however, that differences in health expectancy between socio-economic groups are larger than the corresponding differences in life expectancy (Brønnum-Hansen, 2000). Thus, for elderly people, quality of life is higher in the higher socio-economic groups.

(2) The proportion of the population that suffers from a chronic or other long-duration serious illness decreases with the level of education, and the same is true for self-assessed health (DIKE, 1995).

(3) There are notable life-style differences:

   (i) the proportion of heavy smokers decreases with socio-economic status,

   (ii) the proportion spending minimum 4 hours per week on physical activities is highest among skilled blue collar workers, and among white collar workers, increasing in socio-economic status,

   (iii) the average amount of fresh fruit and vegetables in the person's diet is clearly related to the educational level of men, whereas for women there is no relationship, and

   (iv) the self-reported amounts of alcohol consumption exceeding the recommended maximums (14 and 21 drinks per week for women and men, respectively) do not seem to be related to the individual's socio-economic status; the highest proportions are found among high level white collar workers, skilled blue collar workers and the unemployed. The proportions of heavy drinkers do not differ much, however: they vary between 10 and 14 per cent (DIKE, 1995).

In a recent study by Munch and Svarer (2005), who employ a competing risks model to allow for different causes of death, it is found that for women only deaths due to a few illnesses are affected by marital status, income, wealth and education whereas for men deaths due to some more, but far from all, illnesses were related to socio-economic factors. Thus, this study indicates that the health–socio-economic status gradient seems to be relatively weak in Denmark.

3.3 Studies of the Health and Socio-economic Status Relationship

There are relatively few studies about the socio-economic health gradient for Denmark. This does not seem to be caused by lack of sufficiently good data sources, as there are plenty of potentially interesting data sets that can be exploited in this type of investigations. Furthermore, the opportunities to construct new, large and representative data sets by merging register data are excellent. Consequently, the main reason for the dearth of studies must be lack of interest.

A study of *life-style effects* on mortality (Juel, 1999) was carried out as a follow-up ten years later on a representative sample of people in the 30–64 age range, interviewed in 1987. The risk of dying, more precisely the odds ratio, during the subsequent ten-year period was found to be:

(i) 2.8 for heavy smokers relative to never-smokers,

(ii) 1.4 for persons having on average 4 or more drinks per day (and 0.75 for those having 1–3 drinks per day),

(iii) 2.1 for persons who did not perform any physical exercise as compared to those who are frequently doing physical exercises, and

(iv) 1.7 for people who had very little fresh fruit or vegetables in their diet, relative to those who followed a very healthy diet.

In the same study, the author also compared the odds ratios for (four) different socio-economic groups controlling and not controlling for gender, age and life-style factors, respectively. Strikingly enough, it was found that even if life-style factors were equally distributed in the population, inequality in mortality would only be reduced somewhat, but not by much. As a matter of fact, only the highest and lowest socio-economic groups' odds ratios were changed as a consequence of entering the controls. Thus, this study indicates that life-style factors only explain a relatively small proportion of inequality in mortality risks between socio-economic groups.

Another study of life-style factors, Iversen *et al.* (2002), uses data from a questionnaire that was sent out in 1991 to 26,000 individuals above the age of 18 and living in Copenhagen, of which 12,040 responded. The two health variables studied were: self-assessed health

and chronic or other long-duration illness. The life-style factors analysed were again smoking, alcohol consumption and physical exercise. All three life-style factors are, according to the multivariate analysis, associated with poorer health. Moreover, it was found that self-assessed health falls with age and joblessness, increases with the person's level of education and frequency of social contacts, and has an inverted J-shaped relation with the individual's body mass index. Smoking and physical inactivity increases suboptimal self-reported health significantly. On the other hand, only large amounts of alcohol consumption (5 drinks or more daily) are found to have detrimental effects on the individuals' health. Thus, this study corroborates two previous studies using cohort data, Grønbæk *et al.* (1995, 1999) on, respectively cohort data on mortality and subjective health data.

The commission on life expectancy carried out a study (Social ulighed i sundhed, 2000) which looked at socio-economic differences in the *use of health services*. Given the access of low-cost or free health services provided by the Danish public health care and hospital system, and no regional differences therein, we should not expect to find large differences in health care use. This is, of course, reinforced by the fact that the Danish earnings distribution is quite compressed and, hence, that the prevalence of poverty is low, too. The study finds that there are, indeed, very small differences between socio-economic groups or educational groups with respect to (age-adjusted) contact frequencies with public general practitioners. The picture is slightly different for contacts with private, specialist doctors and dentists: here the differences are more pronounced, albeit still rather minor. Thus, they seem to a large extent to reflect the differences that have been observed between the groups regarding morbidity.

On the other hand, the study documented much clearer differences in the use of the preventive care services provided by the health care system. Thus, the white collar worker groups made more use of services like checking one's cholesterol, measuring one's blood pressure and general health checks.

None of the studies mentioned so far has attempted to address the potential simultaneity problem involved in examining the relationship between health and socio-economic status. The first, and to the best of my knowledge, so far the only one, to do that is Arendt (2002), who in his doctoral dissertation uses data on self-reported health collected by the Danish National Institute of Occupational Health and the National Institute of Social Research in 1990 and 1995. The same data have previously been analysed by Borg and Kristensen (2000),

who found substantial differences in self-reported health between social classes defined as combinations of formal schooling and occupational groups. Borg and Kristensen's key finding was that these differences were reduced by about 60 per cent when working environment factors were controlled for.

Arendt employs a non-parametric technique to avoid imposing restrictive functional forms on the relation. He finds that there are considerable education and wage differentials in health, and in contrast to earlier studies, for both men and women. Using the same panel data set, he next addresses the more challenging question: can the observed education related differences in health be interpreted causally? He makes use of two Danish school reforms for instrumenting the education variable since the latter may be endogenous due to endowments and time preferences; see Arendt (2005). Arendt finds that if the endogeneity of education is not accounted for, this leads to a considerable underestimation of the effect of education on health.

Some evidence on the existence of mental health differences between socio-economic groups can be found in a paper by Agerbo *et al.* (1998), which primarily focuses on the effects of unemployment and other changes in individuals' labour market statuses on first admission to a psychiatric hospital or ward. The study makes use of a data set constructed by merging the Danish psychiatric register (containing all admissions to psychiatric hospitals and wards in Denmark) with another longitudinal register (IDA) with data on individuals' labour market careers during years 1976 to 1993. The analysis is carried out using a nested case-control methodology and the key finding with respect to the mental health – socio-economic status relationship is that, after controlling for age, gender, marital status, presence of children, and a host of labour market status variables, there is no relationship for educational levels, but there are for wealth and lagged income. More precisely, the probability of admission to care in a psychiatric hospital decreases with the amount of wealth of the individual, and the same is true regarding previous labour income. The relation is present for both genders, but is more pronounced for males. The question to which extent this is due to differences in the prevalence of illnesses or in treatment of the illnesses between the wealth and income groups cannot, however, be answered by the study.

3.4 Concluding Remarks

As is clear from this short review, Danish research on socio-economic status and morbidity (and mortality) has uncovered some interesting, puzzling patterns. However, only little work has been carried out on the mechanisms that generate these patterns. The evidence there is, seems more to inform us what does not rather than what does. Thus, only a minor portion of the observed health inequality can, for instance, be attributed to differences in life style or in the use of health services, save the more preventive ones. Thus, the bulk of the differences remain unexplained. The same is largely true for the efforts to understand the time-series changes in mortality. Here, too, ignorance about what caused them remains great.

Consequently, in this context the conventional summary remark that more research is needed, in particular on the underlying mechanisms, is certainly appropriate, perhaps even more than usual.

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CHAPTER 4

A Review of the Finnish Literature on the Relationship Between Socio-economic Status and Health

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4.1 Introduction

Finland is, in the same way as many other EU countries, facing problems owing to the fact that the population is ageing. However, ageing occurs earlier and is more rapid in Finland than in most other OECD countries. Finland's population will peak in the early 2020's at about 5.3 million people, but the labour force already started to decline in 2004 by 0.5% annually. The main problem with this is that the old-age dependency rate (those over 65 years as a fraction of the working age population) is becoming too high. The old-age dependency ratio is projected to rise from 23% currently to about 37% by 2020, which is the fastest increase in the OECD (OECD, 2002a). For public finances, this means that the financing of old age benefits and health care is under threat. In the case of Finland, a fact which further aggravates this general problem is that the actual retirement age is as low as 59, compared with the official retirement age which is 65.

Ill health is a major reason why so many individuals retire early. Ill health is also, as will be shown in this survey, disproportionately concentrated among the lower socio-economic classes. Although this fact is clear, its underlying causes are not equally well known. Specifically, which way does the causation go; does ill health lead to a lower socio-economic or occupational status or is it the other way around? Or, is it some third factor, such as unfavourable childhood experiences, that leads to both a low socio-economic status and bad health? For the older working age population, these issues are of particular importance, because there is evidence pointing to the fact that socio-economic differences in ill health are at their maximum for this age group. Indeed, House *et al.* (1994) report that socio-economic health differences are small in early adulthood, then increase, and finally decrease at high ages.

These causality issues have different implications for public policy. If, for the lower socio-economic classes for example, many years of stressful or physically demanding work lead to severely deteriorated health, perhaps measures to decrease the harmful effects of work are needed. Or, if more education actually causes better health (of which there is some evidence, e.g. Häkkinen *et al.*, 2003) further education should be promoted. Thus, increased knowledge on the causes of the observed social gradient in health will be of use in order to improve individuals' health and hence to influence their labour market participation behaviour.

Socio-economic differences in health and labour market participation will no doubt be affected by the institutional arrangements of a country.

For example, if access to health care is to a large extent dependent on one's own income, and the level of public social protection is low, it is possible that the fact that the worse health of the lower socio-economic classes actually is due to the fact that they cannot afford proper health care. In the Finnish case there is some evidence that richer individuals utilise health services more than do poorer individuals. However, whether this actually can explain actual differences in health remains an open question.

In this survey, we look at studies that try to describe and explain the relationship between socio-economic status, occupational status and health status in Finland. The survey is organised in the following way: In Section 4.2, we survey how health status and socio-economic status have been measured in empirical research in Finland. Indeed, the actual empirical measurement of both individual socio-economic status and individual health status is by no means a straightforward matter. In Section 4.3, we present some main features of the Finnish pension system, as well as some aspects of the unemployment benefit system and health care system. Section 4.4 presents evidence on the relationship between socio-economic status and health expenditure. In Section 4.5, we survey the empirical evidence on the relationship between socio-economic status, occupational status and health status. In Section 4.6, some concluding comments are offered.

4.2 Socio-economic Status, Occupational Status and Health Status in Finland

4.2.1 Measurement of Socio-economic Status

Socio-economic status can be thought of as an all-embracing concept referring to an individual's or a family's position in the system of social stratification. However, it is a theoretical concept, and therefore different proxies, each with a special emphasis, have been used in the literature in order to provide an indication of an individual's social or hierarchical standing, prestige, standard of living, access to resources and way of life. In this section, we go through the various measures of socio-economic status that have been used in Finnish research.

Occupational class is perhaps the measure of socio-economic status that has been used most frequently in the Finnish literature. In some studies, only a crude distinction between manual and non-manual workers has been made (e.g. Valkonen *et al.,* 2000; Martikainen *et al.,* 2001b). In other

studies, individuals have been divided in a more detailed way into several sub-groups, for example into upper white collar workers, lower white collar workers, skilled manual workers, unskilled manual workers, farmers, and other self-employed individuals (e.g. Martikainen *et al.,* 2001a).

Educational level is another proxy that has been used frequently (e.g. Valkonen *et al.,* 1997). One advantage of using education instead of occupational class is that for women, allocation into occupational categories is sometimes difficult. The most serious disadvantage in using a woman's own occupation for this purpose is that women's careers are closely related to their marital status and responsibilities for child care. Married women move in and out of the labour force in order to cope with their domestic and child-care responsibilities, and occupational status may therefore be difficult to ascertain (Martikainen, 1995). The level of education, on the other hand, does generally not change after early adulthood. Also, it does not change as a consequence of childbearing or domestic duties. In Finnish research, individuals have generally been classified into three categories, i.e. less than 10 years of education, 10-12 years of education, and more than 12 years of education. Sometimes, however, a more refined classification has been used. It should also be noted that because of the use of register data in Finland, in most cases years of education are actually derived from information on degrees, as degrees and not actual years of education are available in government registers. For example, someone having a university degree is considered to have 16 years of education (although he or she potentially may have spent fewer or more years in education).

The level of income is an interesting variable in itself and should perhaps not only be thought of as a proxy for socio-economic status. However, particularly for individuals of working age, causality problems are likely to be severe if one uses income (Martikainen *et al.,* 2001b). Thus, if one observes a positive relationship between health and income, is it the case that it is possible to "buy oneself health" or is it the case that deterioration in the health status causes lower incomes?

For the older population the commonly used occupational status indicator of socio-economic status may also be problematic (as is income of course) as most individuals are no longer economically active. Furthermore, using education as a proxy has a special problem for the older population: the variation among the elderly population is not all that great, because only a very small number has a higher education. (However, this problem will be ameliorated in the future as younger cohorts are much better educated.)

Some measure of wealth, such as *housing conditions,* has also been used as a proxy for socio-economic status in the Finnish literature (Martelin, 1994). There are at least two advantages of using wealth measures compared to income measures in this type of research. First, wealth is a more appropriate proxy for economic resources for a whole lifetime, whereas income measures often in practice only pertain to a certain year. Second, using wealth ameliorates the problem of reverse causality in the health – socio-economic status relationship, as wealth, as opposed to income, will not be too affected by a single spell of illness. However, it is often problematic to use wealth in practice owing to measurement problems. In surveys, individuals may be reluctant to state how large their wealth actually is, and register-based data often depict only a part of individuals' wealth. Also, more fundamentally, health and wealth may still be simultaneously affected by third factors, such as unfavourable childhood circumstances.

4.2.2 Measurement of Health Status

Health is not a precise concept, and there are many ways of measuring it. In this section, we review different ways in which health has been measured in Finnish research. Note that in this exposition, we only consider how health has been measured in studies on the relationship between socio-economic status and health. Naturally, in clinical medical research, there always exists some objective measure of health (e.g. leg broken or not?) but that research is of course beyond the scope of this review. In the Finnish case, a natural way to classify the studies is: studies that have used measures of health that are based on register data, and studies that have used measures based on survey data.

The most obvious example of analyses relying on register-based data is that of studies of *mortality*, where researchers have used government registers of death certificates (e.g. Martikainen and Valkonen, 1996). Obviously, mortality is a very crude measure of ill health, but is perhaps on the other hand relatively easy to interpret.

In Finland, *expenses for medicines* prescribed by a doctor are partially reimbursed by the Social Security Institution. Records are kept of these reimbursements, and this information has sometimes been used as a measure of the health status of an individual (e.g. Häkkinen, 1991). This is of course also a crude measure of health, as only illnesses that require a medicine prescribed by a doctor are registered. It may also be the case that this measure reflects not only the true health status of the population, but also aspects of demand for pharmaceuticals, which may differ between socio-economic groups.

Data on hospital discharges from the Finnish Hospital Discharge Register have also sometimes been used as a measure of health (e.g. Keskimäki *et al.,* 1997). This register covers all public and private hospitals in Finland, and includes data on patients' residence, personal identification number and clinical data, among other things. However, data from the Discharge Register also convey a rather crude measure of health, as only bad health that leads to a stay in hospital is recorded.

In contrast, Finnish studies based on survey data have in general focussed on three aspects, namely health in general, long-standing illness, and functional disability (e.g. Lahelma *et al.,* 1997; Mackenbach *et al.,* 1997; Manderbacka, 2001; Valkonen *et al.,* 1997).

Subjective *general health* has normally simply been measured by the answers to the following question: How is your general health? The respondents have then been given the possibility to choose between answering 'excellent', 'good', 'average', 'poor', or 'very poor'. In the case of *long-standing illness*, a more complicated set of questions has been used. For example, first, the respondent has been asked whether or not he or she has had any of a number of listed conditions, or whether or not he or she had used regular medication to treat long-standing illness. For those answering yes to any of those questions, a second question is posed: Does your illness/disability restrict your work or does it limit your daily activities such as gainful employment, housework, or studying? To this respondents have then been given the possibility to choose between answering 'to a great deal', 'to some extent', or 'not at all'. Based on these answers, researchers have calculated various composite measures of long-standing illness. Functional disability has also been measured as some composite measure based on answers to a set of questions. In one representative example (Valkonen *et al.*, 1997) functional disability was based on the answers to the following questions:

- Can you climb stairs without difficulty?
- Can you walk for 5 minutes at a fairly quick pace without difficulty?
- Can you without difficulty carry a load of 5 kg, such as a heavy bag, for a short distance, say 10 metres?
- Can you read ordinary text in a newspaper without difficulty (with or without glasses?)
- Can you hear without difficulty what is said in a conversation between several persons (with a hearing aid, if you use one)?
- Can you chew hard food without difficulty, crisp bread or an apple, for example?

- Are you in good enough condition to be able to carry out the following activities without the help from another person? (Grocery shopping, preparing food, washing clothes and cleaning the house, dressing and undressing?)

If the respondent were unable to carry out one or several of the above tasks, he or she was classified as being functionally disabled. Those who were unable to carry out three or more of the tasks were classified as being severely disabled.

4.3 Social Security and Institutional Arrangements in Finland

4.3.1 The Pension System[1]

The Finnish pension system consists of two main parts, the earnings-related pension and the national pension. The earnings-related pension system aims to provide retirement income sufficient for consumption comparable to that of the working years. The national pension guarantees a minimum income in cases where the earnings-related pension is absent or non-sufficient. Both systems are mandatory. The age of eligibility for both these pensions is 65 years. In addition to those two main forms of pension, there are also other types of pensions, including the disability pension, the individual early retirement pension, and the unemployment pension.

The earnings-related pension scheme consists of all pensions that have been accrued from each employment contract and self-employment. It is of a defined-benefit nature and benefits are based on the number of years in employment, the accrual rate, and the 'pensionable wage', which is based on the gross wage net of the employee's pension contributions. There is no upper limit to benefits. Pension rights are index-linked, with 80–20 weights on wages and consumer prices, respectively, during working years and 20–80 weights after retirement. An interesting feature of the earnings-related pension system is that it is statutory by law but predominantly privately run. The net replacement rate in the Finnish old-age pension system for a worker receiving an average wage in his sixties is about 60% (OECD, 2002b).

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[1] This section draws upon Lassila and Valkonen (2002, 2005).

The national pension is residence-based and the benefits are indexed to consumer prices. The national pension system is administered by the Social Insurance Institution (KELA). In 2006, the amount of national pension will vary depending on place of residence between €490 and €510 for a single person and between €432 and €450 for a married person per month. Note that the pension, like almost all social benefits in Finland, is taxable income. In all some 901,000 individuals (17.3% of the total population) received either the national pension or the earnings-related pension or both in 2003. The number of recipients has risen by around 16% during the last 10 years.

The disability pension is constructed to provide an income for individuals not able to work due to illness. This is not an old-age pension, as individuals between 16 and 65 are eligible for this type of pension, provided that the person's illness is considered grave enough to prevent a further working career. The amount of pension is the same as in the case of the national pension. There is also another variant of the disability pension, the individual early retirement pension. This pension is only available for individuals born earlier than 1944, but is granted using less strict medical criteria than the normal disability pension. In 2003, 267,000 individuals (5.1% of the population) received either individual early retirement pension or disability pension.

In addition, there also exists a system of part-time pension. An individual is eligible for part-time pension, if he or she is 1) between 56 and 64 years old, 2) has been working for at least five years during the last 15 years and at least 12 months during the last 18 months. The system is constructed in such a way that the part-time pensioner is obliged to work 16 to 28 hours a week. Part-time retirement is not very common. In 2003, 41,000 individuals (0.8% of the population) were part-time retired. However, there has been a sharp increase in the number of retirees, as only around 10,000 persons were part-time retired in 1998.

A major issue in the future of the Finnish pension system and, indeed, for the future of Finnish public finances in general is that of the costs of maintaining the pension system. At the moment, pension costs are about 19% of annual gross wages in the private sector, but are projected to rise sharply to 30% by 2030. For the public sector, the situation is even worse (Central Pension Security Institute, 2005). As already stated, this is due to the fact that the population is quickly becoming older. Further aggravating the problem is the fact that despite the official statutory retirement age being 65, the average retirement age is currently 59, as people are utilising the various options for early retirement.

In response to these challenges, a reform of the private-sector earnings related pension system came into effect in the beginning of 2005. In general[2], the aim of the reform is to reduce the burden of pension payments by encouraging individuals to work longer and to restrict eligibility for early retirement. Furthermore, the reform aims at curbing the effects of the increasing life expectancy, and to support ageing workers' ability to work. However, in 2020, with the reform, pension costs, as a share of total gross wages would still be only 1.5 percentage points lower than under the former system.

4.3.2 Health Care

The Finnish constitution states that public authorities shall guarantee for everyone, adequate social, health and medical services and promote the health of the population. The 1972 Primary Health Care Act delegates this task to the municipalities, of which there are currently 431. These statutory services are to be provided in so-called health centres – either in the municipality's own health centre or in conjunction with other municipalities. Municipalities can also buy services from the private sector. The role of the central government, in this case the Ministry of Social Affairs and Health, is to direct and guide social and health policy at the national level.

Because of the very small size of many of Finland's municipalities it is not feasible for them to arrange all types of health care on their own. For that reason, all municipalities are members of federations of municipalities, so called hospital districts, of which there are currently 20. These hospital districts provide specialised health care and coordinate public hospital care within their area. Usually, one hospital district comprises of 1-3 short-term (non-psychiatric) hospitals and 1-2 psychiatric hospitals. Both inpatient and outpatient care are provided in these hospitals. Municipalities negotiate annually on the provision of services with their hospital district.

Alongside the municipal system, private and occupational health services are also provided. Private health care in Finland comprises mainly outpatient care, available mostly in large cities. The two most typical private health care providers are physiotherapy units and private medical doctors' practices. The majority of doctors working in the private sector are specialists, whose full-time job is in a public hospital or in a health centre.

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[2] See Lassila and Valkonen (2005) for further information.

The 1979 Occupational Health Care Act obliges employers to provide occupational health care for their employees. The Act defines compulsory health care as those health services that are necessary to prevent health risks caused by work. In general, occupational health care is seen as preventive rather than curative. In addition however, employers can voluntarily arrange other health care and medical treatment for their employees. A common way for employers is to buy them from a private provider.

The private and public sector services are neither coordinated with each other nor are they real competitors. Neither are their roles exactly similar. The same is also true of the occupational health services. The parallel private and occupational health care systems, alongside with the public health care system, offer more choice for patients living in areas where these are available. At the same time, the parallel systems also create problems, especially from an organisational and financial point of view.

As stated earlier, the municipalities, alone or together with other municipalities through the hospital districts, are the main providers of health care in Finland. Municipalities' health expenditure is mainly financed through the municipality tax. The municipality tax is a flat tax, and the tax rate varies between municipalities. In 2005 the average municipal tax was 18.3% of taxable income. In addition to the municipality tax, municipalities also receive funding from the central government. Because of the small size of some municipalities, all hospital districts must have an equalisation mechanism for spreading the risks of very high medical care costs between the district's member municipalities. If an individual patient's treatment costs exceed a specific threshold, all member municipalities within the hospital district must participate in the costs. The equalisation principle is very important owing to the small size of many municipalities. Without it the risk to municipalities of very expensive treatments would be very high. In 2003, municipalities financed 42% of all health care in Finland, up from 34.7% in 1990 and 28.9% in 1980.

Another important part of health care financing comes from the National Health Insurance Scheme (NHI). The Scheme is used to compensate for loss of income during illness, for pharmaceuticals, for partial reimbursement for medication prescribed in outpatient care, for transport costs, for occupational health care, and for health care for university students. It is also used to compensate for loss of income during pregnancy and childbirth, and for loss of income incurred by the parents of a sick child during treatment and rehabilitation of the child. In addition, the NHI scheme covers part of the costs for private

medical care. The scheme is financed by employer and employee contributions, which are a specific percentage of the salary. The contribution rates are set annually by the central government. In recent years, the share of total health care costs that are funded by NHI funds have increased (Table 4.1), mostly owing to the growing use of expensive pharmaceuticals.

The third important source of financing is out-of-pocket payments by patients. Out-of-pocket payments are mainly used for user charges at health centres and hospitals and to pay for pharmaceuticals. Municipalities are allowed some freedom in deciding the size of user charges for different treatments and procedures, but there are ceilings, which are set by law. In addition, there is an annual ceiling for the total amount of out-of-pocket payments a person can be charged. Between 1990 and 1995, the share of health care spending coming from out-of-pocket payments rose from around 15% to around 20%, and has been roughly stable since then (Table 4.1). The major reason for the increase in the share of out-of-pocket payments was the increase in user charges in the early 1990s.

Table 4.1 Main sources of health care finance 1980 to 1999 (% of total health expenditure)

Source of finance	1980	1990	1995	1996	1997	1998	1999	2000	2001	2002	2003
Public	79.6	80.9	75.6	75.8	76.0	76.2	75.3	75.1	75.9	76.3	76.5
Taxes	67.1	70.3	62.2	61.9	61.8	61.4	60.4	59.8	60.1	60.2	60.0
Central gov.	38.2	35.6	28.4	24.1	20.6	18.9	18.0	17.6	17.1	16.9	17.6
Municipalities	28.9	34.7	33.8	37.8	41.2	42.5	42.4	42.2	43.0	43.3	42.4
Statutory insurance	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4	12.4
Private	20.4	19.2	24.4	24.2	23.9	23.7	24.7	24.9	24.1	23.7	23.5
Out-of-Pocket	17.8	15.6	20.5	20.2	19.6	19.3	20.3	20.4	19.7	19.3	19.1
Private insurance	0.8	1.7	2.0	1.9	2.2	2.2	2.2	2.1	2.0	2.0	2.0
Employers	1.2	1.4	1.5	1.6	1.6	1.7	1.7	1.9	1.9	1.9	2.0
Relief funds	0.6	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4

Source: Järvelin (2002) and the National Research and Development Centre for Welfare and Health.

In a Western European perspective, Finland's health care expenditure does not seem particularly high. In 2002, some 7.3% of GDP was spent on health care, which is less than in most EU countries (Table 4.2). This has been a result of concentrated savings efforts in the 1990s, with health expenditure having grown at a much less rapid rate than GDP. In 1990, health care expenditure was 7.9% of GDP, and in 1995, it was 7.5% of GDP.

Table 4.2 Public health indicators for selected countries in 2003

	Health care spending (% of GDP)*	Life expectancy at birth (men)	Life expectancy at birth (women)
Denmark	8.8	75	80
Finland	7.3	75	82
France	9.7	76	84
Greece	9.0	76	81
Netherlands	8.8	76	81
Spain	7.6	76	83
Sweden	9.2	78	83
United Kingdom	7.7	76	81

*Numbers refer to 2002.

Source: WHO.

According to Järvelin (2002), the Finnish system of health care financing faces some problems. First, the NHI finances some of the costs for private health care. However, most private and occupational health care is available only in the largest cities in the south of Finland. As the NHI is financed by everyone who lives in Finland, regardless of place of residence, some individuals end up paying for services they have no possibility of using. Second, funding sources sometimes determine how a service is produced. For example, municipalities are responsible for financing institutional and outpatient care, but the NHI reimburses certain outpatient costs, such as medication and transport. When it is not clear whether a type of treatment is supposed to be paid for by the municipality or with funds from the NHI, both parties have an incentive to shift responsibility and cost to the other. This has a tendency to lead to perverse incentives and inefficient production of services.

4.3.3 The Unemployment Benefit System[3]

The unemployment benefit system in Finland consists of labour market subsidies and unemployment allowances. Unemployment allowances can further be classified into the basic allowance paid by the state through the Social Insurance Institution (UA), and the earnings-related allowance paid by the unemployment insurance funds (UI).

In order to qualify for an unemployment allowance the unemployed must have been employed for 43 weeks during the past two years. Earnings-related allowance also requires that the unemployed has been a member of an unemployment insurance fund for 10 months prior to unemployment.

Unemployment allowance can be received for 500 days. An exception is made for the unemployed who turn 57 before the benefits expire. These unemployed are entitled to an extension until the age of 60. The age limit for the benefit extension was 55 up to 1997 and was raised to 59 in 2005.

Those unemployed who do not meet the employment condition, or who have already received unemployment allowance for 500 days, can receive a labour market subsidy from the state. The labour market subsidy is paid, subject to a means test, for an unlimited period. Both the labour market subsidy and the basic allowance are currently 23,24 euros per day (2005). Dependent children increase the benefit. The earnings-related unemployment allowance consists of a basic amount equal to the basic allowance, and an earnings-related part. The earnings-related part is 45% of the difference between previous daily earnings and the basic allowance. There is no ceiling on the unemployment benefits, but earnings exceeding 2091,60 euros per month increase the allowance by only 20% of the exceeding amount. In practice, this implies that for the median earner the gross replacement rate is 55%. Since benefits increase by only a fraction of the previous earnings, the replacement rate decreases with earnings. For someone earning twice the median income, the gross replacement rate is 38%.

Unemployment benefits are taxable income in the same way as wages and salaries. Due to the progressive taxation, net replacement rates are higher than gross replacement rates. Accounting for the effect of taxes increases the replacement rate for the median earner from 55% to 64%. Other earnings-related benefits such as housing allowance further increase net replacement rates.

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[3] This section draws upon Koskela and Uusitalo (2003).

4.4 The Relationship Between Socio-economic Status, Access to Health Care and Health Expenditure

One approach to find out whether socio-economic status causes bad health or whether the causal direction is the opposite is to study whether lower socio-economic strata have lower access to health care. This means that holding the type of illness constant, individuals from lower social classes use physician services less. If this is the case, then it is possible that low socio-economic status is causative of worse health.

Häkkinen (1991, 1999, 2002) uses data from the 1987 and 1996 Finnish Health Care Surveys, which are nationally representative cross-sectional samples of the total non-institutionalised population. All these studies show quite clearly that a higher income is positively correlated with greater physician use, holding a set of self-related health indicators constant. Further evidence on the same question can be found in an international comparative study by van Doorslaer *et al.* (2000). Using the same data as in Häkkinen (2002), it is shown that in Finland, income is positively related to physician use, holding need measured by self-assessed health, as well as other control factors constant. Interestingly, this relationship is even truer regarding Finnish private health care. Individuals with higher incomes "go private to jump the public queue". This may explain some of the observed inequality in health between socio-economic strata.

Other studies using other data sets indicate small or no effects of income or socio-economic status on the utilisation of physician services. Häkkinen *et al.* (1996) used a sample of telephone-assisted interviews for 1991–1994 to study, among other things, whether socio-economic status could explain the use of physician services, holding the type of illness constant. They found only marginal effects of socio-economic status, and no income effects. The same result emerges from Ahlamaa-Tuompo's *et al.* (1998) study of children's visits to a paediatric trauma unit. In this study the topic was whether children from more affluent homes were more likely to use the services of a paediatric trauma unit in Helsinki, when user charges were introduced in 1991. Again, the authors find only minor differences in children's visit rates between unequal socio-economic classes, and they conclude that "it is apparent that socio-economic status cannot explain the change in visit rates as a result of the introduction of user charges" (p. 269).

Some further evidence can be found in studies of municipal health care spending. Remember that in Finland, municipalities, alone or in cooperation with other municipalities, are responsible for delivering social and health care services to their citizens. The municipalities are also authorised to levy local taxes to finance services, and they have substantial freedom on how and to what extent they provide health care services for their inhabitants. Indeed, health care spending per capita also varies substantially between municipalities. On this topic, Häkkinen and Luoma (1995) provide convincing evidence that there is a positive relationship between average annual disposable income per capita in a municipality and the level of total health care expenditure. So, although this study does not necessarily prove that individuals belonging to lower socio-economic classes have less access to health care, it certainly points in that direction.

Some other types of physician utilisation studies also point to a causal link going from socio-economic status to health status. Martikainen *et al.* (2001b) and Valkonen *et al.* (2000) report that mortality decreased faster in higher social classes than in lower ones during the 1970s and 1980s. In the 1980s, new treatments and secondary prevention of cardiovascular diseases were adopted. It is possible that those in the higher social classes had better access to such new treatments. Indeed, in the late 1980s, bypass operations were 35% more common among male non-manual than among male manual workers, despite the marked mortality and morbidity differences running in the opposite direction (Keskimäki *et al.* 1997). Then, in the first part of the 1990s, socio-economic inequality in mortality from cardiovascular disease did not continue to increase, perhaps owing to the fact that knowledge and availability of modern treatments for these diseases were now available for the whole population (Valkonen *et al.,* 2000).

In the Finnish case there are thus quite a few studies that have investigated Finns' utilisation of physicians. However, the opposite question, i.e., whether or not health related expenditure affects health, seems to be an area where very little or no work has been done in Finland. It is possible that this shortage of research has to do with data constraints. Indeed, a reasonable set-up for such a study would be to study individual changes in health between two points in time, using some measure of health expenditure as an explanatory variable. However, because of the scarcity of panel data on health status in Finland, such studies have, as far as we know, not yet been done.

4.5 The Relationship Between Socio-economic Status and Health Status

In this section we discuss Finnish research on the relationship between socio-economic status, occupational status, and health status. We start with general studies, and then look at studies focussing on the older workforce. It should be noted that for the older workforce, hardly anything has been written that would specifically treat the association between socio-economic status and health. On the other hand, the relationship between health status and labour force status for the old aged has been researched to some extent.

4.5.1 General Studies

Finnish sociologists have been active in examining the correlation between socio-economic status and various measures of health. As discussed in Section 4.2, several measures of socio-economic status such as occupation, educational level, or income have been used. The main research question has been, not surprisingly, whether the health status differs between socio-economic classes. There have also been efforts to investigate whether these differences have changed over time, and whether socio-economic differences in Finland are small or large in an international perspective.

Finnish research in this field has without doubt benefited from the availability of large register-based data sets. (See Table 4A.1 for an overview of data sets used in the research surveyed in this chapter.) Owing to the fact that the personal identification code is so commonly used for administrative purposes in Finland, Statistics Finland has created databases of individuals that cover the whole population. For example, the sample size in a typical study in this literature, is 23 million person-years (Valkonen *et al.,* 2000). Consequently, the precision of the estimates obtained must be considered exceptionally good.

The empirical strategy in this field of the literature has generally been of the following type: first, researchers have started with a large cross-section of individual data. In most cases, this cross-section has been drawn from census data, and has included background information on marital status, education, income, etc. Then, this basic data set has been linked, using the personal identification code, with indicators of morbidity or mortality. In the case of mortality studies, the data have been linked with death certificates for a follow-up period, usually five years. In the case of studies of morbidity, the basic data has been

linked to some survey of health, such as the 'Survey of Living Conditions' (Lahelma *et al.* 1997). Sometimes both mortality and morbidity have been combined to a health expectancy measure (Sullivan, 1971). After that, it is possible for the researcher to investigate, by use of statistical methods, whether a certain measure of socio-economic status is correlated with higher mortality or morbidity.

The results from this type of studies can be summarised in three points. First, the studies show almost without exception that health is positively correlated and mortality is negatively correlated with socio-economic status. This seems to be the case regardless of which measure is used for socio-economic status (income, education, occupation, housing tenure, etc.), and irrespective of which gender or age group is studied (Martikainen *et al.,* 2001a; Martikainen, 1995; Martelin, 1994). The same pattern can also be found in studies of health expectancy (Valkonen *et al.,* 1997), meaning that a higher socio-economic status is correlated with better health.[4] The strength of this relationship tends, however, to decline rapidly at ages above 65 (Martikainen *et al.*, 2001a; Martelin, 1994), meaning that there are smaller socio-economic differences in mortality at high ages. However, studies that particularly focus on the older working-age population are rare, and as far as we know there is no evidence suggesting that socio-economic differences in mortality are smaller for 50–64 year-olds that for 40–50 year-olds, for instance.

Second, looking at developments over time, *overall* mortality has decreased in Finland.[5] One of the major explanations for this development is that mortality from ischemic heart disease has declined rapidly. This in turn has partly, but not entirely, been due to a decrease in individual's exposure to risk factors, such as smoking and high blood cholesterol levels (Vartiainen *et al.,* 1994).

The third point concerns socio-economic differences in ill health in an international perspective. Although comparative studies of socio-economic differences in mortality and morbidity are difficult to perform, owing to problems with reliability and comparability of data, some large-scale efforts have been done in order to overcome these problems (Mackenbach

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[4] Interestingly, the difference in disability-free life expectancy between individuals with high education and individuals with low education was larger than the difference in overall life expectancy.

[5] Martikainen *et al.* (2001b), for instance, report that life expectancy at the age of 35 rose by around five years for men and by around four years for women from the early 1970s to the early 1990s. The same general pattern can also be found in Lahelma *et al.* (1997).

et al., 1997; Kunst *et al.,* 1998). In general, the findings point in the direction of socio-economic differences in mortality and morbidity among men in Finland being somewhat larger than average, at least in a Western European perspective. This is particularly true for men aged between 30 and 44 years. One explanation for this is a relatively high risk of death from accidents and violence in that age bracket.

As already stated, it is an important question to determine whether low socio-economic status, as measured by income for instance, causes bad health, or whether bad health reduces socio-economic status. In terms of methodology, we do not know of any Finnish studies in which researchers outright would have tried to model this bi-directional relationship. One way to overcome the causality issue may consist in estimating a reduced-form health equation where SES is treated as an endogenous variable. Instead, in most of the research, various other ways to shed light on this fundamental modelling problem have been used. This probably reflects the fact that most of the material has been written either by sociologists or physicians, who tend to favour using somewhat different methods than economists. Nevertheless, several different, sometimes very innovative, approaches have been used in the Finnish literature. However, most of the studies that will be reviewed in the following do not give a full answer to the causality question, but rather indirectly support one or another hypothesis.

As already demonstrated, several studies have documented that Finns with higher education live longer and have better health. Evidence on whether education actually causes better health is virtually non-existent, though. However, Häkkinen *et al.* (2003) constitutes an exception. In their study, the health at the age of 31 of a cohort of individuals born in Northern Finland in 1966 is explained by among other things their educational level. The aspect, which makes this study very interesting, is that the authors are able to control for health and health habits of the same individuals when they were 14. The results show quite convincingly that more education actually improves the health of men. However, the results are not statistically significant for women. The authors consequently conclude by stating that the education of young men should be encouraged in order to improve their health.

Another approach to get a grip on the causality question is simply to analyse whether those in lower socio-economic classes, who have worse health and higher mortality, have life-styles that encompass more risky behaviour, such as smoking. In our view, Finnish research shows quite clearly that part of the excess mortality in the lower socio-economic strata can, indeed, be attributed to this kind of explanation.

Pekkanen *et al.* (1995), for example, report that about half of the excess mortality from ischemic heart disease among men in lower socio-economic classes was associated with their more adverse cardiovascular risk factor profile. A more adverse cardiovascular risk profile in this instance means more smoking, less exercise, and higher blood cholesterol levels. In terms of answers to the causality question, an economist's answer based on this information would most likely not be that lower socio-economic status causes bad health. Instead, a common third factor, perhaps a difference in time discounting or unfavourable childhood experiences, causes both worse health through risky behaviour such as smoking, and a low socio-economic status through perhaps less investment in education. However, one must remember that in Pekkanen *et al.* (1995) a large part of the excess mortality among the lower social classes compared to higher social classes still remained unexplained, and the study cannot consequently completely dismiss the hypothesis that a low socio-economic status causes worse health.

The evidence from studies of alcohol-related causes of death paints a similar picture. In the 1980s, socio-economic differences in mortality increased in Finland. One reason was that the divergence between low and high socio-economic classes in terms of alcohol-related causes of death started to widen (Valkonen *et al.,* 2000). This coincided with a per capita increase of alcohol consumption by almost 20% between 1985 and 1990. Thus, it seems as if the rise in disposable income in the second half of the 1980s increased risky behaviour in the form of drinking, but predominantly within the lower social classes. This is hardly evidence in favour of a causal link between socio-economic status and ill health, though. Instead, it is probably evidence in favour of a third factor which affects both, say investment in education and risky behaviour in the form of drinking, and that in the second half of the 1980s finding money to spend on drinking was less of a constraint than earlier for the lower social classes.

Another highly interesting approach in resolving the issue can be found in studies of the relationship between unemployment and mortality. The major research question in this field is, not surprisingly, whether unemployment leads to higher mortality. In this type of research, causality is a major issue.[6] On the one hand, a positive correlation between unemployment at a point in time and mortality in a follow-up period may be due to a causal effect. Becoming jobless may cause increased psychological stress, which affects mental and physical health negatively. Indica-

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[6] This paragraph draws on the work of Martikainen and Valkonen (1996).

tive of this may be an increased use of tobacco, alcohol or other drugs. Loss of income, loss of social networks, and social stigma may also have independent effects on health and mortality. On the other hand, the relationship may be due to selection, as those unemployed or those prone to become laid off have pre-existing ill health. It may also be the case that socio-economic factors, or life-styles, such as heavy alcohol use or drug use, affect both mortality and the probability of being unemployed at a certain point in time.

In order to find out which one of the two explanations, causality or selection, is more important one would need exogenous variation in the unemployment variable. If unemployment exogenously increases quicker for some groups of individuals while it does not for other groups, and the development in mortality is not different between the groups, there is evidence of selection. On the other hand, if an exogenous increase in unemployment for one group of individuals does lead to a relatively larger increase in mortality, then there is evidence of a causal effect of unemployment on mortality. Interestingly, in order to examine a situation where unemployment would vary exogenously, researchers have studied periods or situations where macroeconomic conditions have brought about differences in the way unemployment has increased between groups of individuals. Indeed, it would be unrealistic to assume that a recession in an entire industry, for instance, is not exogenous to an individual.

In terms of results, studies show almost without exception that the unemployed have higher mortality (Valkonen and Martikainen, 1995; Martikainen and Valkonen, 1996, 1998; Jäntti *et al.,* 2000) than the employed. Regarding the question of causality, the results indicate that selection probably is the most important explanation, because the studies using situations where macroeconomic conditions have brought about differences in the way unemployment has increased between groups of individuals, have generally failed to find that mortality rose more rapidly in groups where the unemployment rate increased faster. For example, in Martikainen and Valkonen (1996), individuals who became unemployed in 1988, when the national unemployment rate was low, were compared to individuals who became unemployed in 1992, when the national unemployment rate was very high. The excess mortality of individuals who experienced unemployment when national unemployment was low was greater than among those who experienced unemployment during the recession in the beginning of the 90s, when the national unemployment rate was high. This supports the selection hypothesis, because individuals who became unemployed in 1992 were to a greater extent similar to the employed population. The individuals who became unemployed before

the recession, on the other hand, were probably selected from a population of more unfit individuals.[7]

In summary, it is fair to say that the Finnish evidence on the association between socio-economic status and health status does not give unequivocal support for any of the causality directions, or for the so-called 'third factor' explanation for the social gradient in health. There is quite a bit of evidence suggesting that individuals with higher incomes use physician services to a greater extent, holding health status constant. This would indicate that some of the socio-economic differences in health might simply be due to the fact that richer individuals have better access to health care. There is also evidence of a direct causal link between education and men's health in Finland. On the other hand, there is also evidence pointing towards the fact that individuals belonging to lower socio-economic classes have more risky lifestyles, which also explains some of the socio-economic differences in health. Studies on the relationship between unemployment and mortality also indicate that pre-existing ill health is a major explanation for the observed relationship. Perhaps then, the best conclusion is that there is simultaneously both a direct causal link going from socio-economic status to health, and another type of relationship, where a third factor, perhaps attitude to risk, affects positively both the probability of having good health and of belonging to a higher social class.

Again, it should be emphasised that there is very little evidence on whether these relationships are any different among the older working age population, compared to the working population as a whole. As such this represents a topic for further research.

Furthermore, in terms of methodology, almost no studies have been done by economists on this topic. This is also reflected in the choice of methodology. Sociologists and physicians, who have been the most active ones in this field, tend to make use of specifically designed datasets and other types of research design to approach the question, whereas economists are more inclined to use other types of econometric methods, such as instrumental variable and simultaneous equation models.

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[7] Leino-Arjas *et al.* (1999) report that among middle-aged construction workers, long-term unemployment was predicted by among other things occupational history, health problems, smoking, and high alcohol consumption. This gives some further weight to the selection hypothesis.

4.5.2 Studies Focussing on the Elderly Workforce

As already mentioned, what has been researched in the Finnish case regarding the elderly workforce is not so much the association between socio-economic status and health in the fashion described in the previous section, but the emphasis is more on the effect of health status on retirement. Indeed, in a country with an ageing population, such as Finland, it is clear that microeconometric studies of individuals' decision to retire early are of great interest. In the Finnish literature, the main focus of these retirement studies has generally been on whether financial incentives are important determinants of an individuals' choice to retire early. Thus, it is hypothesised that an individual maximises his or her utility before and after retirement, and the larger the utility in retirement becomes in relation to utility before retirement the more likely the individual is to retire early.

Nevertheless, despite the focus on financial incentives, it is quite obvious that also the health status of an individual will affect the retirement decision, and for that reason, health indicators have been included in quite a few of the Finnish retirement studies.

In terms of methodology, the most common approach in this type of research is to use duration analysis; i.e., the researcher aims at investigating how various explanatory variables affect the time until an individual retires (Hakola, 2002; Lilja, 1996). In some cases, only one exit channel is considered; i.e., all forms of retirement are considered at the same time. In other studies, the retirement decision is investigated in a competing risks framework, where the various explanatory variables are allowed to have different effects on different forms of retirement, such as early retirement or unemployment pension (Hakola, 2002; Lilja, 1996). In other studies (Gould, 1996; Pyy-Martikainen, 2000), just two periods are considered: period t when all individuals in the sample are working, and period $t+1$, when some individuals have retired and others have not. For the researcher it is then possible to use some form of limited dependent variable model, such as logit or probit, to estimate whether explanatory variables measured at time t can explain whether some individuals made the transition from working in time t to being retired in time $t+1$.

Within this literature, Finnish researchers have used data from various government registers, sometimes combined with survey data. Gould (1996) surveyed some 600 individuals in 1990 and again in 1994, using a mail questionnaire. This information was then appended with information from the registers of the private sector employment pen-

sion scheme. Self-evaluated health status was measured on a three-grade scale (good, moderate, poor). Both Pyy-Martikainen (2000) and Hakola (2002) used samples from the Finnish Employment Statistics as a base for their microeconometric studies. In addition, they added data on health from the Social Insurance Institution's register on Reimbursed Medication on Chronic Diseases. Thus, they both used the fact that an individual has received reimbursement for a chronic disease as an indicator of ill health.

The main message from these retirement studies is that bad health positively affects the probability of retiring early. Interestingly, in a competing risks framework, Hakola (2002) also finds that while bad health affects positively the probability of ending up with unemployment pension or old-age pension, it positively influences the probability of retiring with disability pension. In line with Hakola (2002), also Gould (1996) reports that the main effect seems to be running though the disability retirement channel.

Thus, it seems rather obvious that bad health can cause early withdrawal from the labour market in Finland. On the other hand, one may, as already stated, suspect that there is also a link going from labour market participation to health. In other words, is it the case that individuals' work history was actually causative of the ill health in the first place? However, in the Finnish context, this pathway seems largely unexplored.

4.6 Concluding Remarks

In Finland, quite a bit of research has been done by sociologists and physicians on the issue of socio-economic differences in health and mortality. Indeed, owing to the fact that researchers have had access to register data covering the whole population, these differences are very well documented. Nevertheless, as has been described in this survey, studies focussing particularly on the older working-age population are scarce. However, there is an exception to this, and that concerns studies of the retirement behaviour of the elderly workforce, of which there have been a few. Such studies, where individuals' decision to retire early is investigated, should be of major interest in a country like Finland, where the population is ageing rapidly.

There is clearly room for more Finnish research in this area. In terms of retirement studies, a factor that has not been sufficiently investigated is the issue of how personal wealth affects the retirement decision, and

particularly the decision of the older workforce to go on part-time retirement. Because, in the same way as the Finnish population is becoming older, it is also becoming wealthier.

As described in Section 4.3, some Finnish studies have investigated whether there are differences in health spending between socio-economic groups. However, as far as we know, no Finnish study has taken a step further to study whether changes in health spending create changes in health.

A third topic for future research is the issue of whether work itself is the actual culprit of the ill health of the elderly workforce. Indeed, we know that bad health has a positive effect on an individuals' probability of retiring early, but perhaps the worsened health status is really a result of many years of strain at the workplace?

It is quite evident that panel data on health status, socio-economic status and labour market status would be of great interest. For example, with such data, researchers would have far greater opportunities to answer questions of causality, by focussing on changes in health over time for the same individual. For example, assume that the health status of elderly individuals is generally deteriorating with age. Then, what is the impact of part-time retirement on health?

In principle, the creation of such panel data utilising the available registers of Statistics Finland is possible. To some extent it has already been done. In Hakola's (2002) study of retirement, individual register-based employment statistics were combined with data on reimbursement of prescription drugs. Although this represents an interesting solution to the data problem, data on pharmaceutical use may not, for obvious reasons, be the best choice of health indicator. Instead, increased attention should perhaps be paid to the Finnish Hospital Discharge Register, in which Finns' hospital visits are recorded. Combining that register with, for example, employment statistics could provide interesting opportunities.

Finally, it is of course also possible to combine existing survey data with longitudinal register data. These kinds of linkages have been done before (e.g. Valkonen *et al.,* 1997), but there are clearly more opportunities. Specifically, one could envisage that linking the new Health 2000 data, which is a survey data set including a huge number of health related variables, with register data could be particularly fruitful.

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Appendix 4A.1: The Available Data Sources and Questionnaires

DATA SET	DESCRIPTION ARTICLE (example)	RESEARCH ARTICLE (example)	CONTENTS
1991-1994 annual telephone assisted computer surveys (CATI)	Aro, S., Byckling, T., Häkkinen, U., Kerppilä, S. and Salonen, M., 1994. *Aikuisväestön terveyspalvelujen käyttö ja terveydentila 1993.* Helsinki: Stakes Aiheita 24.	Häkkinen, U., Rosenqvist, G., and Aro, S., 1996. Economic Depression and the Use of Physician Services in Finland. *Health Economics*, **5**: 421-434.	Cross-section. 1991-1993: N about 3,135. About 150 questions about health and use of medical care.
Finnish Health Care Surveys	Arinen, S.; Häkkinen, U.; Klaukka, T.; Klavus, J.; Lehtonen, R. and Aro, S., 1998. *Suomalaisten terveys ja terveyspalvelujen käyttö. Terveyshuollon väestötutkimuksen 1995/96 päätulokset ja muutokset vuodesta 1987*. Helsinki: Gummeruksen kirjapaino.	Häkkinen, U., 2002. Change in the Determinants of Use of Physician Services in Finland between 1097 and 1996. *Social Science and Medicine,* **55**: 1523-1537.	Cross-section. 7,294 adults and 1,743 children. Variables on health status, use of medical services, medical expenses.
Finnish Hospital Discharge Register	Keskimäki, I. and Aro, S., 1991. Accuracy of Data on Diagnosis, Procedures and Accidents in the Finnish Hospital Discharge Register. *International Journal of Health Science,* **2***:* 15-21.	Keskimäki, I., Koskinen, S., Salinto, M. and Aro, S., 1997. Socioeconomic and Gender Inequalities in Access to Coronary Artery Bypass Grafting in Finland. *European Journal of Public Health*, **7**: 43-51.	
North Karelia Project	Vartiainen, E., Puska, P., Jousilahti, P. *et al.*, 1994b. Twenty-year trends in coronary risk factors in North Karelia and in other areas of Finland. *International Journal of Epidemiology,* **23***:* 495-504.	Vartiainen, E., Puska, P., Pekkanen, J., Tuomilehto, P. and Jousilahti, P., 1994a. Changes in Risk Factors Explain Changes in Mortality from Ischemic Heart Disease in Finland. *British Medical Journal,* **309:** 23-27.	Comparable surveys of cross-sectional population samples, every fifth year since 1972. Variables on coronary heart disease risk factors.
Register data from Statistics Finland: Census, Death Register, Labour Force Data		Martikainen, P. and Valkonen, T., 1996. Excess Mortality of Unemployed Men and Women During a Period of Rapidly Increasing Unemployment. *Lancet*, **348**: 909-912.	N = the whole population. Longitudinal.
Survey of Living Conditions	Ahola, A., Djerf, K., Heiskanen, M. and Vikki, K., 1995. Elinolotutkimus 1994. Aineiston keruu, Vol 2. Helsinki: Tilastokeskus.	Lahelma, E., Rahkonen, O. and Huuhka, M., 1997. Changes in the Social Patterning of Health? The Case of Finland 1986-1994. *Social Science & Medicine*, **44**: 789-799.	The domestic predecessor to the ECHP. Cross-section. 1994: N= 8,650. Large number of variables on housing, social circumstances, etc.

Appendix 4A.1 (continued)

Terveys 2000	Aromaa, A. and Koskinen S., 2002, Terveys ja toimintakyky Suomessa. Terveys 2000 – tutkimuksen perustulokset. Helsinki: National Institute of Public Health.		Mainly cross-section. N = 8,082. Panel of 985 individuals from Mini-Finland 1978-1980. Variables: Several hundred, mainly medical.
The Longitudinal Study of the Northern Finland Birth Cohort of 1966	Rintakallio, P., 1988. The Longitudinal Study on the Northern Finland Birth Cohort of 1966. *Paediatric And Perinatal Epidemiology,* **2:** 59-88.	Häkkinen, U., Järvelin, M-R., Rosenqvist, G., and Laitinen, J., 2003. Terveys, Koulutus ja Elintavat: tuloksia Pohjois-Suomessa Vuonna 1966 Syntyneitä Koskevasta Tutkimuksesta, in U. Kiiskinen, ed., *Terveystaloustiede 2003.* Helsinki: Stakes.	N = 12,058, all born in 1966 in Northern Finland. Large number of medically oriented variables measured at birth, at age 14, and at age 31.

N = number of observations.

Appendix 4A.2: Data used in the Literature

Authors	Data	Years	Method	Sample size	LHS	RHS
Ahlamaa-Tuompo (1998)	Outpatient data gathered at the Aurora Hospital in Helsinki	1989-1994	Pooled OLS	38,000	Physician utilisation	SES
Gould (1996)	Mail survey matched with register data on private sector pension schemes	1990-1994	Logit	1,123	Labour force participation	HS (+others)
Häkkinen (1991)	Finnish Suvey on Health and Social Security	1987	Multiple Indicator and Multiple Causes (MIMIC)	10,712	HS, physician utilisation	SES (+others)
Häkkinen (2002)	Finnish Health Care Surveys	1987, 1996	Logit+zero-truncated negative binomial	8,492	Physician utilisation	SES, HS
Häkkinen *et al.* (1996)	Data from Computer Assisted Telephone Interviews	1991-1994	Logit+zero-truncated negative binomial	7,000	Physician utilisation	SES, HS
Häkkinen *et al.* (2003)	The Longitudinal Study of the Northern Birth Cohort of 1996	1966-	LISREL	4,200	HS	SES (schooling)
Hakola (2000)	Employment statistics with additional matched data on reimbursement of prescription drugs	1987-1996	Duration	32,619	Labour force participation	HS (+other)
Jäntti *et al.* (2000)	Census data matched with death records	1987-1994	Panel GEE	3,000	Mortality	Labour market status
Keskimäki *et al.* (1997)	Finnish Hospital Discharge Register matched with death records	1985-1991	Descriptive		HS (Coronary Bypass Grafting Operations)	SES
Kunst *et al.* (1998)	Census data matched with death records	1980-1989	Poisson		Mortality	SES
Lahelma *et al.* (1997)	Surveys of Living Conditions	1987, 1994	Descriptive	12,057+ 8,650	HS	
Mackenbach *et al.* (1998)	Census data matched with death records	1985-1992	Logistic		Mortality	SES
Martelin (1994)	Census data matched with death records	1980-1995	Poisson	4,1 million	Mortality	SES

Appendix 4A.2 (continued)

Authors	Data	Years	Method	Sample size	LHS	RHS
Manderbacka *et al.* (2001)	Survey of Living Conditions	1986, 1984	Logistic	12,057+ 8,650	HS	SES
Martikainen & Valkonen (1996)	Census data, employment statistics, matched with death records	1987-1993	Poisson	2,5 million	Mortality	Employment status
Martikainen & Valkonen (1998)	Census data matched with death records	1985-1993	Poisson	16 million	Mortality	Labour market status
Martikainen (1995)	Census data matched with death records	1970-1985	Poisson	4,45 million	Mortality	SES
Martikainen *et al.* (2001a)	Census data matched with death records	1990-1996	Poisson	8,14 million	Mortaility	SES
Martikainen *et al.* (2001b)	Census data matched with death records	1971-1995	Descriptive		Mortality	
Pekkanen (1995)	North Karelia Project matched with death records	1972-1987	Duration	18,500	Mortality	SES + health behaviour
Pyy-Martikainen (2000)	Employment statistics additional matched data on reimbursement of prescription drugs	1987-1994	Nested Logit	11,000	Labour force participation	HS (+other)
Valkonen & Martikainen (1995)	Census data matched with death records	1970-1980	Descriptive	2,8 million	Mortality	Labour market status
Valkonen *et al.* (2000)	Census data matched with death records	1981-1995	Descriptive	23,3 million	Mortality	
Valkonen *et al.* (1997)	Survey of Living Conditions matched with death records	1986-1990	Descriptive	12,057	Health expectancy	SES
Vartiainen *et al.* (1994a)	North Karelia Project matched with death records	1972-1992	Logistic	29,000	Mortality	SES + health behaviour

LHS = left-hand-side variable; RHS = right-hand-side variables; HS = health status; SES = socio-economic status.

CHAPTER 5

Socio-economic Inequalities in Health: A Review of the French Literature

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5.1 Introduction

Economists as well as epidemiologists have reported substantial socio-economic inequalities in health in many countries and France is no exception. For example, the life expectancy of a 35-year old white-collar worker in France is 44,5 whereas the corresponding figure for a 35-year old manual worker is 38. Likewise, at age 35, the life expectancy of workers in academic occupations is 46 while that of service employees is 36,5. Moreover, trends over time indicate that these inequalities have been in steady increase since the 1950s, as the mortality rate has diminished more rapidly for white-collar workers than for blue-collar workers (Desplanques, 1993; Mesrine, 1999).

Understanding the sources of such inequalities has important implications for the design of economic and public health policies aiming at reducing health inequalities. Not only is health an important determinant of the well-being of the citizens (van Praag *et al.*, 2002), but it also significantly contributes to economic growth (Bloom and Canning, 2003; Bloom *et al.*, 2004). Moreover, reducing health inequalities is not only socially profitable in the short term, but it might also result in less costly redistributive policies in the long term. An important related issue is the potential effect of health on labour market participation behaviour, especially in countries like France, where the ageing problem adds to the pension funding system being based on intergenerational solidarity.

During the last decades, a number of potential determinants of socio-economic inequalities in health have been explored in the literature. Among these, working conditions and access to health care have been given special attention. However, since the publication of the Black report (Black *et al.*, 1982), researchers find it difficult to explain why health inequalities persist despite most countries having adopted active working conditions improvement policies, as well as national health systems aiming at widening access to health care. Another hypothesis that has been investigated is that of selection, where it is assumed that it is health which influences one's socio-economic status and social mobility. Again, the evidence is mixed and, although it suggests that health influences individuals' decisions to withdraw from the labour market, it is less conclusive with respect to the effect of health on occupational achievements (Marmot, 1986) or on wages (Currie and Madrien, 1999). A large body of literature has also investigated the effect of life style behaviour on health. The existing evidence suggests that such an effect is rather limited, albeit significant (Marmot, 2000). A number of researchers have argued that the causes of socio-economic health disparities must be searched for

over the individuals' life cycle. The idea is that adults' health status is the outcome of cumulative effects starting from early childhood environment (Aïach, 2004). Others have argued that it is not the absolute level of one's economic endowments which determines health but rather one's relative position in the social hierarchy (Marmot and Wilkinson, 1999). One corollary of this view is the so-called income inequality hypothesis, which sees income inequality as a further potential determinant of health. Unfortunately, the existing empirical evidence is again mixed (see Mellor and Milyo, 2001, for instance).

It is, of course, likely that there are also other phenomena at play not yet explored by researchers. For instance, Couffinhal *et al.* (2005) argue that the functioning of the health system might itself yield socioeconomic inequalities in health. Even a system theoretically guaranteeing total access to health care might in reality result in unequal access.

However, our view in this chapter is that the association between health and socio-economic status is complex and raises a number of methodological issues which have probably not been adequately accounted for. First, the relationship between health and socio-economic status is bi-directional: a poor socio-economic status might yield poor health and at the same time, poor health might reduce one's earnings power and saving potential. This means that not only is it important to determine which of the causation or selection effects is the most important, but also to use suitable data and appropriate econometric tools to overcome the simultaneity and endogeneity problems that this implies. Second, a number of intermediate factors might be at play. For instance, it might be the case that poor socio-economic statuses yield less access to health care or to lower quality care, which in turn might result in poorer health statuses. Besides, there are also confounding factors determining simultaneously health as well as socio-economic statuses. One example of these is the individual's time preference as it has an effect on both educational and health investment decisions. Last but not least, investigation of how different socio-economic effects cumulate along one's life cycle requires cohort or longitudinal data over reasonably long time spans.

By reviewing the French literature, this chapter aims at assessing the extent to which these issues have been analysed using French data, the main goal being to identify knowledge gaps as well as data needs. It is organised as follows. Section 5.2 discusses the question of how to measure individuals' health and socio-economic status. Section 5.3 briefly presents important aspects of French institutions; namely, the public health insurance system, the unemployment benefits system and the pension

funding system. Section 5.4 reviews analyses focussing on the association between socio-economic status and health spending behaviour, as well as on the impact of the latter on health status. Section 5.5 envisages the association between health and socioeconomic status in a more direct way, as it reviews studies that do not raise the health spending issue. In particular, it contains a sub-section summarising studies that focus on the specific case of the older workforce. Section 5.6 summarises one study examining the effect of income inequality on mortality. Section 5.7 presents some concluding remarks.

5.2 Health Measures and Socio-economic Indicators

There is now a wide body of qualitative and quantitative information on the association between health status and socio-economic status. One important characteristic of this literature is the variety of measures of socio-economic and health status it resorts to. Not only are the quantitative results likely to be sensitive to the measures under consideration, but their interpretation might also be misleading if the economic content of such measures is not clearly defined. Therefore, only after a discussion of the various measures used in the literature will we review the main results it comes with.

5.2.1 The Measurement of Individuals' Health

According to the World Health Organization, health cannot be simply defined as the absence of illnesses and handicaps. It rather refers to *a state of complete physical, mental and social well-being*. This implies that any measure of health status should capture the variety of its dimensions, by including at least indicators of physical, mental and social health. In the literature, the most widely used indicators rely on measures of morbidity and mortality or combinations of them.

According to Blaxter (1989), measures of morbidity should reflect the existence of well-defined diseases, either physical or mental, functional limitations such as the disability to perform ordinary life tasks, and self-assessment of health status. Not surprisingly, these are the three dimensions on which measures used in the literature rely. Self-reported health is rather widely used, probably because data including it are easy to obtain. In addition, it has been shown that it is significantly correlated with mortality, even when other objective health indicators are controlled for (Goldman, 1996; van Doorslaer *et al.*, 1997; Vistnes, 1997). However, since it provides a subjective measure of

health status, a number of authors have argued that it may be endogenous to individual labour market outcomes (Bound, 1990; Waidmann *et al.*, 1995). Others have shown that relative deprivation, due to income inequality, may induce individuals to report lower health status (see Mellor and Milyo, 2001, for a discussion).

Information on diseases, on the other hand could be exploited in different ways. In some cases, individuals simply report the set of illnesses that they suffered from and which physicians have diagnosed. Examples of studies using this kind of information on physical as well as mental health are Wu (2001), Smith (1999), Currie *et al.* (2003) and Glied and Lleras-Muney (2003), among others. Alternatively, the available information could be given to medical professionals who translate it into an index. Vital risk and disability risk are constructed in this way. While the former is meant to measure the extent to which individuals' health status is likely to affect their life expectancy (Gaussat and Glaude, 1993; Raynaud, 2002), the latter aims at assessing how individuals' ability to function is affected by their health status (Sermet, 1993; Mizrahi and Mizrahi, 1994). Interestingly, vital risk and disability risk allow one to predict the so-called relative ageing index (see Mizrahi and Mizrahi, 1994; Dumesnil *et al.*, 1997), which aims at enabling one to compare individuals' morbid age to actual age.[1]

Note that, by construction, the disability index as well as the relative ageing index account for individuals' ability to function, which Blaxter (1989) pinpoints as an important dimension of health status. Indeed, in many questionnaires, information on ordinary life functioning is available and could therefore be used to construct a specific index. For instance, Anderson and Burkhauser (1984) use the so-called ADL-score to measure the disabling obstacles respondents face during Activities of their Daily Living.[2]

Obviously, there are circumstances where detailed health related information cannot be used, either because it is not available or because it is simply irrelevant. The lack of appropriate data in some countries has induced researchers to use proxies of health status such as the body-

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[1] Relative ageing is measured as the prediction of individuals' morbid age from a regression where the left-hand-side variable is age and the right-hand-side variables are vital risk and disability.

[2] The score is constructed from the responses to questions like "*How difficult is it for you to walk several blocks?"* or *"How difficult is it for you to bath or shower without help?"*.

mass-index (see Strauss and Thomas, 1993, for an example).[3,4] Likewise, the above measures of health status may not be appropriate when the emphasis is on early childhood health. Again, a rough measure such as birth weights could be helpful.

Besides these morbidity based measures, another means of assessing individuals' health status is by resorting to mortality indicators. Studies based on mortality data use estimates of life expectancy to compare populations' health status.[5] Some authors argue, however, that due to advances in medical technology, there is the possibility that some individuals show a high life expectancy even when their health status is poor (Verbrugge, 1984; Riley, 1991). Indeed, despite remarkable gains in life expectancy in almost all OECD countries, mirrored in lower mortality rates and higher survival rates, it is not clear whether extra living years mean extra quality of life. Actually, life expectancy is indeed increasing, but at the same time, susceptibility to chronic diseases is larger, and functional limitations are more frequent. This casts suspicion on the appropriateness on life expectancy and any mortality based indicator as measures of health status.

This is probably why a number of life expectancy measures have recently integrated some assessment of quality of life (Bossuyt and Van Oyen, 2001). One such measure is the so-called disability-free life expectancy, where a distinction is made between years lived with no activity limitation and years of activity limitation.[6]

5.2.2 The Measurement of Socio-economic Status

A common feature of these measures is that they are rather static and, henca, neglect the dynamic dimension of health accumulation. Indeed, not only does health status vary across individuals, but it also evolves dif-

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3 The body-mass-index (BMI) is defined as boby weight in kilograms divided by the square of body height in meters.

4 See also Costa (1991).

5 Life expectancy is defined as the average number of years an individual is expected to live, starting from birth (for life expectancy at birth) or at age 65 (for life expectancy at age 65), on the basis of mortality statistics for a given observation period.

6 Since January 1st, 2006, every resident has to choose (freely) a practitioner as her/his referring GP and is no more allowed to resort to a specialist practitioner before consultation of her/his referring GP. Only the latter is allowed to orient the patient towards a specialist practitioner if needed. Otherwise, she/he incurs a penalty which takes the form of lower reimbursement rates.

ferently through time, partly because of factors that are out of individuals' control and partly because of individuals' behaviour in terms of health accumulation. For instance, the model in Grossman (1972) is based on the idea that current health depends on past health status, medical care history as well as the riskiness of health behaviour. However, whether out of or under individuals' control, these factors are tightly related to socio-economic status. Unfortunately, while most of the literature agrees upon the idea that socio-economic status is one of the best predictors of health (see, for instance, Marmot *et al.*, 1984, and Nelson, 1994), the question of the best measure of it is still the subject of a wide debate. Indeed, although socioeconomic status is commonly thought of as the rank order position of individuals in the social distribution of economic endowments, the question is that of what is the best indicator of that position. There are at least four candidates to play such a role: (i) Income and/or wealth, (ii) Education, (iii) Occupation, and (iv) Employment status.

Among these, income seems to be the most frequently used indicator, probably because of data availability. Income is, however, one of the least stable measures of socio-economic status since it continuously varies over time. Not only does it depend on age, but it is also subject to transitory shocks. Moreover, it is well-known that, in general, individuals show a rather low propensity to declaring the actual amount of income they earn.

In addition, a given amount of income does not always have the same meaning depending on whether its origin is labour, wealth or public transfer. In particular, as noted by Smith and Kington (1997, p. 159), "income in a single year may not adequately measure the financial resources available to an individual over the lifetime in which decisions affecting health are made". This led several authors to conclude to the superiority of wealth as a measure of economic capacity (McDonough *et al.*, 1997; Feinstein, 1993; Smith, 1999). Ross and Wu (1996) underline the difficulty of identifying a clear causal relationship between health and income. They argue that deterioration in health status is likely to result in lower income which, in turn, might lead to a worsening of health status. Likewise, Feinstein (1993, p. 285) suggests that "the problem of reverse causality is less likely to afflict household wealth than household income measures, primarily because wealth accumulates over time and hence is less affected by a single episode of illness". However, as noted by Feinstein (1993) himself and others (Smith, 1999; Levy, 2000), very serious negative health shocks could result in a decline in wealth. Similarly, as argued by Meer *et al.* (2003, p. 5),

"the relationship between wealth and health could still be driven by third factors, such as childhood environment, genetics, or the like".

It is probably these difficulties that yield researchers to resort to alternative indicators of socio-economic status and especially those which are less likely to vary over time. From this point of view, education is certainly a serious candidate. Unfortunately, it has limitations that are also difficult to overcome. First, causality is still an issue since bad health status during one's childhood is likely to influence negatively educational investments, which might in turn result in lower investments in health. Second, just like that of health status, the distributions of measures like school leaving age or educational attainments are cohort-specific and as such, raise identification problems as well (Chenu, 2002).

This argument applies to occupations as well since occupational distributions are also heavily influenced by cohort effects. Moreover, as argued by Nelson (1994), measures of socio-economic status that rely on occupations are likely to be biased, reflecting the gender and race segregation component of occupational distributions.

Of course, occupations are certainly not a relevant measure of socioeconomic status in analyses focussing on the elderly since the majority of these are very likely to be retired. For those who are still in the labour force, employment status is also often considered as a measure of socioeconomic status. Yet, as a correlate to education, it might suffer from the same limitations. In addition, as noted by Chenu (2002), such an indicator allows one to capture neither the situation of individuals who earn very high incomes from other sources than their own labour, nor that of individuals whose social status is so precarious that they are durably stuck out of employment.

Despite the limitations that each of these indicators suffers from, researchers seem to consider income and education to be the best predictors of health status. To be more specific, it is argued in the literature that for young individuals, income is a better measure of socio-economic status than education. For instance, Nelson (1994) observes that the younger the age groups under consideration, the more homogeneous are within-group educational achievements. In contrast, Winkleby *et al.* (1992) suggest that analyses focussing on older individuals should better measure socio-economic status via education rather than income or occupations. Probably, what this implies is that only via a combination of the available indicators could one appropriately measure socio-economic status.

5.3 The Institutional Framework

5.3.1 Pensions

One category of the population which deserves specific attention is the older workforce, which we define in the sequel as that of participants to the labour market aged 50 or more. Indeed, due to the well-known baby-boom effect, it is expected to grow significantly in the near future. In France for instance, the growth rate of this population category is expected to reach 40% over the next 20 years (Guillemot *et al.*, 1998). At the same time, one also observes remarkable differences in its labour market participation rates across OECD countries. In 1999, the participation rate varied between 65 and 75% for those aged 55 to 59 and between 15% in France and 75% in Japan for the 60–64 year-olds (Fournier and Givord, 2001; Martin-Houssart and Roth, 2002). In general, these patterns are attributed to economic factors such as the trend in unemployment rates during the last three decades, decreasing growth rates, changes in the structure of labour demand, etc. (Bommier *et al.*, 2001). Besides, institutional aspects are also gaining economists' interest. In particular, retirement age is thought of as a serious explanation as well. This holds true at least in France, where both the retirement age and participation rates of the older workforce are among the lowest in the OECD area.

To the extent that the focus is on the association between health and socio-economic status, it is obvious that these institutional aspects might act as a third factor in this association. One has, indeed, to discriminate in individuals' participation behaviour between the part that is due to institutional considerations and the part that is due to health *per se*. This is particularly important in the context of international comparisons since differences in labour market participation rates do not necessarily reflect similar differences in health inequality.

The French retirement system is rather complex at least because neither the rights nor the obligations are uniform across categories of citizens. Roughly speaking, however, one could distinguish between a General Scheme *(Régime Géneral),* which applies to the majority of private sector employees, and a number of specific schemes. Private sector employees (and their employers) contribute to a two-level retirement system. The first level consists of a pension distributed by the General Social Security Regime. Contributions and pensions are based on wages, up to a certain ceiling.[7] The

[7] The monthly wage threshold was FF 14,950 in January 2001.

second level consists of a pension distributed by an obligatory supplementary regime. Contributions are based on wages up to three times (for employees) or four times (for management) the value of the threshold. In 2000, 17 (out of 22) million employees contributed to the General Scheme. Although the legal retirement age was set to 60 in 1982, only if beneficiaries have contributed during 150 quarters (37,5 years) do they become eligible for full pension. Full pension then equals 50% of the average wage of the two best years of employees' working career.

Beside the General Scheme, two other broad categories of workers could be distinguished: the self-employed, on the one hand and public sector employees, on the other hand. Within each of these categories, there is a variety of schemes that are in general specific to occupations. However, a common characteristic of all self-employed schemes is that the retirement age is set at 65. Likewise, public sector employees (state civil servants, civil servants employed by local government or by public hospitals, and workers employed by a variety of publicly owned firms) contribute to different pension schemes. In 2000, about 5,5 million workers contributed to these pension plans. Public sector employees' pension is calculated as a percentage of the wage at the end of the working career, the percentage being itself determined by the number of years of contributions. To be more specific, the monthly pension amounts to 2% of the terminal monthly wage times the number of years of contribution. An interesting peculiarity of public sector schemes is that a 15-year experience in the public sector makes 60 year-old individuals eligible for pension. On the other hand, contributions made beyond 37,5 years are not taken into account in the pension calculation.[8]

Despite these differences, a common feature of all these schemes is that pensions are funded through earnings-based contributions which are paid on a pay-as-you-go (PAYG) basis. Overall, the idea underlying the French pension system is that of inter-generational 'contracting'. In particular, pensions of current beneficiaries are mainly financed thanks to the contributions by current workers whose pensions will in turn be paid by their children. This, plus the fact that the amounts of contributions depend on pensioners' earnings and/or occupations, implies that the French retirement system is based on inter- and intra-generational solidarity principles.

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[8] A 10% bonus is given to pensioners with at least three children, an extra 5% being added for each supplementary child.

5.3.2 Unemployment Benefits

Solidarity is also the underlying principle of the French social protection system. While it has initially been designed to cover only employees in the manufacturing and trade industries, it has been extended over the years to cover the whole private sector. Actually it provides workers with two different kinds of benefits.

First, the unemployed are eligible for benefits the level of which depends on the amount they used to earn before unemployment. These are financed through contributions from both the employers and their employees and are calculated as proportions of gross earnings. Employees' contributions, however, cannot exceed 8.5 times the guaranteed minimum wage (SMIC).[9]

There are three main criteria for eligible individuals to be entitled to unemployment benefits: (i) having been previously employed, (ii) having not lost the previous job for own fault and (iii) being intensively searching a new job. Only the older unemployed (above 59) are exempted from the latter condition.

The generosity of the French unemployment benefits system could be judged through the replacement rate *per se*, on the one hand, and the entitlement duration, on the other. The former is a function of the so-called daily reference wage, which is defined as the total wage one has earned in the last job divided by the number of attendance days (d). Since 2001, the replacement rate is calculated as $\sup\{(0.404*d+9.94);(0.574*d)\}$. The duration of unemployment benefits depends on age as well as the duration of the latest employment spell.[10] While a young unemployed having worked four months within the last 18 months would receive benefits during four months, a 55-year old having worked 27 months over the last 36 months would receive such benefits over 60 months.

Second, the unemployed are in any case guaranteed to receive a minimum income even when they do not meet the criteria for being entitled to insurance benefits. The only requirement here is that the personal income does not exceed 830.36 euros (1656.15 euros for a couple). Though financed by the State, these complementary benefits do probably better reflect the *solidarity* aspect of the French unemployment scheme.

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[9] Contributions represent 3.7% (employer's part) and 2.1% (employee's part).

[10] More detailed information about this is accessible at http://www.assedic.fr

5.3.3 The Health Care System

All legal residents of France are now covered by public health insurance with no freedom to opt out. More specifically, since its setup in 1945, public health insurance was guaranteed on an employment status basis. Since January 2000, however, the Universal Health Coverage (CMU) reform has been adopted by the government so that the whole population is now entitled to public health insurance on the basis of legal residence.

In France, health care is provided by private practitioners as well as public and private (non-profit and for-profit) hospitals. Access to these is free from any gate-keeping as French patients have complete freedom to choose the types of providers, as well as to decide when and how often to resort to them. Consequently, the deficit of the public health insurance budget has been continuously increasing over time.

Actually the functioning of the French public health insurance system could be described as follows. First, it is mainly funded through tax revenues and social contributions from employers and employees.[11] Second, it is based on a pricing scale which associates a specific tariff to each medicine and to each medical care. It is on this official scale that reimbursement of health expenditures is based. While general practitioners and specialists in the ambulatory sector are paid on a fee-for-service basis and are basically free to decide upon their tariffs, patients are reimbursed on the basis of the official tariff only. On average, the public health insurance system covers some 75% of the costs an ordinary patient would incur if all tariffs were in line with the official one.[12] One exception, however, is that of CMU beneficiaries with low income who are reimbursed 100% of the official tariffs. For instance, hospitalisation expenditures are covered up to 90% whereas outpatient care and medical

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[11] Taxes include:

1. The "general social contribution" (CSG). The CSG rate is 5.25% (3.95% on pensions, unemployment benefits and illness benefits). In 1997, the CSG financed 6.2% of health care and 30.1% in 1998.
2. Taxes paid by pharmaceutical firms.
3. Specific taxes on tobacco, alcohol (and cars until 2001).

Social contributions are regressive for the self-employed (6.5% of net earnings up to an annual ceiling of 28,000 euros; 5.9% of net earnings between 28,000 and 141,000 euros) and farmers (8.13% up to an income ceiling of 164,000 euros), but proportional for salaried workers in the manufacturing industry and commerce (13.5% of gross earnings).

[12] To be covered by public health insurance, health services must be provided or prescribed by a doctor or physician and distributed by health professionals.

equipments are up to 66% and 58%, respectively.[13] Practically, the patient is responsible for a co-payment *(ticket modérateur)* which might be partially or totally reimbursed through a complementary insurance system.

Indeed, any individual is free to subscribe to a private complementary insurance contract. In 2000, 86% of the population were affiliated to such private insurance schemes. In addition, since low income CMU beneficiaries are fully covered up to the official rates, they could be seen as systematically benefiting from a complementary insurance as well. This raises the above proportion by some 7.2 percentage points.

Obviously, depending on the complementary contract one subscribes to, reimbursement rates might vary quite largely.[14] For instance, in most contracts, the reimbursement rate for a basic dental prosthesis is 150% of the official rate whereas 25% would reimburse less than 55% and 10% would reimburse 285%. Of course, as will be discussed below, people with higher income tend to hold the most 'generous' contracts.

Although the World Health Organisation (WHO) has considered France as having the best overall health care system in 2000, the latter is also very expensive. Indeed, in 2000, total spending on health care in France has been estimated to 140,6 billion euros; that is, 10% of gross domestic product (GDP). To be more specific, public and private spending account for, respectively 7.7% and 2.3% of GDP.[15] Health care consumption, on the other hand, has accounted for 122,2 billion euros; that is, 2,017 euros per capita on average.[16] Likewise, health care and medical goods have accounted for 12.3% of household consumption (see Geffroy and Lenseigne, 2000). Not surprisingly, despite its rather high cost, the French health care system is strongly supported by the population.[17]

However, a number of reforms have been implemented by successive French governments to reduce the growth of health care spending and thus to limit the resulting deficit. Of course, all these reforms aimed at promoting economic efficiency, especially by encouraging parsimonious health care spending in a system that gives both patients and profession-

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[13] See Eco-Santé 2000, CREDES-DREES for more details.

[14] Source: Health and Health Insurance Survey (ESPS) 2000.

[15] France ranks fourth in the world after the United States, Germany and Switzerland, in terms of health spending as a percentage of GDP.

[16] Source: DREES. National Health Accounts. Paris: DREES; 2001.

[17] Two-thirds of the population are fairly satisfied with the system: Eurobarometer 1997, quoted in "the changing health system in France", OECD.

als a great deal of freedom. Probably the most important of these reforms is the one that was adopted in 1996 and which resulted in a revision of the French constitution, allowing the Parliament to yearly pass a law to finance the Social Security System.[18]

Nevertheless, it is still too early to evaluate the effectiveness of these policies which in some cases have not yet been fully implemented. However, even if a trend towards a reduction in the ratio of health spending to GDP seems to be perceptible (with health spending falling slightly between 1995 and 1998), health spending remains a big concern for public authorities.

5.4 Health Expenditures and Access to Health Care

The French literature on the association between socio-economic status and health spending is rather large, probably because of the increasing deficit of the French public health insurance system. Not surprisingly, this literature seems to suggest that however it is measured, socio-economic status is positively correlated to health spending. Of course, it is hard to infer any causal relationship from such a correlation, since it is not clear whether socio-economic status influences individuals' propensity to consume medical care, or the other way around. In addition, a confounding mechanism is also at play via the possibility that individuals subscribe to complementary private insurance contracts. One could reasonably suspect wealthy individuals to be more likely to be endowed with such contracts. But this might at the same time increase their propensity to consume medical care. This, in turn, raises the selectivity issue as the relationship between socio-economic status and health spending might differ depending on whether individuals benefit from private insurance contracts or not. Unfortunately, the French literature seems to focus exclusively on the pathway from socio-economic status to health spending. Interestingly, however, some studies enlighten the effect of health related expenditures on health status as well.

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[18] This law contains a National Health Care Spending Objective, detailed in different sections (private hospitals, public hospitals, ambulatory care, etc.).

5.4.1 The Impact of Socio-economic Status on Health Expenditures

One phenomenon which the French literature clearly highlights is that of a positive effect of socio-economic status on health spending. Using the 1980 wave of the *Enquête sur la Santé et les Soins Médicaux* (SSM), Gaussat and Glaude (1993), for instance, show a positive correlation between income and the type as well as the amount of health spending. Breuil-Genier *et al.* (1999), who use the 1991 wave of the SSM coupled with the 1992-97 waves of the *Enquête Annuelle sur la Santé et la Protection Sociale* (SPS), report a similar finding. They, however, also show that low consumption by low income individuals does not indicate a lower spending, but rather a lower frequency of medical care use. In the same vein, Bocognano *et al.* (1999) use the 1998 wave of the SPS and draw simple descriptive statistics which suggest that budget constraints are an important determinant of the decision to consume medical care. In particular, the budget constraint argument is raised by the unemployed twice as often as by the employed, and by individuals with no complementary insurance more than twice as often as by the others.

One particularly interesting study is the one by Raynaud (2002) as it examines a variety of aspects of socio-economic status. The analysis is based on the *Permanent Sample of the Socially Insured*, together with the 1992, 1995 and 1997 waves of the SPS, and aims at identifying the determinants of health related expenditures. Simple descriptive statistics suggest that there is a strong relationship between health spending and the occupational status of the household head. Compared to the mean, unskilled manual workers and skilled labourers spend 15% and 8% more, respectively, while intermediate workers and white-collars spend 4% and 13% less, respectively, service employees' expenditures being equal to the mean.[19] At first sight, these figures seem to contradict those highlighted by Auvray *et al.* (2001) who observe that individuals with a higher position in the socio-economic scale, the highly educated, and high income earners resort significantly more often to more expensive care. The contradiction is, however, solved when Raynaud (2002) shows that the differences that his data highlight are in fact due to differences in the amounts devoted to hospitalisation. The data suggest, indeed, that while hospitalisation expenditures of unskilled manual workers are 31% above the mean, those of white-collars are 42% below.

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[19] These figures are adjusted for age and gender differences.

Beside these descriptive statistics, Raynaud (2002) also examines the relationship between care consumption, socio-economic status and health expenditures via a generalised tobit model. The first equation models the probability of resorting to medical care within a given year as a function of socio-economic variables like education, household income, occupational and employment status, as well as of health indicators such as vital risk and incapacity. The second equation models the annual amount spent in medical care as a function of the above explanatory variables, as well as of whether or not a complementary insurance contract is available. A partial observability problem arises, however, as only for those who have actually resorted to medical care during the year are the amounts spent observed. For this reason, a two-step Heckman procedure is implemented to estimate the above model.

The results enlighten several interesting patterns. First, the consumption of ambulatory care is negatively correlated with household size. Second, while hospital expenses are much higher for blue than for white collar workers, the probability to resort to hospital care at least once a year does not seem to depend on one's occupation. In contrast, employment status seems to be an important determinant since the unemployed resort less frequently to medical care but spend much more than the employed when they do. Third, there is a clear education effect: the higher one's qualification, the more likely she/he is to resort to a specialist practitioner and/or to consume dental and optical care.

Another interesting result highlighted by Raynaud (2002) is that while income has no perceptible impact on hospital care consumption, it positively influences the consumption of ambulatory care, and especially, the payments to specialist practitioners. Rochaix (1997), for instance, argues that this income effect is in fact an induced demand effect. That is, to guarantee their own income, practitioners induce wealthy individuals to consume more. The induced demand hypothesis seems, however, to be in conflict with Raynaud's (2002) result that white-collars' consumption is lower than that of blue-collars. In addition, Couffinhal *et al.* (2002) argue that this cannot explain the higher frequency of consumption by wealthy individuals.

A commonly observed phenomenon, which Raynaud's (2002) study confirms, is that subscription to a complementary private contract is an important determinant of care consumption as well as of the amounts of ambulatory expenditures. This is in line with the results in Gaussat and Glaude (1993) as well as in Breuil-Genier *et al.* (1999), who show that expenses when resorting to specialist doctors or to ambulatory care are much higher when individuals benefit from a complementary insurance. This

makes the income effect and the complementary insurance effect difficult to disentangle. While income is a major determinant of the decision to subscribe to a complementary insurance contract (Bocognano *et al.*, 1999), it is also a potential determinant of the level of health spending (Raynaud, 2002). This is probably why the income effect is not commonly agreed upon. In contrast to Raynaud's (2002) finding, the results by Bocognano *et al.* (1999) suggest that only slightly does health spending increase with income, and induce the authors to conclude that what income primarily determines is the type of medical care individuals resort to.

In any case, the importance of a complementary insurance as a determinant of health spending is a commonly observed phenomenon in French studies. Gaussat and Glaude (1993), for instance, estimate a multinomial logit model the left-hand-side variable of which is the type of medical consumption (specialists, pharmacy, scans, etc.), the right-hand-side variables being annual household income, the occupation of the head of the household, her/his qualification, gender, age, region and insurance reimbursement rate if any. Besides, log consumption is modelled via a generalised tobit model where the explanatory factors are household income, age, gender, incapacity, vital risk and a dummy indicating whether a complementary insurance contract is subscribed to or not.[20] Not surprisingly, the variable influences positively the propensity to consume medical care. More specifically, its effect is conditional on the type of medical care. For instance, the availability of a complementary insurance increases the probability to resort to specialist practitioners in the private sector, but reduces the probability to resort to public hospitals. Perhaps even more interesting is the result that health spending depends on the reimbursement rate of the complementary insurance contract which is itself an increasing function of income.

The last mentioned result is in line with those obtained by Mormiche (1993), who presents descriptive evidence on the relationship between socio-economic status, medical care consumption and the reimbursement rate of complementary insurance contracts. Using the 1990 wave of the SSM, he constructs socio-economic categories according to either occupational status or income class. For each classification, he evaluates a consumption index for each age group and gender in a given socio-economic category, defined as the ratio of the actual consumption level of that category to the one which would have been observed had its

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[20] These models are estimated using the 1980 wave of the SSM, coupled with a complementary survey which provides information on vital risk and the degree of incapacity.

members consumed as much as the average person of the same gender and age group. This is a means of controlling for the specific effects of gender and age on health spending.

Not surprisingly, the results suggest again that the higher one's income or position in the occupational distribution, the more often she/he visits a physician and, conditional on having any visit, the more likely she/he is to resort to a specialist practitioner. To be more specific, while the average individual would visit a doctor 6.5 times per year, socio-economic differences in the frequency of resorting to a doctor are rather limited. The difference between the extreme categories is around 20% and is even slightly lower than 10% among salaried workers. In contrast, the most discriminating variables seem to be unemployment and the unavailability of a complementary insurance contract which, together, go with a lower medical consumption.

It is worth noting that the relationship between a complementary insurance and care consumption is not easy to interpret. By reducing the cost of medical care, a complementary insurance might, indeed, increase individuals' propensity to consume. But it might also be the case that an adverse selection mechanism is at play. That is, the higher one's expected medical care needs, the more likely she/he is to subscribe to a complementary insurance contract. The analysis by Genier (1998) aims at testing the adverse selection hypothesis. Using the 1980 and 1991 waves of the SSM, she examines the relationship between care utilisation and complementary insurance via a two-equation generalised tobit model. On the one hand, care consumption is modelled as a function of a set of socio-demographic variables such as gender, age, education and income as well as a dummy indicating whether or not individuals benefit from a complementary insurance. On the other hand, the insurance decision is assumed to depend on the set of socio-demographic variables only. The results suggest the adverse selection effects to be very limited. While having subscribed to a complementary insurance contract significantly increases the likelihood as well as the amount of care consumption, there is almost no difference in health status between the privately insured and those who are not. In addition, among private insurance beneficiaries, there is no significant difference in care consumption between those who have subscribed freely and those who were compelled to do so.[21]

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[21] In France, there are circumstances where individuals are obliged to subscribe to a complementary insurance contract. Being a student is one example, but there is also a number of occupations where the wage package contractually comprises payment of a private insurance premium.

Another study which is worth mentioning here is the one by Raynaud (2003) as it examines the impact of the recently voted CMU reform on health spending. Using the 2000 wave of the SPS, together with the permanent sample of the socially insured, he again estimates a 2-equation generalised tobit model the left-hand side variables of which are the probability to resort to medical care during the year and the amount spent during the same year. However, the amounts spent are collected from the public health insurance register and are therefore available only for those who actually had medical expenses during the year. To avoid the resulting selection bias while estimating the consumption amount equation, a 2-step Heckman procedure is used. The set of explanatory variables includes indicators of health status, demographic and socioeconomic individual characteristics and an indicator of whether individuals are CMU beneficiaries or not.

Rather interesting results emerge from this study. The spending behaviour of CMU beneficiaries seems to be most comparable to that of private complementary insurance contract holders. Both insurance types have a positive effect on ambulatory care expenditures and no significant impact on hospital care consumption. However, comparison of these two categories shows that CMU beneficiaries have higher ambulatory care consumption than the privately insured. For instance, while the general practitioners spending of the former is 12% higher than the non-privately insured, that of the latter is less than 3% higher. The corresponding figures for pharmacy expenditures are 32% and 16%, respectively. Overall, not only are CMU beneficiaries more likely to consume medical care but their spending amounts are 13% higher than those of the other insured taken as a whole and 20% higher than those of the non-privately insured.

It should, however, be noted that while only in January 2000 has the CMU reform been implemented, Raynaud's (2003) study is based on data for the same year. Thus, whether the effects he observes are only transitory or permanent ones is still a question to be addressed. Clearly, the CMU reform has widened access to care to people who would apparently not been able to afford it otherwise. Better access to health care is, however, likely to improve CMU beneficiaries' health status and probably to moderate their health spending behaviour in the long run.

5.4.2 The Impact of Health Expenditures on Health

Whether or not higher health expenditures yield an improvement in the health status is a rather difficult question to answer. The issue is

that of discriminating between the effect of current care consumption on future health and the fact that, in general, individuals with poor health status are exactly those who consume the most. One way to overcome such a difficulty is to resort to natural experiments such as those conducted by Cole (1994), Ayaniam *et al.* (2000) or O'Malley *et al.* (2001). Unfortunately, to our knowledge, no such experiments have been implemented in France. Alternatively, one could use longitudinal data to examine individuals' health evolution over time. As far as we know, only Couffinhal *et al.* (2002) adopt this approach. Researchers probably consider the impact of health expenditures on health to be systematic and as such deserves no specific analysis. In addition, panel data that are suitable for studying the impact of health expenditures on health are rather poor.

Merging the SPS annual surveys with a variety of other specific data sets, Couffinhal *et al.* (2002) run logistic regressions to examine the impact of medical consumption at time t on the probability of a bad health status at time $t+1$, as well as on the probability that health status deteriorates between time t and time $t+1$, while controlling for current health status as well as age and gender. An important aspect of the estimated model is that health status is alternatively measured via vital risk, number of chronic diseases, incapacity and a self-assessed score of health status. Although the data cover only a period of four years and cannot capture long-term effects, they suggest that only the incapacity score is influenced by medical consumption. To be more specific, neither hospital nor specialist practitioner expenses have an impact on incapacity over the following four years. Only when individuals visit a general practitioner at least seven times a year is there no deterioration of their incapacity. In contrast, when health status is measured using vital risk, no significant impact of neither general nor specialist visits is observed.

It should, however, be noted that the model estimated by Couffinhal *et al.* (2002) suffers from a number of endogeneity biases, which the use of longitudinal data could apparently not overcome. They, indeed, find counterintuitive results which suggest that such biases do persist. One example of such results is a negative correlation between pharmacy expenditures at time t and health status at time $t+1$, especially when incapacity or vital risk is the measure of health status. Another example is a negative effect of either type of expenditures at time t on the number of chronic diseases at time $t+1$. These examples illustrate clearly enough the aforementioned statistical difficulties, which one faces when attempting to assess the impact of health expenditures on health status.

5.5 The Association between Health and Socio-economic Status

Because health spending behaviours are very likely to depend on institutional features such as the health insurance system or the public health system *per se*, it is probably more interesting to examine the direct relationship between health status and socio-economic status, at least for international comparison purposes. This does not mean that institutions could be neglected. Rather, once the health status–socio-economic status nexus is nationally established, one could examine how sensitive it is to specific institutions.

However, the association between health status and socio-economic status is still not easy to quantify. As for the relationship between socio-economic status and health spending, methodological issues render the analysis rather puzzling. First, there is the causality issue. That is, it is not clear whether a better socio-economic status favours good health or whether better health widens individuals' socio-economic opportunities. Second, here again, confounding mechanisms might yield misleading conclusions since a number of individual and/or institutional characteristics might simultaneously affect health as well as socio-economic status. One example of such third factors is individuals' time discounting behaviour (Barsky *et al.*, 1997). Last but not least, one could reasonably suspect selection mechanisms to yield severe biases as bad and good healthed individuals could probably not be treated as a homogeneous group.

Despite the existing evidence that these are serious sources of bias, economists' preference goes in general to models in the tradition of Grossman (1972) where health is assumed to depend on socio-economic characteristics (Smith, 1999). In addition, though notable efforts are exerted in the literature in order to overcome the causality problem, not much has been done to account for selectivity issues (see McDonough *et al.*, 1997; Smith, 1999). Indeed, despite the researchers' awareness that these are serious potential sources of bias, the scarcity of appropriate data, together with obvious difficulties to simultaneously tackle the causality, simultaneity and selectivity problems, make the exercise difficult to perform. As a result, estimates of the effect of socio-economic status on health are very likely to be biased downward (see Ettner, 1996).

Though this chapter aims at reviewing the French literature only, we shall first start by briefly discussing the causality issue, which has so far been the main subject of researchers' interest. This way, the reader could judge the robustness of French empirical results, at least from the causality point of view.

5.5.1 Methodological Issues

Obviously, the most basic means of assessing the relationship between health status and socio-economic status could consist in cross-tabulating health indicators and some measures of socio-economic status. Though it has the simplicity advantage, such a descriptive approach is not precise enough as both health and socio-economic status might vary with a number of other characteristics such as age, gender, etc. One could, however, move a step forward by estimating a relationship where these factors could be controlled for. Depending on whether the left-hand-side variable is continuous or not, OLS-type or qualitative models could be appropriate. Unfortunately, the only information this approach is likely to provide the researcher with is the extent to which one's health status might vary with the socio-economic status and vice-versa, all other covariates being held equal elsewhere.[22] While the interest is on whether socio-economic status has an impact on health or not, an OLS estimate does by no means imply such a causality mechanism, albeit highly significant. This is obviously an important issue because the association between health status and socio-economic status is bi-directional. As mentioned earlier, an improvement of one's socioeconomic status might, for instance, yield better health via better access to health care or via more awareness of health related risks, etc. But a better health status might also widen one's job market opportunities and/or wealth accumulation power. As a consequence, when socio-economic status is put on the right-hand side of a health equation, not only does it certainly depend on a variety of factors, but it also depends on the left-hand-side variable itself. From an econometric point of view, researchers should at least account for the endogenous nature of socio-economic status. Avoiding the endogeneity bias does, however, not allow to infer any conclusions about the causal pathway. The problem is similar to estimating a market equilibrium model where estimation of the price-elasticity of demand requires recognition that prices depend on supply as well.

The household production model provides a useful framework for an analysis of the causal relationships that link health to socio-economic status (Becker, 1976; Grossman, 1972; Rosenweig and Schult 1983; Wagstaff, 1986). The idea underlying this approach is that health (which is of intrinsic value) is produced by the household, given its members' physiological predispositions to good/bad health. These health endowments are, however, observable to the household, not to the analyst. Furthermore, health investment and labour market participation decisions are

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[22] See Ettner (1996) or Meer *et al.* (2003) for a discussion.

tightly connected. Of course, adults invest in their own health to improve their well-being, but also because health is part of their human capital and, as such, determines their earnings power in the labour market (Grossman, 1972).[23] To the extent that individuals simultaneously determine their health capital (which influences earnings power) and decide upon their labour supply (which depends on the earnings they can hope for), health status and socio-economic status must be considered as outcomes of joint individual decisions. Therefore, studies where health is treated as an outcome and socio-economic status as an input or the other way around will necessarily overestimate the effect of the pseudo input on its presumed outcome, simply because both the inputs and the outcomes are intimately correlated to common determinants.

This is what Manski (1986) refers to as the *simultaneity* problem. Ideally, it necessitates the design of a structural model, the equations of which are to be simultaneously estimated. One example of such a modelling strategy could comprise equations where earnings depend on any kind of human capital, including health, the latter being itself a function of labour supply as well as of earnings. A further equation could serve to identify the effect of health and expected earnings on labour supply.

In practice, however, it is not necessary to estimate the whole model. Instead, if a variable or combination of variables has an effect on health but could reasonably be excluded from the earnings and the labour supply equations, then it could serve as a robust instrument. In this case, estimates of a reduced-form model yield causal coefficients. Such an estimation strategy has been used by Lee (1982), Wagstaff (1986) and Haveman *et al.* (1994), among others.

Using the U.S National Longitudinal Survey of Men, Lee (1982) estimates a general simultaneous equation model with multiple discrete health indicators. Based on a sample of males aged 45 to 59, the results suggest that wages and health capital are strongly jointly dependent. They also indicate that earnings have a greater effect on the demand for health capital than on education.

In the same vein, Haveman *et al.* (1994) estimated a three-equation simultaneous model consisting of structural equations for health, working hours and wages. Using the sample of males aged 24 to 65 who report positive working time and labour earnings from the Michigan Panel Study of Income Dynamics, he conducts a longitudinal analysis to capture the time dependent nature of the relationships linking these vari-

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[23] See also Lee (1982) and Bartel and Taubman (1986).

ables. The results he reports show that wages are positively and significantly associated with good health. Regarding human capital variables, it also turns out that while age is positively associated with health limitations, education is associated with better health. Surprisingly enough, the amount of working time is not found to affect health status. Perhaps more interestingly, the presence of health limitations in previous periods is found to be negatively associated with wages.

One aspect of the work by Haveman *et al.* (1994), which is worth pointing out, is the comparison they perform between estimates from a simultaneous framework and those from an equation-by-equation estimation procedure. They, indeed, show such estimates to be significantly different, thus highlighting how important it is to account for the endogenous nature of health, working time and wages.

While the Haveman *et al.* (1994) study uses discrete health indicators, Sundberg (1996) replicates it using Swedish data where a continuous measure of health is available. The sample includes male as well as female workers whose ages vary from 18 to 76. Again, wages and health are found to be positively jointly dependent. Furthermore, long working hours are negatively related to health for women, not for men. Finally and in contrast to the result reported by Haveman *et al.* (1994), education is found to be a significant determinant of wages, not of health.

A slightly different approach is that adopted by Ettner (1996), who examines the relationship between health and income in an ordered probit instrumental variable framework. Her analysis departs from the assumption that the State unemployment rate, work experience, parental education and spousal characteristics are reasonable candidates to determine individuals' income, not their health status, and could therefore serve as instruments for income. She, however, finds that work experience, parental education and spousal characteristics are not valid instruments. Nevertheless, her results suggest that there is a significant effect of income on health and that estimates from a non-instrumental approach are downward biased.

Another study, which is worth mentioning, is the one by Adams *et al.* (2003) who adopt a Granger-type causality approach to analyse the direct causal links from socio-economic status to health and vice versa. Using the Asset and Health Dynamics of the Oldest Old survey (AHEAD) which sampled respondents born in 1923 or earlier, they test for the significance of the effect of socio-economic status on various health outcomes. They show that, although socio-economic status is strongly associated with health, this association is weaker when controlling for previous health problems. Overall, socio-economic status appears to have stronger links with mental and chronic illness than with acute and sudden onset conditions.

Beside the causality issue, there are of course a number of methodological difficulties which are raised in the literature. One example of such difficulties is that due to the non-linearity of the relationship between health and socio-economic indicators such as income and wealth. For instance, Mellor and Milyo (1999) include income and income squared, and find clear evidence of a concave relationship with self-reported health, while Wolfson *et al.* (1999) find a convex relationship between income and mortality risk. Likewise, Kennedy *et al.* (1997) report odds ratios for six income categories while Soobader and LeClere (1999) do so for quartiles of the income distribution.

Obviously, researchers' ability to handle all these problems depends on the quality of the data that are available to them. Because the current health status of an individual is the result of a dynamic accumulation process, panel data seem to be more than a requirement. First, they allow investigation of the dynamics of health accumulation. Second, by allowing researchers to track individuals over time, they also enable them to account for the effect of unobservable health endowments, which in general generate much of the endogeneity problem.

5.5.2 The French Evidence

In general, the conclusions from the French literature are in line with those usually reported in the international literature. That is, the better individuals' socio-economic status is, the healthier they are. The strength of the highlighted relationship differs, however, from one study to the otther, due to differences in the sampling framework, in the period of observation and, most importantly, in statistical techniques and in the choice of socio-economic and health indicators.

Mizrahi and Mizrahi (1995) aim at examining the relationship between relative ageing and a set of socio-economic indicators such as education, income and employment status.[24] The analysis simply relies on descriptive statistics drawn from the 1991-92 wave of the SSM. Within the sample of households whose members are salaried workers, unskilled workers present 2,2 years of premature ageing while top managers present -2,4 years of delayed ageing. Likewise, data from the whole sample show that when compared to tertiary education graduates, those holding only primary education qualifications and those

[24] As noted earlier, relative ageing is based on the prediction of individuals' morbid age from a regression where the left-hand side variable is age and the right-hand-side variables are vital risk and disability.

with no qualification at all are 2,9 and 4,1 years prematurely aged, respectively. These figures are, however, gender-specific in the sense that the gaps are higher for men than for women. For instance, when comparing tertiary education graduates to individuals having not even a primary school qualification, relative ageing turns out to be 4,7 years for men but 3,6 years only for women. In addition, the results highlight a steadily increasing pattern of relative ageing across the income distribution so that the gap between those whose monthly gross earnings are less than €647.91 and those who earn more than 4,192.35 per month reaches 5 years.

Another interesting feature of the work by Mizrahi and Mizrahi (1995) is the distinction they make between adults aged 18 to 64 and the elderly. While the data suggest that there are no significant differences between these two categories in terms of occupational status, the effects of education and income seem, in contrast, to differ from one category to the other. Indeed, the gap in relative ageing between differently educated individuals is much lower for the elderly than for younger individuals. Likewise, not only is the pattern of relative ageing less steadily increasing across the income distribution, but the difference between the extreme fractiles of the elderly is only 2,74 years, a figure to be compared to the 5-year gap that exists among younger adults.

Dumesnil *et al.* (1997) are also interested in relative ageing, but extend the analysis to other health indicators such as vital risk and incapacity. Like Mizrahi and Mizrahi (1995), they use cross-tabulations to examine the association between these indicators and alternative socio-economic indicators; namely, income, educational qualifications and occupations, but in contrast to them, they exploit the 1997 wave of the SPS. The results suggest that the correlation between these series of indicators is systematically positive, thus indicating that the healthier one is, the better is one's socio-economic status and vice-versa. As shown by the authors, although the association holds for both gender groups and all age categories, the number of diseases, vital risk and degree of incapacity are age-dependent and this dependency is, moreover, gender-specific. The work by Mizrahi and Mizrahi (1995) is also illustrative enough with respect to the role of gender and age. Simple cross-tabulations can therefore not isolate the pure HS–SES association from variations due to other factors such as age or gender. In addition, by construction, cross-tabulations assume no causal direction between health status and socio-economic status.

In contrast to the studies by Mizrahi and Mizrahi (1995) and Dumesnil *et al.* (1997), Guilbert *et al.* (2001) as well as Dumartin (2000)

specify a causal pathway that goes from occupational status to health. Using the *Health Barometer 2000*, Guilbert *et al.* (2001) aim at showing how the influence of unfavourable socio-economic conditions such as unemployment can be mirrored in individuals' quality of life and in certain health related behaviours such as smoking, alcohol and drugs consumption or even suicide. They estimate logistic regression models where respondents' physical and mental health indicators are alternatively expressed as a function of occupational status and earnings. The resulting estimates confirm the intuition that the unemployed present health scores that are far less good than the employed. Within the latter category, it also turns out that while the self-employed and liberal professionals show the best quality-of-life indices, manual workers present the worst scores.

Using self-assessed health information, Dumartin (2000) argues that socio-economic status has an impact on the judgement individuals make about their own health. She exploits the 1999 wave of the *Enquête Permanente sur les Conditions de Vie des Ménages* (EPCVM) which allows her to estimate three separate probit equations, the LHS variables of which are (i) whether the individual feels good or bad health, (ii) whether the individual needs regular care for severe or chronic diseases and (iii) whether the individual has difficulties to move. Beside a set of control variables such as gender, age, household size, the socio-economic indicators included are occupational status and quantiles of household living levels. Her results indicate that the probability that men employed in an intermediate occupation and whose income belongs to the third quartile of the income distribution declare that they are in good health is 0.91, 0.84 and 0.77 depending on whether they are aged 30 to 39, 40 to 49, or 50 to 59, respectively. Interestingly enough, she also shows that unemployment has a significantly negative impact on the judgement individuals make about their health. While controlling for age, gender, income and social origin, she finds that the probability that an unemployed declares good health is 0.73, 0.62 and 0.55 for the 30–39, 40–49 and 50–59 age groups, respectively.

Overall, what Dumartin's (2000) study clearly shows is that low income, unemployment and/or unfavourable social origin result in a negative judgement by individuals of their own health. Interestingly enough, the author claims that the effects she highlights are mainly due to differences in working conditions, although no working condition indicator is available to her. The argument is simply based on the observation that white collar workers are more likely to declare good health than blue collar workers.

In a sense, this is consistent with the argument by Dyèvre and Léger (1999) that not only are bad working conditions very often responsible for on-the-job accidents, but they also yield specific diseases or pathologies. In particular, they argue that changes in the work organisation have serious negative effects on workers' health via the stressful environment they yield. This argument has been made also by Bosma (1998) for the USA and Askenasy (2000) for Canada. Unfortunately, Dyèvre and Léger's (1999) analysis is rather descriptive, probably because the data they use are rather poor. The information is, indeed, drawn from the public health insurance forms filled in by doctors when workers have experienced a work related disease or accident. Since only when certified by a doctor is these paid for by social security and, hence, the results are very likely to suffer from serious selectivity bias.

While Dyèvre and Léger's (1999) analysis focuses on the employed only, Mesrine (2000) analyses individuals with different employment status and compares their respective mortality risk. Using sub-samples of the 1975, 1982 and 1990 Population Censuses, merged with civil status data from the registry office, she estimates a duration model from which she infers relative mortality probabilities, the main explanatory variables being dummies indicating individuals' employment status and qualifications. Her results suggest that individuals not participating in the labour market face a mortality risk which is 5.1 times higher than for participants, although this ratio reduces to 3.7 when education is controlled for. Likewise, among participants, the mortality risk is on average 2.3 times higher for the unemployed than for the employed. This suggests that participation, education and employment status are important determinants of mortality risk. Further evidence for this relies on the observation that the mortality risk of non-participating women aged between 30 and 50 and holding no qualification at all is almost double that of equally aged women who have had some labour market experience or who hold a qualification. Overall, what Dyèvre and Léger (1999) show is that the mortality risk is tightly linked to labour market participation, the link being dependent on age, gender, marital status, education and occupational status. Thus, studies focusing on sub-groups of the population defined according to such characteristics could probably better help understanding the association between health status and socio-economic status.

The use of the so-called RMI leavers survey (RMI) is interesting in this context as it covers a part of the French population with a specific position in the socio-economic scale: that of minimum income beneficiaries. In France, individuals whose income is below a certain threshold are eligible for the so-called RMI (*Revenu Minimum d'Insertion*) whether they are employed or not. In particular, those unemployed whose unemployment

benefits are below the RMI-eligibility threshold are also eligible for it. Basically, one of the ideas behind the RMI is mainly to help unemployed household members keep on searching for jobs. To assess the efficiency of such a system, INSEE, the national statistics institute, conducted a specific survey in 1997 and 1998 based on a sample of individuals who were RMI beneficiaries in 1996. Obviously, one advantage of such a survey is that it allows one to track RMI beneficiaries over time and, thus, to observe the evolution of their employment status.

Using the RMI survey, Blampain and Eneau (1999) estimate alternative probit equations, the left-hand-side variables of which are (i) whether or not the individual is permanently unable to work, (ii) whether or not the individual has difficulties to move, (iii) whether or not the individual has difficulties to concentrate, and (iv) whether or not the individual is able to drive a car. In addition to control variables such as gender, age, etc., socio-economic status is captured via employment status and qualifications. Not surprisingly, the results systematically suggest that those who do not manage to leave unemployment are more likely to suffer from a bad health status. The underlying assumption in their estimation strategy is therefore that occupational status causes health. The motivation behind such a causal assumption has been discussed by several authors, such as Fournier *et al.* (1984) and Portier *et al.* (1990). The argument is that as unemployment lasts, the risk of psychological troubles increases and induces the unemployed to adopt risky behaviour such as smoking and alcohol consumption and in extreme cases to commit suicide. Yet, one could also argue that the healthier are more likely to be more efficient in their job search process than the less healthy. In this case, it is the reverse pathway that should be privileged. This is the case in the works by Schaetzel and Quérouil (1991), Gadreau and Goujon (1994), Lechene and Magnac (1994) and Rioux (2001).

Gadreau and Goujon (1994) aim at showing that poor health influences negatively workers' insertion in the labour market. They again use the 1991 wave of the RMI sample where health related information is self-reported. In particular, they focus on whether or not individuals face health problems and whether health problems have any incidence on work. The data suggest that at age 30, while 30% of the unemployed RMI beneficiaries declare having health problems which negatively affect their working ability, only 15% of the employed do so. The difference between the two groups even reaches 20 percentage points at age 45. Moreover, while on average, 21% of RMI beneficiaries declare having health problems, this proportion reduces to 13.5% for those holding a secondary education level qualification. Finally, as in the study by Blampain and Eneau (1999), whatever health indicator they consider, the

poorly educated, the unemployed and labour market non-participants are systematically more likely to report bad health status. This leads the authors to conclude that it is poor health that is the main obstacle to leaving unemployment.

Likewise, Schaetzel and Quérouil (1991) use the same data but focus on a sub-sample of individuals chosen while having a health check-up. This provides them with doctor-reported health information. Their analysis highlights significant over-morbidity among RMI beneficiaries. Especially, among those facing mental health troubles, 53% are totally unable to work whereas 41% present a reduced ability to work. This suggests that only for the remaining 6% is the working capacity unaffected. It should, however, be noted that the sample used is not representative of the population of RMI beneficiaries as resorting to a medical check-up is certainly not a random process. One illustration of such non-representativity bias is that the data contain to 50% individuals suffering from mental health problems whereas this proportion is only 27% in the SSM of the same year.

Perhaps more interestingly, Rioux (2001) examines, using the RMI data, how health status influences the intensity of job search and how the latter influences the probability of finding a job. Job search intensity is measured via an index which increases with the number of job search means individuals have adopted. Health status is measured via a dummy which indicates whether or not the individual faces health problems. Not astonishingly, the results show that the healthier individuals are, the more intensively they search for a job, and the more intensive job search is, the higher is the probability to find a job. More subtle is the result suggesting that the more intensive job search is, the higher is the probability that it results in a tenured job contract. In addition, among RMI beneficiaries who found a job, having health problems results in a wage growth which is 11% lower than for healthy individuals.

More generally, the effect of health on income also underlies the work by Lechene and Magnac (1994). The idea is that illness has two effects on income: a direct effect via worker absence and a long-run effect via the loss of experience and human capital accumulation. Interestingly, they also address the question of how illness might yield a slower evolution through the income scale. Using the 1986-87 wave of the *Enquête sur les Conditions de Vie des Ménages* (ECVM), they estimate a two-equation model comprising a wage equation and an experience equation. In both equations, the health indicators included are whether the individual has previously had a serious health accident and whether the individual is handicapped either mentally or physically. None of these indicators

seems to have an impact on individuals' investment in human capital. This suggests that health accidents and handicaps have no permanent impact on earnings. When concerned with health accidents or handicaps, individuals loose money only because, while absent from work, other comparable workers keep on accumulating labour market experience.

5.5.3 The Specific Case of the Older Workforce

Despite the lively public debate that exists in France about ageing problems and pension funding reforms, there are astonishingly very few studies putting specific emphasis on the older workforce. As far as we know, only Barnay (2002, 2005) and Volkoff *et al.* (1996) have explicitly studied the relationship between health status and socio-economic status for this specific category of the population.

Barnay (2002) uses the "Retirement and Living Conditions of Persons Aged 50 or More" which was conducted by INSEE in 1996 as a complement to the French LFS. The sample used comprises 3,174 individuals in the labour force aged between 50 and 64. Health status is measured based on a taxonomy of indicators, including the existence of mental or physical handicaps, physical incapacity (eyes, ears, longest walking distance, etc.) and social incapacity (reading, crosswords, watching TV, etc.). Socio-economic status, on the other hand, is captured via employment and occupational status. In addition, a distinction is made between men and women and between three cohorts; namely the 50–54, 55–59 and 60–64 year old.

The Multiple Correspondence Analysis that the author conducts highlights several interesting patterns. While for men, there are three main discriminatory variables: the existence of handicaps, occupational status and age, only two of this kind of variables distinguish between women: physical incapacity and employment status, women being more often unemployed than men. This single difference reflects important gender related specificities. For instance, while 30% of men aged between 50 and 54 declare multiple health limitations, 84% of women from the same age group declare only one affection. Likewise, while for males, manual workers are the category whose health status deteriorates most rapidly, for females this category extends to service employees as well. This suggests that not only are there gender related differences in terms of health status, but also that the relationship between health status and socio-economic status is gender-specific. It is, indeed, illustrative enough to observe that females (males) are dominant in those occupations which show the poorest (the best) health status; namely, unskilled manual and

agricultural workers and service employees (CEOs, the self-employed and technicians). Another example is that of female farm employees who remain in the labour force longer than any other category, despite being endowed with the poorest health status.

Though specific to the older workforce, the results reported by Barnay (2002) are rather frustrating. On the one hand, no comparison to the other age groups is made. On the other hand, the issue of whether there exist health-related differences in participation behaviours is not addressed. This issue is, however, explicitly analysed by Volkoff *et al.* (1996) as well as by Barnay (2005).

Volkoff *et al.* (1996) aim at assessing the influence of health status on participation behaviour at the end of individuals' working lives, using the *Enquête Santé, Travail et Vieillissement* (ESTEV). Indeed, the 1990 and 1995 waves of ESTEV allow the authors to observe in 1995 the employment status of the 20,000 salaried workers that were interviewed by company medical officers in 1990 about their health status. It turns out that 9.3% of the employed interviewed in 1990 were unemployed in 1995 although they had not yet reached retirement age. While health status is described in the original survey according to the Nottingham Health Profile scale, which comprises 38 binary items, the authors chose to focus on only 6 of these to describe physical and mental health. The analysis is then based on odds ratios from gender-specific logistic regressions where the 1990 value of these health dummies, together with working conditions and job characteristics, are included as explanatory factors of the probability to be employed in 1995.

Not astonishingly, the results indicate that there is a robust association between health status in 1990 and employment status in 1995. This association seems, however, to be stronger for physical health aspects than for mental ones and also stronger for men than for women. For males, having faced physical troubles such as pain or limited mobility doubles the unemployment risk. In addition, the strength of the relationship significantly increases with the physical constraints imposed by working conditions. The effect of health is not even significant for those who did not face such physical constraints in 1990. Of course, this does not mean that only on-the-job physical constraints matter for unemployment risk, but rather that they are likely to be highly correlated with health status.

While the above results apply to the average sampled individual, a distinction between age groups highlights interesting patterns as well, especially with respect to the older workforce. Comparison of individuals born before 1938 (52 years old in 1990 and older) and younger ones shows, indeed, that the 'impact' of health on the unemployment risk is

much weaker for the former group than for the latter. In particular, psychosocial dimensions of health have apparently almost no influence on the unemployment risk for the elderly.

Barnay (2005) explicitly examines the effect of health on retirement age. He again uses the "Retirement and Living Conditions of Persons Aged 50 or More". He distinguishes between three sets of potential explanatory factors of withdrawal from the labour market. The first set reflects institutional and labour market constraints (reached retirement age, unemployed, end of temporary labour contract, etc.). The second set relates to private considerations (partner retired, family reasons, etc.). The third set is that of health-related reasons. The analysis is based on linear regressions where the dependant variable is the labour market leaving age and where the right-hand side includes the above factors as well as a number of covariates, including the latest occupation, social category, school leaving age, a dummy for whether discontinuities occurred in workers' careers, and a dummy for whether the individual is affiliated to the general pension regime or to a specific one (see the institutional framework section above). Most interestingly, health enters the model through a set of four dummies combining information from two variables: one for whether health was a motive for withdrawal from the labour market, and one for whether the individual has experienced a long episode of illness.

As a first step, the author runs gender-specific regressions and highlights notable gender-related differences. In particular, for men institutional and labour demand constraints are the most important determinants of the labour market leaving age. For women, the latter is mainly determined by family and private considerations. However, for both men and women, health is a common determinant of retirement age. On average, women (men) having experienced a long episode of illness and having mentioned bad health as a motivation for early retirement leave the labour market 4 (5) years earlier.

The second step of the analysis consists in crossing the health indicator and the occupational category. The results suggest that health is again a significant determinant of retirement age for all occupational categories although its effect is more pronounced for men than it is for women. Perhaps even more interesting is the rather significant variation of the estimated effect across occupational categories. Unfortunately, the highlighted hierarchy in the effects of health on retirement age is counterintuitive and at least difficult to interpret. As an example, for both men and women, the effect for white collar workers is higher than for service employees or labourers.

Overall, the analysis by Barnay (2005) confirms the main result of a number of other non-French studies, that health is an important determinant of retirement age (Diamond and Hausman, 1984; Stern, 1996, and Siddiqui, 1997, among others).

5.6 The Income Inequality Hypothesis

To our knowledge, the only French study examining the relationship between income inequality and health is Jusot's (2003) PhD dissertation, the purpose of which is to explore the social gradient in health through the relationship between income and mortality in France. The main data source originally available to the author is the 1988 Wealth at Death Time survey jointly conducted by INSEE and the French tax administration. Although the data contain information on individual characteristics as well as on the income declared to the tax administration the year prior to death, they do not allow a clear assessment of the probability of death as any measure of the latter is noised by the effect of cohort size. To overcome this problem, the author conducts a case-control study which allows her to examine the determinants of the probability of death by comparing the characteristics of dead individuals to their survivor counterparts. This is done by exploiting the 1990 Household Tax Income survey, also conducted by INSEE and the tax administration. However, statistical considerations compel the author to restrict the analysis to male individuals, either salaried or retired.

Actually the analysis could be summarised in three steps. First, logistic regressions show that the probability of death is negatively correlated to income. The correlation is, however, conditional on a number of characteristics such as age and occupations. Indeed, the results suggest that the income effect is stronger before age 65 than later. Likewise, regressions where income is controlled for suggest that white-collars face a lower risk of death than any other occupational category.

The second step consists in testing for non-linearities in the income–mortality relationship. Actually, it is more than a requirement to test for potential non-linearities in the association between health status and socio-economic status as failure to do so might lead to misleading interpretations of the latter. Suppose for instance that, as shown by Mellor and Milyo (1999), health is related to income through a concave relationship, hence implying decreasing health returns to income. In this case, any increase in income inequality is likely to result in a deterioration of the health status of the average individual. Indeed, any marginal decrease in the income of the least well-off will result in a deterioration of their

health status that will outweigh the positive effect of a marginal increase in the income of the most well-off. This is what led a number of authors to argue that the apparent correlation between health and income inequality is spurious due to the non-linearity of the health–income relationship (Rodgers, 1979; Gravelle, 1998; Wolfson *et al.,* 1999; Mellor and Milyo, 2001). What Jusot (2003) shows is that the 20% least well-off (in terms of income) face a death risk that is at least twice as high as the risk faced by the 20% most well-off.

Actually it is the observation of such strong non-linearities which led Jusot (2003) to test for whether or not they are due to relative income effects. Indeed, some authors have argued that income inequality might have a specific effect on health, the idea being that it is not only material considerations that matter for health, but also the way societies are structured (Wilkinson, 1992, 1995, 1996; Kaplan *et al.,* 1996; Kawachi *et al.,* 1997). This is the so-called income inequality hypothesis, which stipulates that income inequality might harm individuals' health through two types of psychosocial factors. The first one relates to the effect of relative income. That is, relative deprivation might lead to feelings of inadequacy and envy on the part of certain individuals, which may in turn induce them to engage in self-destructive behaviours (Marmot and Wilkinson, 1999; Marmot, 2004). The second one relates to the idea that income inequality may simply undermine social cohesion and hinder the formation of social capital, which may in turn influence health through the pathways of crime, public assistance, individual behavioural risks and socio-economic factors (Mellor and Milyo, 1999; Blakely *et al.*, 2002; Kawachi *et al.*, 1997; Kawachi and Kennedy, 1997).

Thus, the third step of Jusot's (2003) analysis consists in studying the effect of social environment on individuals' probability of death. To be more specific, part of the analysis is devoted to multi-level analyses of regional mortality differences. The results show that the individual death risk increases with regional income inequality even when specific regional random effects, as well as regional supply levels of ambulatory care are controlled for. Clearly, these results are in favour of the income inequality hypothesis and, interestingly enough, Jusot (2003) also attempts to investigate some of the mechanisms likely to be underlying it. The data suggest that the social capital explanation should be rejected as the effect of regional levels of criminality turned out to be insignificant. In contrast, they suggest that the income inequality effect is mainly due to social deprivation. In particular, individuals' risk of dying seems to be increasing with the income level of their otherwise similar counterparts.

5.7 Concluding Remarks

As in the international literature, a variety of aspects of the association between health and socio-economic inequalities have been discussed based on French data. The results from such French studies are in line with those observed in other countries. However socio-economic status is measured and whatever health indicator is used, the healthier systematically turn out to be the wealthier. The highlighted relationships suffer, however, from a number of statistical limitations. First, the causation mechanism is explored in none of the reviewed studies. While epidemiologists and public health researchers systematically assume socio-economic status to be the input and health status its outcome, economists explore the reverse pathway. Second, while a variety of third factors are likely to generate confounding mechanisms, these are very seldom explored. For instance, one such third factor is health spending as it is likely to depend on the socio-economic status and, at the same time, to influence health. Unfortunately, while a large number of studies show that health spending behaviour is to a large extent sensitive to socio-economic characteristics, none of them simultaneously explores the effect of health spending on health. Third, the selectivity issue is also neglected as none of the reviewed studies addresses the question of whether or not one is right in treating healthy and non-healthy individuals as a homogeneous group and, therefore, whether the health socio-economic status nexus is monotonic across the distribution of health endowments. These limitations are certainly not specific to French studies, as much of the debate in the international literature is on the appropriate tools one needs to implement to overcome them. The point, however, is that even the endogeneity issue, which is a rather standard econometric problem, is not addressed.

Probably, the lack of suitable data to address these issues is the main explanation of these knowledge gaps. First, it seems to be a rather difficult exercise to extract appropriate instruments from French data to identify the effects one is interested in within a simultaneous equations framework. Second, analysing the dynamic aspects of health accumulation requires the availability of panel data. Unfortunately, these seem to be the exception rather than the rule in France. In only one of the reviewed studies have the authors merged a variety of surveys to obtain a reasonably suitable longitudinal data set. This is unfortunate, as panel data could also be helpful in overcoming the identification problems which arise when endogeneity is to be dealt with.

Beside these methodological issues, there are also a number of economic problems that seem to be neglected in the French literature. One

such problem, which is the subject of a large debate in the international literature, is the potential impact of income inequality on individuals' health. As far as we know, only Jusot (2003, 2004) comes with empirical evidence that regional income inequality is positively correlated with mortality.

But the topic which is the most astonishingly neglected one in French studies is that of the *strength* of the association between health and socio-economic status as it holds for the older workforce. Not only is the debate in France about ageing and pension funding reforms rather lively, but important policy implications could be inferred from such an analysis. Indeed, if the health status of the older workers is correlated with their labour market participation behaviour and/or with their employment status, then the implications in terms of welfare provision could be important enough to deserve an economic evaluation. Yet, only from three studies could we extract some information on the health–socio-economic status relationship for the older workforce. They all confirm that such a relationship does exist, but how different it is from the one which prevails for younger workers and what mechanisms underlie such a difference are still questions to be carefully addressed.

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Appendix 5A.1: Selected French Datasets

In France, several datasets are available that can be used for further investigation of the relationship between health and socio-economic status.

1. The Health and Social Protection Survey (Enquête Santé et Protection Sociale, SPS)

The Health and Social Protection Survey has been conducted yearly since 1988 by CREDES, a private research institution.[25] It aims at establishing links between individuals' health care consumption, health insurance coverage, health and socio-economic status. The sample is drawn from the public health insurance register and is restricted to ordinary resident households, having at least one 15-year old member. The resulting data set provides detailed information on actual medical consumption, as well as the health problems which caused it. It also provides life style indicators such as tobacco and alcohol consumption, as well as a variety of socio-demographic characteristics such as occupations and whether individuals are RMI beneficiaries or not. In addition, a number of health insurance indicators are also available. Examples of these are whether individuals subscribe to a complementary insurance contract and whether they are CMU beneficiaries or not. Interestingly enough, the sampling criteria are such that the sampled individuals have been observed at least four times since 1988, hence allowing constitution of a household panel.

2. The Insertion Minimum Income Leavers Survey (Enquête des Sortants du Revenu Minimum d'Insertion, RMI)

The RMI survey was conducted by INSEE, the National Statistics Institute between September 1997 and September 1998, jointly with a number of public and social institutions. The initial sample comprised some 10,000 individuals and was representative of the 882,047 who were beneficiaries in December 1996.[26] A first interview allowed identification of some 1,850 individuals who left the RMI between December 1996 and September 1997 or were about to leave it. This sub-sample was then completed by a complementary sample of some 2,350 beneficiaries

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[25] Centre de Recherches, d'Etudes et de Documentation en Economie de la Santé. See http://www.credes.fr

[26] The latter number excludes beneficiaries from the agricultural sector and residents of the overseas.

among individuals who were still beneficiaries in September 1997. The resulting 4,200 individuals were again interviewed twice, in January and in September 1998. While the questionnaire is oriented towards professional insertion of RMI beneficiaries, a number of other issues are addressed as well, including living conditions, housing and daily financial difficulties. Beside these socio-economic descriptors, a number of health related questions were also asked. In particular, individuals self-assess their health status and declare whether they suffer from handicaps and judge the extent to which these have impacted on their lives in general and on their working ability in particular.

3. Transition to Retirement and Living Conditions of Persons Aged 50 and Older (Passage à la retraite et conditions de vie des personnes âgées de 50 ans et plus, PRCV)

The PRCV was conducted as a complement of the 1996 wave of the LFS. The French LFS is a household survey that has been conducted yearly by INSEE since 1950 and is built up as a rotating panel, one third of the sample being renewed each year. It has evolved significantly over the years and is now comparable to the LFS of other countries like Great Britain for instance. It thus aims at studying the structure and the evolution of the workforce and at analysing unemployment and the functioning of the labour market. It is, therefore, one of the richest sources of information on individuals' socio-economic characteristics. Unfortunately, there is no health related information available. The only exception is for 1996 when the PRCV was conducted. While a variety of aspects of the life of the retirees is addressed in the PRCV, the questionnaire also raises health related questions. In particular, individuals declare whether they suffer from handicaps or not, from physical and/or from social incapacity. Interestingly enough, 3,174 individuals out of the 11,200 respondents to the PRCV questionnaire are between 50 and 64 year old.

4. The Health, Work and Ageing Survey (Enquête santé, travail et vieillissement, ESTV)

The ESTV is a longitudinal epidemiological survey that has been conducted by INSERM, the National Institute of Health and Medical Research. The data have been collected in 1990, 1995 and 2000 by 400 company medical officers, who had to fill in medical questionnaires during medical examination of workers born in 1938, 1943, 1948 or 1953. The idea behind such a schedule is to examine samples of workers twice each five years in order to study the dynamics of health conditions and the ageing process with special emphasis on the interaction between

these and working conditions. Two additional questionnaires have also been submitted to the workers themselves, who self-reported descriptions of their working conditions and judgements about their own health. While the questionnaires in 1990 were exploitable for some 21,378 workers, only 18,695 of these could be questioned again in 1995.

5. The Health Barometer (Le Baromètre Santé)

The Health Barometer is a survey that is conducted yearly by the French Committee for Health oriented Education, since the year 2000.[27] Each cross-section comprises some 14,000 individuals interviewed over telephone about their health related behaviours, as well as their opinions and knowledge about health issues. In particular, health status is described through the 17 questions of the so-called *Duke profile*. Information is thus available about physical, mental and social health, but also about self-esteem, pain, anxiety and depression. In addition, socio-economic information is available at the individual as well as at the household level. Examples of the disposable indicators are occupational status, income level, educational attainment, as well as descriptions of a number of aspects of life, including living conditions and affective breaking off situations.

6. Household Living Conditions Permanent Survey (Enquête permanente sur les conditions de vie des ménages, EPCVM)

The EPCVM is again a survey conducted by INSEE. Its main aim is to assess households' equipment rate in durable goods. Though it is a yearly survey, it is conducted thrice a year. In January, the questionnaire is about housing and local environment in terms of collective equipments. In May, households are questioned about health, housing comfort, durable goods equipment, income and savings. In October, the questionnaire targets life style aspects and living conditions. Each year's sample includes some 14,000 individuals aged 15 or more and belonging to some 5,500 households. Beside a variety of socio-economic indicators such as occupations, human capital and income, May's questionnaire also provides a number of health indicators. Examples of these are self-assessed health status, disability, care consumption, health insurance, as well as life style characteristics like smoking and sport practicing.

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[27] Comité Français d'Education pour la Santé.

7. The Health and Medical Care Survey (Enquête Santé et Soins Médicaux, SSM)

The Health and Medical Care Survey is based on face-to-face interviews, conducted by INSEE every ten years since 1960-1961. Its main focus is on the yearly amounts devoted to, and the types of individuals' medical consumption as well as on their impact on their health status. Actually it also aims at analysing the motivations underlying individuals' behaviour in terms of health spending. Consequently, thorough information on self-assessed health status and disabilities is available, as well as a description of past and current life style. The survey also provides information on working conditions and on socio-economic status via a number of indicators such as income, education, occupations, etc. The two waves that are available so far (1980 and 1990) include approximately some 21,000 individuals belonging to some 7,500 households.

8. The Households' Living Conditions Survey (Enquête sur les Conditions de Vie des Ménages, ECVM)

The Households' Living Conditions survey is again conducted by INSEE. Its aim is to study inter-household inequality in terms of living conditions considered from the point of view of various daily life aspects. Its main goal is to allow identification of the determinants of such inequalities as well as of their time-dynamics. The resulting data set comprises individual as well as household-level information regarding health and socio-economic status. To be more specific, working conditions of the employed as well as a number of socio-economic indicators such as income, education, occupations and employment status are available. In addition, individuals describe the type of health insurance they are covered by. They also self-assess their health and potential disabilities and provide a number of life style characteristics.

On average, each of the two cross-sections available so far (1986 and 1993) includes some 25,000 individual residents aged 18 and older and belonging to some 13,000 households.

Annex 5A.2: Data used in the French literature on the association between health status and socio-economic status

Authors	Aim	Data	Years	Obs.	Method	LHS	RHS
Rioux (2001)	Health status, job search and employment status	RMI	1997, 1998	3,415	Probit	SES	HS
Gadreau and Goujon (1994)	Effect of poor health on employment status	RMI	1991, 1992	3,415	Descriptive		
Lechene and Magnac (1994)	Effect of health on income	ECVM	1986-1987	13,154	Two-equation model	SES	HS
Dumartin (2000)	Impact of occupational status on health self-assessment	EPCVM	1999	10,987	Probit	HS	SES
Blanpain and Eneau (1999)	Impact of working conditions on health	RMI	1997-1998	3,415	Probit	HS	SES
Dumesnil *et al.* (1997)	Health and socio-economic status	SPS	1997	11,425	Descriptive		
Mesrine (2000)	Sensitivity of mortality risk to employment status	Census	1975, 1982, 1990	77,765	Duration	HS	SES
Dyèvre and Léger (1999)	Working conditions, job accidents and diseases	STAI	1989	737,477	Descriptive		

Annex 5A.2 continued

Schaetzel and Quérouil (1991)	Mental and physical health status of RMI beneficiaries	RMI	1991	1,965	Descriptive		
Volkoff *et al.* (1996)	Effect of health on participation of the elderly	ESTV	1990-1995	20,000	Logistic	SES	HS
Mizrahi and Mizrahi (1994)	Relative ageing and socio-economic indicators	SSM	1991-1992	20,417	Descriptive		
Barnay (2002)	Gender diff. in effect of health on socio-economic status	PRCV	1996	3,174	Descriptive		
Guilbert *et al.* (2001)	Risky behaviours and socio-economic status	Barometer	2000	13,685	Logistic	HS	SES

LHS = left-hand-side variable, RHS = right-hand-side variable, HS = health status, SES = socio-economic status.

Annex 5A.2 continued

Authors	Socio-economic indicator	Health indicator	Other controls
Rioux (2001)	Employment	Individual faces health problems.	Sex, age, education, work experience
Gadreau and Goujon (1994)	Employment	Individual faces no health problems. Health problems without professional incidence. Health problems with professional incidence.	
Lechene and Magnac (1994)	Income	Individual has had a serious health accident. Individual is handicapped (functional, mental)	Marital status, age, education, children
Dumartin (2000)	Occupational status. quantiles of house-hold living levels.	Individual feels to be in Good or Bad health. Individual needs regular care.Individual has difficulties to move.	Gender, age, house-hold size, education
Blanpain and Eneau (1999)	Occupational status, qualifications.	Individual is permanently unable to work. Individual has difficulties to move. Individual has difficulties to concentrate. Individual is able to drive.	Age, sex, RMI,
Dumesnil *et al.* (1997)	Income, education, occupations	Vital risk, Disability index	
Mesrine (2000)	Employment	Mortality risk	Sex, age, education, marital status

Annex 5A.2 continued

Authors	Socio-economic indicator	Health indicator	Other controls
Dyèvre and Léger (1999)	Occupation	Diagnosed diseases, pathologies	
Schaetzel and Quérouil (1991)	Employment	Diagnosed diseases or pathologies	
Volkoff *et al.* (1996)	Employment status	Individual is healthy or unhealthy (Nottingham Health Profile)	Sex, age, working conditions
Mizrahi and Mizrahi (1994)	Income, occupations, education	Vital risk Disability Relative aging	
Barnay (2002)	Employment, occupational status.	Handicap (mental or physical) Physical incapacity Social incapacity	
Guilbert *et al.* (2001)	Income, education, occupations	Duke profile	Sex, age, life style

Annex 5A.3: Data used in the French literature on the association between health spending and socio-economic status

Authors	Aim	Data	Years	Obs.	Method	LHS	RHS
Gaussat and Glaude (1993)	Impact of SES on health spending	SSM	1980	16,766	Logit	Health spending	SES
Breuil-Genier *et al.* (1999)	SES and health spending	SSM	1991	21,600	Descriptive		
Bocognano *et al.* (1999)	SES and health spending	SPS	1998	20,000	Descriptive		
Raynaud (2002)	Determinants of health ex-penditures	SPS	1992,1995, 1997	9,000	Two-equation model	Health spending	SES
Raynaud (2003)	Impact of CMU reform on health spending	SPS	2000	20,000	Two-equation model	Health spending	SES
Couffinhal *et al.* (2002)	Impact of health spending on health	SPS	1992,1995, 1998	3,435	Logistic	HS	Health spending
Auvray *et al.* (2001)	Impact of CMU on health care access	SPS	2000	20,000	Descriptive		
Mormiche (1993)	Health care disparities	SSM	1991	21,600	Descriptive		
Genier (1998)	Testing the adverse selection hypothesis	SSM	1991	21,600	Two-equation model	Health spending	SES

LHS = left-hand-side variable, RHS = right-hand-side variable, HS = health status, SES = socio-economic status.

Annex 5A.3 continued

Authors	SE indicator	Health indicator	Other controls
Gaussat and Glaude (1993)	Income, education, occupations		Age, sex, health status, insurance
Breuil-Genier *et al.* (1999)	Income		
Bocognano *et al.* (1999)	Income, employment status		
Raynaud (2002)	Occupation, education, income		Sex, age, household size, health status
Raynaud (2003)	Education, occupations, employment status		Sex, age, health status, CMU, household size, marital status
Couffinhal *et al.* (2002)		Vital risk, disability index	Age, sex
Auvray *et al.* (2001)	Occupation, education, income		
Mormiche (1993)	Occupation, income		Age, sex
Genier (1998)	Income, education, occupation		Age, sex, health status, insurance

CHAPTER 6

The Case of Greece

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6.1 Introduction

International studies provide consistent evidence that socio-economic status (SES) effects do exist and contribute significantly to the observed health inequalities of the populations.[1] Furthermore, SES inequalities in health constitute an area of great importance to policy makers due to both the ageing of the population and the stronger effects that are observed among the older workforce members. The older workforce typically involves individuals aged from 40–50 years up to their retirement age, which is usually at 65 years of age. Since individual SES and health status are interrelated, the issue of the distributional character of public policy arises in order to protect individuals that are greatly affected by the negative consequences of low SES and low health, as in the older workforce.

The demographic ageing of the Greek population is attributed to the increasing life expectancy combined with decreasing fertility rates. Such changes in the population structure imply that the share of older people is growing while the share of individuals in working age groups (namely, 15–64 years) is decreasing. Actually, Greece has begun to exhibit negative rates of population growth, supporting the views arguing that in a few years Greece will be mostly populated by older people (Eurostat, 2004). The ageing of the population is expected to cause economic and social changes in a number of areas, including healthcare systems.

Table 6.1 exhibits the proportions of six age groups in the native workforce and in the total population being in working ages, respectively. The data were drawn from the Greek Employment Observatory and reveal that individuals aged 45–64 have the second largest share among the native workforce in the years 1992 and 2002 (Chletsos, 2003).

The present chapter provides a critical assessment of the relevant research conducted for Greece, with the emphasis on the older workforce in order to provide policy guidelines for future research. The chapter is organized as follows: Section 6.2 analyses the indicators and the methodological considerations encountered by researchers, Section 6.3 presents and discusses the national institutional schemes that operate in Greece, Section 6.4 analyses the basic findings of applied research in Greece, and Section 6.5 concludes.

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[1] Bartley *et al.*, 1997; Wamala *et al.*, 1997; Theodossiou, 1998; Lynch *et al.*, 2000; Duncan *et al.*, 2002.

Table 6.1 **Greek workforce and population at working ages by age groups for the years 1992 and 2002**

Age groups	1992	2002
	Percentage in the workforce (%)	Percentage in the workforce (%)
15-19	3.3	1.6
20-24	10.1	9.0
25-29	11.8	13.0
30-44	37.7	39.9
45-64	34.1	34.1
65+	3.0	2.4

Source: Chletsos (2003).

6.2 General Methodology

6.2.1 Health Status Indicators

Health status is a qualitative concept with multiple dimensions. Thus, it is quite hard to approximate it in an accurate way. A historical, more lay definition of overall health is: "absence of disease or infirmity",[2] whereas a more detailed definition describes health status as "the ability of all people within the community to reach full mental, spiritual and physical potential by living in safety with vigour and purpose; meeting personal needs; meeting community responsibilities; adapting to change; and having trusting and caring relationships".[3] Finally, occupational health is related to "… the science of designing, implementing and evaluating comprehensive health and safety programs that maintain and enhance employee health, improve safety and increase productivity in the workplace".[4]

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[2] Federal Occupational Health, US.

[3] Community Health Endowment of Lincoln, US.

[4] Federal Occupational Health, US.

Mortality indicators are frequently encountered in the Greek literature due to the relatively good availability of data.[5] Age-standardised mortality ratios of specific geographic regions and by causes of death have been extensively utilised in the literature. Such causes of death are fatalities from leukaemia, pestilent diseases, neoplasms, diabetes melihus, ischemic heart diseases, accidents and injuries (Tsimbos *et al.*, 1990), and suicide rates that are believed to be affected by individual SES (Zacharakis *et al.*, 1998). Kogevinas *et al.* (1992) utilised the Potential Years of Life Lost (PYLL) index as an indicator of premature mortality in order to investigate the social cost from specific causes of death. The number of PYLL was approximated as the number of years lost when the individual dies before the age of 70.

In addition, studies address the relative importance of SES on various dimensions of physical health, namely SAHS (self-assessed health status),[6] the duration of gestation, blood lipid data, the risk of school injuries, the use of glasses, the history of past accidents, the severity of injuries, the experience of chronic diseases, and hospital admissions.[7] Other studies utilised work-related health conditions, namely circulatory diseases, musculoskeletal problems, neoplasia, injuries and poisoning.[8] Alamanos *et al.* (1986) assessed the incidence and the severity of work-related accidents, indicated by fractures, burns, amputations, concussions and other injuries.

The Psychologists' society in USA defines mental health state as "the successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and to cope with adversity; from early childhood until late life, mental health is the springboard of thinking and communication skills, learning, emotional growth, resilience, and self esteem".[9] Depressive symptoms, suicidal behaviour, stress, the use of psychoactive medication, and mental hospital discharge rates have been extensively applied in the literature.[10] Mental health state in relation to specific job features, for example job-related tension and stress and job satisfaction have also been examined

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5 Kyriopoulos *et al,*. 1983; Le Grand, 1987; Petridou *et al.*, 1994; Tsimpos *et al.*, 1990.

6 Mergoupis, 2001; Kyriopoulos *et al.*, 2003.

7 Kouri *et al.*, 1995; Petridou *et al.*, 1995, 1996, 200; Lascari *et al.*, 2000.

8 Kagialaris *et al.*, forthcoming; Xidea-Kikemeni *et al.*, forthcoming.

9 National Association of School Psychologists, www.nasponline.org.

10 Madianos and Stefanis, 1992; Petridou *et al.*, 1996; Madianos *et al.*, 1999; Lascari *et al.*, 2000.

by researchers (Lascari *et al.*, 2000; Xidea-Kikemeni and Aloumanis, forthcoming).

Health-related habits, namely nutrition and health enhancing activities, are known confounders on the SES–health relationship. The individual life-style factors that are met in Greek research are smoking, alcohol consumption, weight, and the body mass index (Madianos and Stefanis, 1992; Kouri *et al.*, 1995; Petridou *et al.*, 1995, 1996; Mergoupis, 2001; Xidea-Kikemeni and Aloumanis, forthcoming). Petridou *et al.* (1997) constructed an indicator of "risky behaviour" based on individual tendency towards risky activities such as the non-use of seat belt, smoking, drinking and driving, etc.

6.2.2 SES Indicators

Tountas (2000) distinguishes between three main SES inequalities that have an effect on individual health:

- *Individual SES*, which is defined by the individual position in the production process.
- *The material resources* owned, which are related to individual SES.
- *The social and ethical values* that affect health-related behaviours and attitudes.

Income level is a known determinant of health status. However, to our knowledge, only two studies control for individual and household income in their analyses (Mergoupis, 2001; Kyriopoulos *et al.*, 2003). On the other hand, economic position is more often documented in the Greek literature by the ownership of a car and the affordability of respondents regarding their health investment choices, such as choosing a private medical facility, freedom in the choice of the attending physician, or the existence of insurance for primary or secondary health care (Petridou *et al.*, 1994; Kyriopoulos *et al.*, 2003).

At the whole-economy level, indicators such as expenditures on public and private medical care are utilised in the literature (Le Grand, 1987). Other studies have used regional socio-economic development indicators, namely per capita national income, per cent of industrial employment, and per capita consumption of food.[11] Madianos *et al.* (1999) constructed an index of regional economic development based on the popu-

[11] Kyriopoulos *et al.*, 1983; Tsimpos *et al.*, 1990.

lation growth, the local infrastructure (network of roads, health care delivery, etc.), the economic well-being (electric power consumption, availability of telephone, etc.), and the economic productivity of each region in Greece.

Occupational status, in contrast, has since long ago drawn the interest of researchers in Greece as a factor contributing to the observed health inequalities. Occupational class, approximated by own or paternal occupation, is widely used in applied research.[12] Occupational class can affect individual health through many pathways. For example, workers in construction services exhibit a higher incidence of musculoskeletal problems in comparison to employees in other professions, such as clerical jobs (Tountas, 1999). In addition, work-related features, namely years of work experience, the shortage of stuff in the workplace, job demands and working tasks undertaken, hours of work, and work-load are also introduced in the literature as health determinants (Xidea-Kikemeni and Aloumanis, forthcoming).

Education not only defines earnings from work but also affects personal health-related attitudes and life-styles in a beneficiary way. The educational level of the respondent[13] and the paternal and maternal educational level[14] are commonly utilised in applied research. In general, they are approximated by completed years of schooling. School grade is also used as a proxy of school performance in younger age samples.[15]

Demographic indicators, namely age, gender, family situation and marital status, birth ranking, residence and housing conditions, and urbanisation in the area of residence, are frequently utilised in studies in order to control for confounding effects.[16] Housing safety conditions were investigated in a study by Petridou *et al.* (1996) based on the existence of specific safety standards in the place of residence such as electric safety switches, stair handler, and adequate lightning in passages.

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[12] Madianos and Stefanis, 1992; Petridou *et al.*, 1994; Laskari *et al.*, 2000; Mergoupis, 2001.

[13] Petridou *et al.*, 1996; Kyriopoulos *et al.*, 2003; Xidea-Kikemeni *et al.*, forthcoming.

[14] Petridou *et al.*, 1994; Petridou *et al.*, 1995; Kouri *et al.*, 1995; Petridou *et al.*, 1997; Mergoupis, 2001.

[15] Kouri *et al.*, 1995; Petridou *et al.*, 1997.

[16] Madianos and Stefanis, 1992; Kouri *et al.*, 1995; Petridou *et al.*, 1995, 1996, 1997; Zacharakis *et al.*, 1998; Madianos *et al.*, 1999; Laskari *et al.*, 2000; Mergoupis, 2001; Kyriopoulos *et al.*, 2003; Xidea-Kikemeni *et al.*, forthcoming.

6.2.3 Problems Regarding Health Indicators

In general, health status indicators can be sub-divided into objective and subjective measurements. The former entail approximations that are based on external objective criteria, such as mortality or disease diagnosis. Subjective health measurements are based on individual self-perceptions of health, such as self-assessed health status (SAHS).

Redwood (2003) argues that SAHS differs in comparison to objective measurements of health, since it can be either overestimated or underestimated by the respondents based on their personal characteristics (Kyriopoulos *et al.*, 2003). Indeed, studies indicate that self-reported health status scores "…are rather weak sources of information of an individual's health status. The weaknesses relate to the subjective nature of these questions and their available responses" (Mergoupis, 2001, p. 3).

In particular, older and younger age groups tend to underestimate their health status (Kyriopoulos *et al.*, 2003). Bias in SAHS scores may arise due to gender differentials as well (Redwood, 2003), since women relate bad health to the presence of painful symptoms and/or mental health problems, whereas men relate it with the absence of certain physical abilities (Kyriopoulos *et al.*, 2003).

Table 6.2 SAHS scores of individuals aged over 65 in Europe for 1997

Country	"Very Good/Good", %	
	Women	Men
European Union (average)	29.0	34.5
United Kingdom	54.4	57.5
Ireland	53.5	62.3
Denmark	43.4	53.7
France	27.1	31.6
Spain	26.4	36.9
Greece	**23.1**	**37.8**
Italy	20.3	26.7
Germany	17.2	19.3
Portugal	5.1	12.8

Source: Redwood (2003).

Table 6.2 exhibits SAHS levels of individuals older than 65 years in selected European countries for the year 1997 (the data are in percentages and non-standardised). The data indicate that women have a tendency to underestimate their health status, since they systematically report lower levels of health status in comparison to men. Furthermore, the health status of the Greek male population appears to be a better than in more economically prosperous countries, such as France.

6.2.4 Greek Datasets

Greek research is greatly hampered by the limited availability of relevant data. Thus, the majority of relevant studies either use public statistics and conduct regional level analyses, or they construct questionnaires in order to collect data for micro-level analyses.[17] However, researchers point out that there are several limitations in the use of questionnaire-based surveys. In particular, self-responses need to be treated with caution, since sometimes the respondents do not fully understand the meaning of the questions (Kyriopoulos *et al.*, 2003).

Public sources of relevant data are quite limited in Greece. Researchers usually draw data from official public databases, such as the National Statistical Service of Greece, which contains data on health care provision and regional economic indicators published in the annual Statistical Yearbook of Greece (Tountas *et al.*, 2002), included in the Censuses and the Central Health Register (Madianos *et al.*, 1999), whereas data on fatalities are included in the Vital Statistics Bureau (Kyriopoulos *et al.*, 1983; Zacharakis *et al.*, 1998; Tsimpos *et al.*, 1990). Data on the structural components of the mental health care delivery system (e.g. number of psychiatric beds and rehabilitation places, etc.) and the geographical distribution of the medical personnel can be drawn from the Monitoring and Evaluation of Mental Health Services Unit, which is part of the Athens University Mental Health Research Institute, and from local Medical Associations in Greece.

International organisations, such as the World Health Organisation and the World Bank, provide databases with relevant health information on, for example, healthy life expectancy and mortality rates and on national economic indicators for several countries (Le Grand, 1987; Kogevinas *et al.*, 1992). The OECD also provides a wide range of data avail-

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[17] Kagialaris *et al.*, forthcoming; Kouri *et al.*, 1995; Lascari *et al.,* 2000; Petridou *et al.*, 1994, 1995, 1996, 1997; Xidea-Kikemeni *et al.*, forthcoming.

able to the public regarding SES, health status and health expenditures for many countries (Kyriopoulos *et al.*, 1983; Tsimpos *et al.*, 1990). Mergoupis (2001) drew his dataset from the Eurobarometer 43 survey, which is a micro-level survey conducted in various EU countries and covers several aspects of individual SES and health characteristics.

6.3 The Greek Institutional Setting

6.3.1 The Health Care System in Greece

Recent research has shown that there are certain requirements that health services must fulfill in order to satisfy the needs and demands of the insured in Greece (Kyriopoulos *et al.*, 2003):

- Dignity: the protection of human rights.
- Autonomy: information about their health condition and the alternative cure methods.
- Prompt attention: the supply of timely care in situations of emergency.
- Confidentiality.
- Communication: the attitude of the personnel towards the insured.
- Choice of the provider: the possibility of choosing health centre.
- Social support (regarding hospital care).
- Environment.

Nowadays, the basic characteristics of Greek health services are: availability (24 hours per day and 365 days per year) (Ifantopoulos, 1988), accessibility (time accessibility and place accessibility), acceptability, affordability, accountability (Katsouyannopoulos, 1994). The contemporary health care system in Greece can be separated into three main categories of health care: 1. Primary health care (non-hospitalised treatment), 2. Secondary health care (hospital treatment), 3. Tertiary health care (university treatment).

Primary health care in Greece was first established in 1938, when the Social Security Institution, the major public insurance provider, started operating. At first, primary health care covered the urban population. In 1953 a legislative decree set the basis for regional health services. However, the organisation of the primary health care system for the

non-urban population was only completed in 1961. The bases of contemporary primary health care, and the requirements for the provision of primary health services, were set by the Congress of International Organisation of Health that took place at Alma-Ata in September 1978 (Ifantopoulos, 1988). Finally, in 1983 legislation established functional and organisational connections between the three levels of the health services (Ifantopoulos, 1988).

At present primary health care in Greece is provided by various social funds and insurance institutions, without any link to the secondary and tertiary health services. More specifically, it is provided by (Theodorou *et al.*, 1994):

- Doctors who operate their own surgery.
- Doctors belonging to the multi-surgeries owned by the insurance funds.
- Agricultural clinics provide basic health care to the non-urban population.
- Health centres, provide health services to the regions.
- Outpatients' departments, provide general and specialised primary health care.

The term secondary health care refers to the provision of health services to patients that are hospitalised. The conditions in the secondary health care system changed radically in the second half of the 20th century, when Greece followed the trends in other European countries (Theodorou *et al.*, 1994). Nowadays, the hospital services are provided in Greece by three main institutions (Ifantopoulos, 1988):

- Public hospitals
- Independent charities
- Private clinics that operate as independent economic units.

Funding for public hospitals come mainly from the state budget, but also from the various public insurance funds. Another financial source since 1993 is co-payment by patients. Private insurance companies pay the same expenses as the social insurance funds for their insurees who are hospitalised in public facilities. Other financial sources are inheritances, donations and profits from the hospitals' property (Theodorou *et al.*, 1994).

Tertiary health care is similar to secondary health care and therefore they are sometimes considered as one. In particular, tertiary health care includes the health services provided by university hospitals and university clinics (Theodorou *et al.*, 1994). In 1982, there were 17 hospitals, which had university clinics, in Greece. Those hospitals were spread between the big Greek cities: Athens (9), Thessaloniki (5), Patras (1), Ioannina (1) and Alexandroupolis (1). In 1982, the university hospitals had a capacity of 4,430 beds, although the Greek government is planning to increase the number of university hospitals and therefore the number of beds (Ifantopoulos, 1988).

6.3.2 Social Insurance in Greece

Since the end of the 19th century and mainly during the 20th century, the institution of social insurance developed into its current form. The Greek system of social insurance aims to protect the employees, and other working population categories (such as the self-employed). The financial support of this system comes from the contributions of the employers and the employees, and also from governmental subsidies (Provopoulos, 1987). The current social insurance system covers the following risks (Solomos *et al.*, 1991):

- Old age, disablement and death.
- Illness and motherhood.
- Industrial accident and occupational illness.
- Unemployment.
- Family members' illness.

Social insurance also covers the risk of unemployment by providing benefits to the long-term unemployed. More specifically, the unemployed are under the care of the Greek Manpower Employment Organisation (Greek initials: Ο.Α.Ε.Δ.), which is in turn under the direction of the Ministry of Labour and Social Affairs. OAED takes action in the following sectors (Greek Manpower Employment, 2003):

- Vocational Guidance.
- Technical – Vocational Training.
- Promotion of Employment.
- Supply of Social Security provisions (Unemployment Benefits as well as conscription, supplementary maternity allowances, allowance

due to insolvency of the employer, etc.). The legal framework consists of several Laws regulating the details concerning each benefit or allowance. Beneficiaries of Social Security provisions against risk of Unemployment are people who – irrelevant of their state of origin – are salaried workers (with fixed term contracts or non fixed term contracts), receiving Social Security provisions from a relevant body (for example the Social Security Institution). Specifically, an unemployed person is entitled to Unemployment Benefit in case his/her work contract has expired or in case he/she was dismissed. Beneficiaries of O.A.E.D. are given the opportunity to transfer the right of receiving Regular Unemployment Benefit to any Member State of the EU provided that they fulfil all requirements.

- Vocational Training and Employment Programmes concerning Groups of the Population Facing or Endangered with Social Exclusion (ex-drug addicts, handicapped persons, or released prisoners).

The Law 2868/1922 imposes obligatory insurance for salary-earners of various fields or businesses, and equal contributions from employers and employees. In addition, 61 Supplementary Insurance Agencies (Provopoulos, 1987) have been established. Their purpose is to provide the insured with additional benefits. The financial sources of this insurance organisation come from the contributions of employees and employers. The establishment of the Social Security Institution (Greek initials: I.K.A.) in the late 1930s marks the beginning of the Greek social insurance system (Soulis, 1999). In 1982, it covered 40.5% of the population and was considered to be the major insurance organisation. I.K.A. is mainly financed by the contributions of the employers and the employees, but also by state subsidies. The amount of the contributions is a standard percentage of the insureds' income and it is dependent on the type of employment and work, and the level of their income (Ifantopoulos, 1988). I.K.A. covers all the formally employed, provided that they are not insured at another fund of main insurance, the members of their family, as well as foreign workers and visitors (Soulis, 1999). The employees must be insured from the first day of their work. For the long-term unemployed, insurance is compulsory (Management of I.K.A., 2002). The allowances that I.K.A. provides include: pension, medical treatment, pharmaceutical treatment, hospitalisation, sick pay, allowance for accidents, etc. There are certain requirements in order to get an allowance from I.K.A., whether monetary (the sick pay or the pay provided in circumstances of industrial accident), or in kind (the use of the three levels of the health care system, and health goods) (Soulis, 1999).

The main problems that the health services of I.K.A. confront are (Theodorou *et al.*, 1994):

- Long waiting lists for a doctor's appointment, only available during morning hours.
- Excessive demand and consumption of health services.
- The quality of health services is insufficient.
- Lack of trust towards the diagnoses of I.K.A. doctors.
- No connection between GPs and specialised doctors within IKA's primary health care system.

Private health service has a supplementary role to social health insurance (Soulis, 1999). In Greece, private health insurance was established in the 1980s due to the perceived performance inadequacies of social insurance. Between 1980 and 1999, there were approximately 50 private insurance companies, of which around a fifth were exclusively health insurance companies (Liaropoulos, 1993). Private insurance provides monetary and in kind allowances, similar to those of social insurance. The health services that the private company provides depend on the type of the contract (Soulis, 1999). One of the major problems of the insurance companies that operate in a competitive environment is the so-called 'adverse selection'; private insurance companies prefer to provide their services to particular groups of the population who are not at excessive risk (Kyriopoulos and Niakas, 1994). Research from 1989 shows a gradual increase in the number of people insured in private insurance companies (Liaropoulos, 1993).

6.3.3 The Retirement System of Greece

The Social Insurance system of Greece covers also the retirement of the insured. From the first day of work the employees are obliged to start paying into their pension insurance fund, which, together with employers' contributions, provide the funds for IKA pensions (Management of I.K.A., 2002). I.K.A. grants three different types of pension: old age pension, disablement pension and widow's, or survivor's, pension (Lanaras, 1994). Persons eligible for pensions are all those who have been working and have paid their contributions to I.K.A. The retired with a low pension are also financially supported with a supplementary allowance. This allowance is called "Social Solidarity of Retired" (Management of I.K.A., 2002).

In order for the insured at I.K.A. to get old age pension, they must fulfill the following two basic requirements:

- Certain age limit.
- Minimum number of working days varying according to the work category to which the insured belongs.

There is also the old age pension for special circumstances. This type of old age pension allows full old age pension even for persons below the lower age limit. This type of pension refers mainly to totally blind people and mothers with adolescent children (Lanaras, 1994). The long-term unemployed insured with I.K.A. needing up to five years to qualify for their full pension have the option to continue their pension insurance, with the contributions paid by OAED. The level of the pension is calculated by taking as basis the salary of the insured on their last day of work. This type of insurance for retirement is suspended if the insured becomes employed (Circular of I.K.A., 2001).

The insured that are eligible to receive disablement pension are those who have a disability due to illness or industrial accident, or to an accident that did not occur within the working environment.

The disability is categorised in three levels:

- Heavy – 80% of disability.
- Usual – 67% of disability.
- Partial – 50% of disability.

Widow's or Survivor's Pension is paid in cases when the insured passes away. Under this circumstance the protected members of his/her family are eligible to receive a pension, with the only requirement that the insured has worked for a minimum number of days. In case of death due to industrial accident or occupational illness, the pension is received regardless of the number of the working days of the insured (Lanaras, 1994).

6.3.4 Hygiene and Safety at Work

The first attempts of organising regulations for the protection of workers during their work appeared in 1836. The general framework follows the guidelines of the European Union for the hygiene and safety at work (Sarafopoulos, 1986). The dominant terms regarding the safety at work

are: industrial accident, occupational illness, and psychological effects (Demarogonas *et al.*, 1987).

Greek law started to implement measures for the hygiene and safety at work much earlier than 1920 (R.D.-25.8.1920). After the complete membership of Greece in the European Union, some laws had to be transformed in accordance with the guidelines of the EU regarding the hygiene and safety at work (Decree 15.7.96). According to the law, employers are obliged not only to supply the employees with self-protection equipment, but also to provide training on matters of safety at work, and criminal penalties and fines can be imposed on employer-offenders (Law 2224, 1994) (YPERG). The employees in businesses (with more than 50 people) have the right to form a committee of hygiene and safety at work, responsible for the control of the working conditions and the measures for the improvement of the working environment. The committee will check whether the measures are kept, and point out the risks for certain workplaces, while recommending alternative solutions (Law 1568/1985). Such a business is obliged to use the services of a Security Technician (responsible for the control of the safety of the working conditions, the advising for the planning and the organisation of safe and healthy working conditions and the general improvement of the workplace) and a Work Doctor (responsible for advising the employer and the employees regarding the measures taken to ensure the physical and psychological health of the employees) (Law 1568/1985). In situations where the employees need to use special self-protection equipment, the business establishment must provide them to the employees. The employers have to check whether the workers apply the necessary measures for their safety and hygiene and employees are responsible for putting into practice these regulations (Theodoratos and Karakissidis, 1997).

6.4 Empirical Findings

The existing field of research in Greece is still in an early stage. Research is conducted mainly by scientists in medical and epidemiological fields, and much more work has to be done before one can reach valid conclusions. Greek studies can be divided into two broad categories; *individual-level studies* that focus on the SES determinants of health, and *macro-level studies* dealing with the observed SES inequalities in health at the national level or in different geographic regions of Greece.

6.4.1 Methodological Shortcomings

The complex interrelation between SES and health status was long ago recognised in applied research. The endogeneity issue, namely the bi-directional direction in the relation of interest, complicates the issue of establishing a causal effect of SES upon individual health. Furthermore, the existence of mediating and confounding factors that intervene in the SES–health relationship cause various identification problems. Selection bias is frequently observed in survey-based data as well, since high, systematic non-response rates are recorded for indicators such as household income (Mergoupis, 2001). These methodological shortcomings require the adoption of advanced econometric tools. However, these issues have not been addressed by the Greek literature, with the exception of Mergoupis (2001) who addressed the selection issue in his study.

The Greek literature utilises mainly simple statistical and econometric methods in order to assess the SES determinants of individual health state. Descriptive and statistical tools are applied in the majority of relevant studies, such as parametric and non-parametric test statistics, factor analysis, analysis of variance and Pearson product moment correlations.[18] Yet, some studies have attempted to identify causal effects with the use of regression analyses, namely linear regression[19] and hazard modelling techniques[20] in case of continuous health approximations; and logistic or probit regression analyses in case of categorical and hierarchical health variables.[21]

6.4.2 Mortality and SES

Researchers have assessed the effects of individual SES on mortality risk, and provide consistent evidence that it is higher among lower SES groups. In particular, it is found that socially and economically disadvantaged children have higher fatality rates from childhood leukaemia in comparison to the remainder (Petridou *et al.*, 1994). Other studies indicate that a large proportion of premature mortality is due to preventable causes of death, highlighting the necessity for the adoption of healthier

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[18] Tsimpos *et al.*, 1990; Madianos and Stefanis, 1992; Petridou *et al.*, 1997; Madianos *et al.*, 1999; Laskari *et al.*, 2000; Kyriopoulos *et al.*, 2003; Xidea-Kikemeni *et al.*, forthcoming.

[19] Kyriopoulos *et al.*, 1983; Le Grand, 1987; Madianos and Stefanis, 1992; Petridou *et al.*, 1995, 1996, 2000; Zacharakis *et al.*, 1998; Madianos *et al.*, 1999.

[20] Petridou *et al.*, 1994.

[21] Kouri *et al.*, 1995; Petridou *et al.*, 1995; Mergoupis, 2001.

life-styles (Kogevinas *et al.*, 1992). Furthermore, Kogevinas *et al.* (1992) detected gender differentials in mortality patterns and argued that women enjoy more years of life expectancy than men, independently of age.

Many researchers have assessed the effects of regional socio-economic inequalities on the health of the population.[22] All cause and cause-specific mortality rates are positively related to regional indicators of industrial employment and per capita consumption of food and negatively related to per capita income (Kyriopoulos *et al.*, 1983; Tsimpos *et al.*, 1990). A characteristic example is the fact that Thrace exhibited the highest mortality levels among the remained Greek regions, Ionian Islands and Crete the lowest. However, average mortality in Greece occupied one of the lowest positions among EU countries (Tsimpos *et al.*, 1990). Moreover, while trends of mortality levels in each region were downward sloping in 1996, this decrease was slower for regions of low SES (in Tountas, 2000). Le Grand (1987) confirmed the positive relationship between income inequality and mean mortality in a cross-country comparison study with Greece exhibiting high inequality independently of the inequality measure applied.[23]

Studies dealing with the effects of occupational class on mortality concentrate mostly on work-related fatalities. About 4,000 people loose their lives due to working accidents in the EU countries (Eurostat, 1997). Higher mortality rates due to work-related accidents are observed mainly in manual jobs, such as working in mines, quarries, construction and agriculture, and in the transportation sector (in Tountas, 2000). In a recent survey, 57% of the fatal work-related accidents took place in the sector of construction services and other manual, technical services (Centre for Occupational Health and Safety, 2002).

6.4.3 Physical Health and SES

The SES determinants of physical health are a major issue investigated in various studies, and researchers have detected SES gradients in the health of both children and adults. Specifically, studies argue that the

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[22] Kyriopoulos *et al.*, 1983; Tsimpos *et al.*, 1990; Kogevinas *et al.*, 1992; Madianos and Stefanis, 1992; Zacharakis *et al.*, 1998; Madianos *et al.*, 1999; Kyriopoulos *et al.*, 2003.

[23] The countries included in the analysis are: Australia, Austria, Belgium, Bulgaria, Canada, Czechoslovakia, Denmark, Eire, England and Wales, France, FRG, GDR, Greece, Hungary, Iceland, Italy, Japan, Luxembourg, Netherlands, N. Ireland, Norway, New Zealand, Poland, Portugal, Romania, Scotland, Spain, Sweden, Switzerland, U.S.A., Yugoslavia.

risk of school injuries is positively related to both low parental education and low school performance (Petridou *et al.*, 1994; Kouri *et al.*, 1995). Furthermore, maternal occupational class is a significant determinant, since children of women in non-professional occupations exhibit a higher risk of school injuries in comparison to the remainder (Petridou *et al.*, 1995). In relation to the above, adolescents from low and middle income urban families are found to exhibit substantially higher values of blood lipid levels (and consequently, increased risk of coronary heart disease) compared to children from high income urban families (Petridou *et al.*, 1995).

The SES effects on health are evident in adult ages as well. Greek studies provide consistent evidence that SAHS is positively affected by higher levels of income, education, and primary health care coverage (Mergoupis, 2001; Kyriopoulos *et al.*, 2003). Housing conditions and life-style factors, such as smoking and alcohol drinking, are also found to affect the risk of injury among a sample of elderly individuals (Petridou *et al.*, 1996).

Various Greek studies have investigated the effect of occupational status on health inequalities. The relationship between unemployment and morbidity rates is well established through the higher incidence of high-risk behaviours and unhealthy habits (Tountas, 1999). In addition, Mergoupis (2001) argues that a strong, negative 'manual work' effect operates on long-term health status compared to non-manual occupations. Furthermore, occupational injuries exhibit the greatest severity among all kinds of injuries (Petridou *et al.*, 2000).

Work-related features were also found to affect health state. Job tenure, physically demanding working tasks, workload, job demands and shortage of stuff in the job can affect negatively the incidence of physical health problems (namely, diseases of the circulatory system, musculoskeletal problems, neoplasia, injuries and poisoning) (Kagialaris *et al.*, forthcoming; Xidea-Kikemeni *et al.*, forthcoming).

Age and gender effects are also consistently supported by the literature. In particular, health state worsens as age increases independently of how health is approximated (Petridou *et al.*, 2000; Mergoupis, 2001; Kyriopoulos *et al.*, 2003). Work-related accidents and health impairments also increase with age (Alamanos *et al.*, 1986; Xidea-Kikemeni *et al.*, forthcoming). However, it is found that the incidence and the severity of work-related accidents decrease after the age threshold of 60 years. Alamanos *et al.* (1986) conclude that the observed under-employment rates and the legal retirement age threshold for employees over 60 years contribute to this finding. Similarly, other studies indicate an age threshold of 55 years before which health scores are lower among employees (Lascari *et al.*, 2000).

The evidence on gender differentials is less clear-cut. Some studies fail to provide evidence (Kyriopoulos *et al.*, 2003), while other studies argue that women appear to have deteriorated overall health status compared to men (Lascari *et al.*, 2000; Mergoupis, 2001).

6.4.4 Mental Health and SES

The European Agency for Safety and Health at Work (2000) points out that stress constitutes a dominant hazard among health professionals. Studies provide findings that Greek employees suffer from higher levels of stress in comparison to employees in other EU countries. Women and younger age groups appear to be more exposed to stress. Furthermore, long-term exposure to stress factors can lead to serious physical health problems, such as cardiovascular diseases (Tountas and Alamanos, 1999). Madianos and Stefanis (1992) provided evidence that females, older individuals, individuals either divorced or widowed, Athenian residents, currently unemployed and individuals of lower SES exhibit a higher risk of depression. A positive association is detected between age, job tenure and mental health problems (Xidea-Kikemeni *et al.,* forthcoming) whereas tension and stress symptoms are negatively related to job satisfaction, workload and beneficiary working environment features (Xidea-Kikemeni and Aloumanis, forthcoming). In addition, women appear more stressful in comparison to their male counterparts (Lascari *et al.*, 2000).

6.4.5 Mediating Pathways in the SES–Health Relationship

Establishing causal effects from SES upon health status is hampered by the appearance of confounders that operate on the relationship of interest. Such factors are mental health symptoms and life-style risk factors.

The literature argues that mental health problems are not solely affected by individual SES characteristics but they impose a direct burden on physical health as well. For example, work-related characteristics (such as the work environment, workplace relations, work-related accidents and diseases, and stress at work) can influence the health of the working population by generating physical, biological, psychological and social risk factors (Tountas, 1999). Thus, the various dimensions of individual health status interrelate and invalidate the findings on the relationships of interest.

Indeed, the evidence suggests that certain social and psychological factors (such as stress) can affect the appearance of serious psychosomatic disorders, such as cardiovascular diseases. Still, more evidence is needed

in order to establish a causal effect running from mental health to physical health symptoms (Economou, 1997). Other studies argue that stress mediates the relationship between societal factors and morbidity and even mortality. In particular, Zoutzoglou-Kottarides (1984) argues that certain conditions of social environment have both a direct and an indirect impact on the cause and the course of cancer, with indirect pathways emerging through individual prior exposure to stress.

Health-related behaviour and life-style factors also act as confounders on the SES–health relationship. For example, risky behaviour is inversely affected by individual SES. Furthermore, risky behaviour scores are higher for males and they increase sharply with age (Petridou *et al.*, 1997). In addition, life-style choices, such as smoking, affect negatively the duration of gestation (Petridou *et al.*, 1996) and suicidal behaviour as well (Zacharakis *et al.*, 1998).

6.4.6 Health Status and Health Care Provision in Greece

The Greek health care system is suffering from "deficit of specialised staff, maldistribution of personnel, absence of decentralisation policies, inadequate training, and rigid practices of personnel promotion" (Polyzos and Yfantopoulos, 2000, p. 639) resulting in low productivity (Tountas *et al.*, 2002) and, hence, may result in poor health outcomes of the population, such as hospitalisation rates (Madianos *et al.*, 1999). Actually, Tsimpos *et al.* (1990) argued that cause-specific mortality could be "…avoidable through medical intervention and health service organization" (p. 73).

Yfantopoulos (1984, 1986) concentrated on the Greek model of economic and health development and concluded that Greece seems to exhibit a time lag in her responses to the worldwide economic developments. In addition, the strong inequality that is observed in Greece manifests the necessity for the adoption of egalitarian redistributional policies. Indeed, only 5% of the population enjoy about 60% of health expenditures (Tountas *et al.*, 2002). Furthermore, social benefits (e.g. illness and health care, disability, old age, survivors, unemployment) in Greece are below the EU average level with the exception of social benefits for old age (Eurostat, 2000).

Studies indicate that health care supply can facilitate the improvement of the population health state. Madianos *et al.* (1999) provide evidence that regions of low socio-economic development exhibit an inadequate psychiatric care provision. In detail, economically disadvantaged areas (for example in Macedonia and Thessaly) are characterised by higher mental hospital utilisation rates. Indeed, Madianos and Economou (1999)

argue that community-based mental health services provide an alternative efficient solution to inpatient care, especially since cultural barriers in Greece motivate individuals to avoid hospitalisation for mental problems.

6.5 Conclusions

A number of studies in Greece reveal significant SES gradients on the health of the population at different stages of the life-cycle. Low SES approximated by low education, unemployment, low income, and certain job characteristics hampers individual health, independently of how health is approximated. Regional analysis indicates that areas of low socio-economic development are characterised by poor health outcomes and uneven health care service distribution. Age differentials are quite evident with health status decreasing as age increases. In addition, females appear to report lower levels of overall health and increased stress, but they enjoy higher life expectancy in comparison to male respondents. Still, insufficient evidence is provided regarding the confounding mechanisms (such as life-style and mental health factors) operating in the SES–health relationship. Importantly, the endogeneity issue is not confronted by Greek studies. Greek studies provide evidence that SES inequalities in health can be traced back to childhood and adolescent years, implying the existence of a dynamic relationship between SES and health.

Summarising, the health care system in Greece is divided into primary, secondary and tertiary health care. The secondary and tertiary levels deliver hospital services while the primary level provides clinic-based services. The Social Security Institution is the main social insurance provider in Greece. The Institution's services include monetary and non-monetary allowances to the employed and unemployed under certain conditions. The retirement system consists of three main types of pension: old age, disablement and widow's. Concerning hygiene and safety at work, there is an obligatory legal framework applying to both the employees and the employers, in accordance to EU regulations, in order to prevent and reduce the number of industrial accidents. Studies indicate that the disadvantages characterising the Greek health care system further contribute to the observed SES inequalities in health.

Although research in Greece has started to focus on SES inequalities in health, the available evidence is not enough and further research is needed in order to disentangle the complex mechanisms that contribute to health inequalities (Economou and Nikolaou, 2005).

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CHAPTER 7

The Case of the Netherlands

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7.1 Introduction

The relationship between socio-economic status and health is influenced by the institutional setting of countries. Is health insurance available for everyone? Is the use of health care expensive? Who are eligible for social security and when? In this chapter, we first describe the Dutch institutional setting, that is, the health care system and the social security system.

Some people are healthy, while others suffer from several diseases and limitations. Less healthy people relatively often have disability benefits, are unemployed, unmarried, immigrants or homeless.[1] A common factor is that these people have a relatively low socio-economic status. In this chapter, we investigate the relationship between socio-economic status and health in the Netherlands. First, we assess this relation for the general population. Next we investigate whether the relation between socio-economic status and health differs for the elderly. Then we turn to the mechanisms that may explain socio-economic health differences.

Health also influences the labour force participation rate. Health is one of the main factors that influence the retirement decision (Heyma, 2001). In addition to a relation from health to labour force participation, there might as well be an influence from labour force participation on health. Working conditions can damage health. In this chapter we give a short overview of the available literature about the relationship between health and labour force participation in the Netherlands by focusing on the nature and extent of the relation among Dutch elderly people and on attempts to explain these empirical relations.

7.2 The Dutch Institutional Setting

7.2.1 The Dutch Health Care System

The Dutch health insurance system is a mix of public and private insurance. But people can make no choice between a public and a private insurance, since it is completely determined by income. By means of the Health Insurance Act of 1941, the following people are publicly and compulsory insured: employees with an income below the income

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[1] Rijksinstituut voor Volksgezonheid en Milieu (1997).

level gauge (for 2002 this was set at 30,700 euro per year), their (non-earning) partners and their children, people over 65 years with an income up to 19,550 euro per year, recipients of social insurance benefits, and self-employed people, including their (non-earning) partners and children, with an income up to 19,650 euro per year. Around 63 per cent of the Dutch population are insured by a public insurance company.[2] The premium is to a large extent income related and fixed by the government. Only a small part of the premium can be set by the public insurance company. The public insurance package – which medical care is insured – is also set by the government.

With an income level of more than 31,750 euro per year, people can only apply for private health insurance. Private insurers have to accept everyone for at least the 'standard package policy', which covers a fixed package of health care at a relatively high price, which is set by the government. Insurance companies with a lot of unhealthy insured customers are compensated for that. More than half of the employees who earn more than the income level gauge (and therefore have to apply for private health insurance) are insured within a collective contract, provided by the employer (Kok *et al.*, 2002).

In addition to the mix of public and private insurance, the Dutch health care insurance system is divided into three so-called compartments. The first compartment contains the General Exceptional Medical Expenses Act (AWBZ), which is insurance for extreme medical risks. It covers elderly people in need for nursing, the mentally ill and the handicapped. The AWBZ is a national insurance: everyone who lives in the Netherlands is insured for these risks, which are difficult to insure in a private market. The second compartment contains basic public and private health insurance. These insurances cover basic medical care expenses such as the general practitioner and hospital visits. In the third compartment, supplementary medical care is offered by private insurance companies. People who want to insure themselves above the basic public package, can apply for a supplementary insurance. In Figure 7.1 the Dutch (health) care insurance system is summarised.

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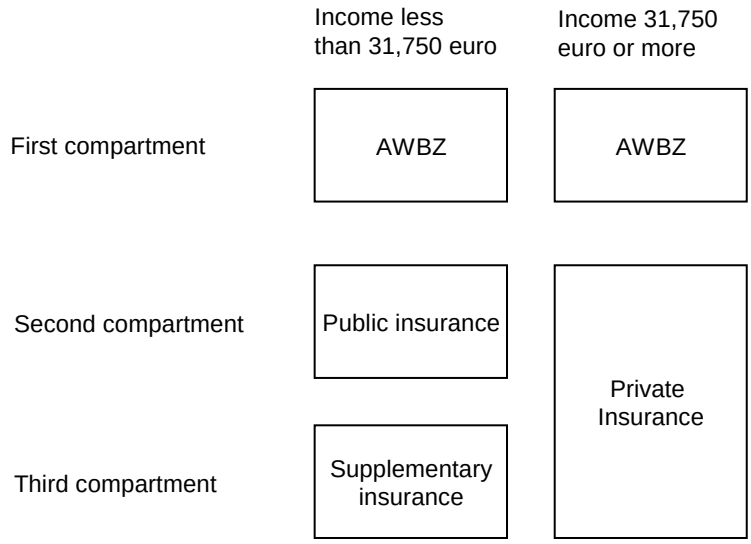
[2] www.zn.nl

Figure 7.1 The Dutch (health) care insurance system



Up to the beginning of the 1990s, the public insurance companies had a regional monopoly: people who earned less than the income level gauge were not able to choose their public insurer. Instead, they were automatically served by the one in their region. Since 1992, the insured can change public insurer once a year. Until recently, price differences between public insurers were small and the insured hardly switched insurance company. Price elasticities were small (Shut and Hassink, 2002). However, in January 2003, a national newspaper opened with 'the publicly insured vote with their feet' to report that people in fact do switch insurance companies now – due to increasing price differences between public insurers.[3] Privately insured people have much longer been able to choose their insurance company. Among this group, price elasticities vary: for younger people the price seems to be more important, for the elderly the possibility of choosing a practitioner is much more important (Kok *et al.*, 2000).

Because of moral hazard, medical consumption can be much higher than necessary. Since the patient is insured, (s)he is not faced with the costs, which influences behaviour. People may, therefore, invest less in health or prevention. Once people become ill, only the best is good

[3] Volkskrant, 17 January 2003, 'Ziekenfondsklanten stemmen met de voeten'.

enough to get better again. There are several ways to deal with moral hazard. Firstly, co-payments can be introduced. In the Netherlands, co-payments and own risks are rare, especially among public insurance companies. Several experiments with co-payments have failed because of high administration costs. Secondly, gatekeepers may guard medical consumption. In the Netherlands, the general practitioner has such a role by deciding what medicine to use and whether specialist treatment is sought.

Health Care Expenditures

During the last fifty years, Dutch expenditures on health care more than doubled. In comparison to other European countries, Dutch health care expenditures are slightly above average, see Table 7.1. In the last years, expenditures on health care have risen sharply. In 2002, the expenditures on health care per head were 2,045 euro per year.[4]

Table 7.1 Health care expenditures as a percentage of GNP, in US-dollar purchasing power parity (ppp), 1997

	Expenditures as a percentage of GNP	Expenditures per head in US-dollar ppp
Germany	10.7	2,364
France	9.6	2,047
Greece	8.6	1,196
Sweden	8.6	1,762
The Netherlands	**8.5**	**1,933**
Austria	8.3	1,905
Denmark	8.0	2,042
Portugal	7.9	1,148
Belgium	7.6	1,768
Italy	7.6	1,613
Finland	7.4	1,525
Spain	7.4	1,183
Luxembourg	7.0	2,303
UK	6.9	1,415
Ireland	6.3	1,293

Source: SCP (2000).

[4] Central Bureau of Statistics (2003).

Most expenditures on health care are covered by health insurance. Public health insurance is funded by employers and employees: employers pay 6.75 per cent of wage incomes and employees pay 1.70 per cent of their wage income. In addition to the income-related part of the premium, people pay a monthly fee to their insurance company. In 2003 these fees varied between 19,95 euro and 32,50 euro. Public insurance companies are not allowed to ask different fees to different customers. Premiums for private health insurance can vary with the expected health risks, although the insurance companies have agreed that the difference in the premium between the young and the old cannot be more than 50 per cent. On average, the premium paid for private health insurance in 2000 was 86,86 euro per month (basic plus supplementary insurance, with no wage income fee) (Kok *et al.*, 2002). Not all health care expenditures are covered by health insurance. People with private insurance often face an 'own risk': they pay themselves the expenditures up to a fixed amount.

The Dutch Central Bureau of Statistics asks several people to monitor their health care expenditures. With these data the amount people pay for health care that is not covered by their health insurance can be investigated. Households with a head younger than 45 spend on average an additional 300 euro per year (1.2 per cent of total consumption) on health care, households with a head between 45 and 65 spend an additional 400 euro per year (1.5 per cent of total consumption) and households with a head older than 65 spend an additional 360 euro per year (2.0 per cent of total consumption).

Health Care Reforms

For several decades there have been plans to reform the Dutch health care system from a supplier directed system to a demand directed system. Competition would be the central element in this new system. The plans for health care reforms contain the following elements (CBP, 2003):

- the difference between public and private insurance disappears;
- everyone pays a nominal premium for a standard health care package, with a compulsory own risk and income-dependent support from the employer;
- children do not pay premiums;
- low income earners are compensated for the cost they make for health care;
- health insurance becomes compulsory;

- insurers negotiate with health care suppliers about the price and quality of care;
- premiums are the same for all insured and insurers have to accept everyone;
- to make sure that insurers do not try to attract the most healthy customers (with techniques like cherry picking), an adjustment system is introduced.

Competition plays a central role in these plans. Health insurers negotiate with suppliers of health care (hospitals, general practitioners). They try to get a good deal, so they can offer their customers a low premium and a high quality product. Therefore, health care insurers will put pressure on suppliers of health care, hereby taking over the task of the budgeting system. Currently, the plans are to introduce this new system in 2006.

7.2.2 The Dutch Social Security System

The normal retirement age in the Netherlands is 65. For the older workforce, the social security system is sometimes used to retire earlier. There are several programmes that can be used for early retirement: unemployment programmes, disability programmes and employer provided early retirement programmes.

Social security programmes are national programmes for every employee or for every citizen. For example, the unemployment programmes can be divided into unemployment benefit (UB) programmes for employees and social assistance (SA) programmes for all citizens. Unemployment benefit programmes are programmes for all employees who involuntarily loose their job. The level and duration of benefits depend on the individual labour market history. If the unemployed has worked at least four out of the five years before unemployment, the benefits amount to 70 per cent of the last wage earnings.[5] The duration of UB also depends on the individual labour market history, and has a maximum of five years. When the UB period ends, people can apply for continuation benefits for a period of two years (three and a half years for people aged 57,5 and older). Continuation benefits amount to 70 per cent of the minimum wage level. The drop in income may therefore be substantial.[6] When no (longer) rights on UB exist, people can apply for

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5 However, there is a maximum level.

6 www.minszw.nl.

SA. SA benefit recipients have to be in active search for employment to maintain (full) benefits, except for recipients aged 57,5 and older. Also SA benefits amount to 70 per cent of the minimum wage level and are, in addition, means tested. The eligibility rules for unemployment benefits result in a major difference between people younger and older than 57,5. With enough labour experience, elderly workers may retire if loosing their job and receive 70 per cent of their last wage up to age 62,5 without the obligation to search for a job. Between 62,5 and 65 years of age, continuation benefits up to 70 per cent of the minimum wage level bridge the final gap until normal retirement.

Disability Insurance (DI) programmes provide income for employees who cannot work (anymore) because of a handicap. The benefit level depends on age, previous earnings and earnings capacity, with a maximum of 70 per cent of previous wage earnings. Up to the beginning of the 1990s, both employers and employees considered the disability benefit programme to be an attractive way to retire early. In an attempt to reduce the number of DI recipients, DI regulations have in recent years been tightened. This has made it harder to use DI as an early retirement programme.

A third way to retire early is to use employer provided early retirement schemes. These programmes were introduced in the 1970s. The older workforce was given the opportunity to retire early and make place for the young unemployed. Early retirement replacement rates vary by firm and sector, but are rather attractive with an average benefit of around 72 per cent of last wage earnings (Dalen and Henkens, 2000). Figure 7.2 summarises the Dutch social security system.

Figure 7.2 The Dutch social security system

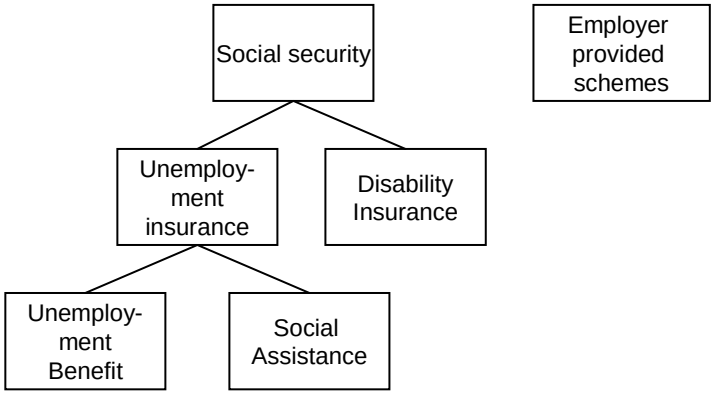
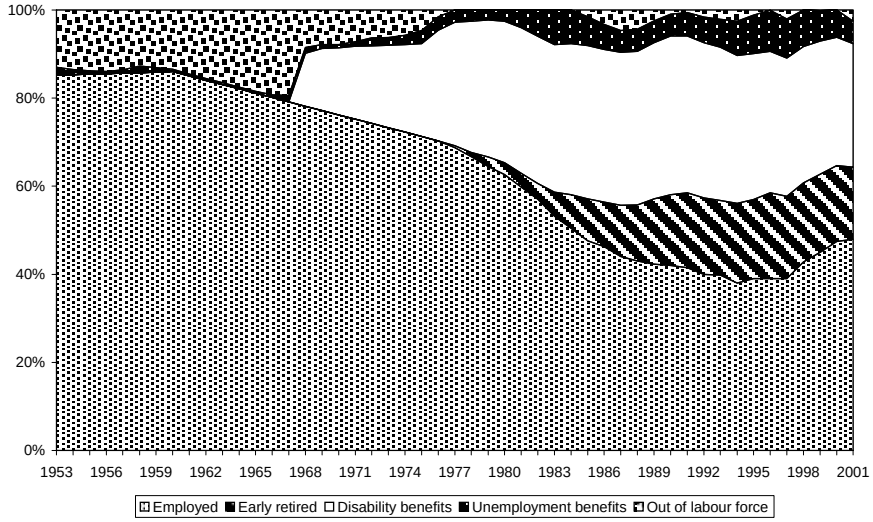
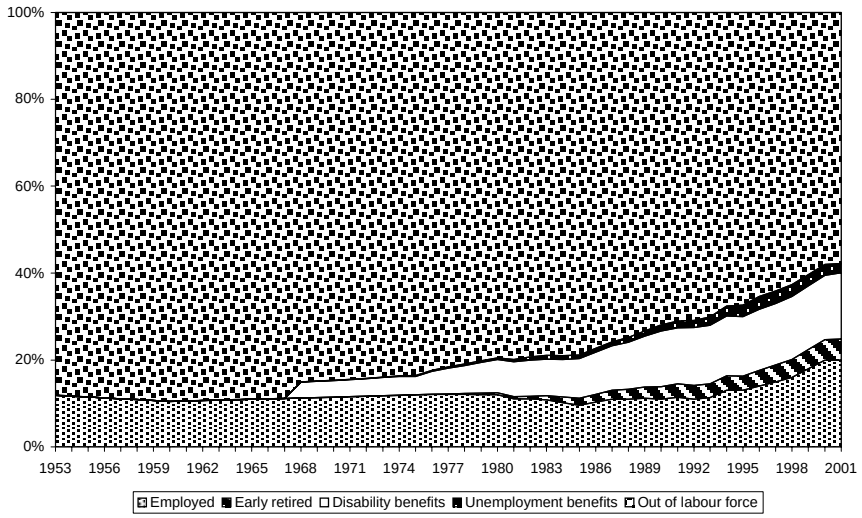


Figure 7.3 Development of labour participation of men aged 55-64



Source: Heyma and Zijl (2003).

Figure 7.4 Development of labour participation of women aged 55-64



Source: Heyma and Zijl (2003).

Figures 7.3 and 7.4 depict the labour force participation and the use of social security among the elderly Dutch. Labour force participation of elderly Dutch men decreased until the mid 1990s. In 1994 only 38%

of men aged 55 to 64 were working, 18 percent received early retirement benefits, 34 per cent received disability benefits and 8 per cent of these elderly men received unemployment benefits. For women aged 55 to 64, a different pattern exists. The labour force participation rate has risen from 12 per cent in 1953 to 20 per cent in 2001. The use of social security has risen sharply: in 2001, 15 per cent of women between 55 and 64 received disability benefits and 2 per cent of them received unemployment benefits.

Expenditures on Social Security

In comparison to other European countries, Dutch social security expenditures are slightly above the European average, see Table 7.2.

Table 7.2 Expenditures on social security as a percentage of GNP (1995), in US-dollar purchasing power parity (ppp), 1997

	Net expenditures as a percentage of GNP (minus tax and inclusive of semi-collective and private expenditures)	Expenditures per head in US-dollar ppp
Germany	27.7	3,676
The Netherlands	**25.0**	**3,639**
Denmark	24.4	4,098
Belgium	26.5	3,962
Italy	22.3	3,915
Finland	25.7	3,741
Spain	27.0	3,572
UK	26.0	2,340
Ireland	18.7	2,184

Source: SCP (2000).

7.3 The Relation Between Socio-economic Status and Health

7.3.1 Nature and Extent of Socio-economic Health Differences

The Dutch research institute TNO recently investigated socio-economic differences in life expectancy. Socio-economic status was measured by education. They used five measures of life expectancy:

- general life expectancy;
- life expectancy with no functional limitations;
- life expectancy in good (subjectively experienced) health;
- life expectancy in good psychological health;
- life expectancy with no chronic diseases.

Table 7.3 Socio-economic differences in life expectancy

	Men		Women	
	Low education	High education	Low education	High education
Life expectancy				
By birth	73.1	78.0	79.5	82.1
At age 65	11.1	14.8	16.4	18.5
Life expectancy with no functional limitations				
By birth	63.8	73.7	64.7	73.3
Percentage of total life	*87.3*	*94.5*	*81.4*	*89.3*
At age 65	8.0	12.6	9.3	12.7
Percentage of total life to live	*72.1*	*85.1*	*56.7*	*68.6*
Life expectancy in good (subjective) health				
By birth	52.9	68.7	54.2	68.2
Percentage of total life	*72.4*	*88.1*	*68.2*	*83.1*
At age 65	6.3	11.3	7.4	12.4
Percentage of total life to live	*56.8*	*76.4*	*45.1*	*67.0*
Life expectancy in good psycho-logical health				
By birth	65.5	73.3	67.7	72.1
Percentage of total life	*89.6*	*94.0*	*85.2*	*87.8*
At age 65	10.0	14.0	14.1	16.4
Percentage of total life to live	*90.1*	*94.6*	*85.6*	*88.6*
Life expectancy with no chronic diseases				
By birth	49.2	59.1	49.3	54.6
Percentage of total life	*67.3*	*75.8*	*62.0*	*66.5*
At age 65	11.1	8.1	6.0	7.4
Percentage of total life to live	*48.6*	*54.7*	*36.6*	*40.0*

Source: van Herten *et al.* (2002).

Table 7.3 shows the results. Highly educated men become almost five years older then men with a low level of education. These socio-economic differences in life expectancy still exist at age 65. In addition to dying earlier, men with low socio-economic status live a larger part of their life in bad health. Socio-economic differences in life expectancy in good subjectively experienced health are more than 15 years for men.

For women, we see the same pattern. Highly educated women live longer and live a larger part of their life in good health compared with lower educated women. However, socio-economic differences in life expectancy are less pronounced for women than for men.

Gender differences exist: women grow older than men, but live a larger part of their life in relatively bad health. Differences in life expec-

Table 7.4 Socio-economic differences in health

	Post-secondary education (Hbo, University)	Higher secondary education (Havo, Vwo, Mbo)	Lower secondary education (Mavo, Lbo)	Primary school only
Percentage that thinks own health is 'less than good'	18	22	28	41
Percentage with four or more health complaints	26	30	34	44
Percentage with two or more chronic impairments	17	20	20	22
Percentage with one or more physical limitations	23	29	31	41
Relative risk of a stroke	1	1.23	1.26	1.85*
Relative risk of an accident	1	1.04	1.65*	1.49*
Relative risk of lung cancer	1	1.45	2.33*	2.60*
Relative risk of prostate cancer	1	0.83	0.73	1.05

* The risk for this educational category is significantly higher than the risk for the highest educated.

Source: Stronks *et al.* (2001).

tancy between men and women have decreased over the last years, mainly because men and women have developed more of the same behaviour (smoking, labour participation).[7] The results are comparable with studies in other European countries (van Herten *et al.*, 2002).

Schrijvers *et al.* (2001) have investigated the relationship between several health measures and education (as a proxy for socio-economic status). The results are given in Table 7.4. People with higher education perceive their health as 'good' or 'very good' more than twice as often as people with lower education. Lower educated people more often suffer from health problems and physical limitations. They also have higher risks of getting cancer, a stroke or an accident. No socio-economic differences were found for prostate cancer. Mackenbach (1994) found similar results. He distinguished between education, occupation and income as measures for socio-economic status. Recently, Smits *et al.* (2005) confirmed these results with an analysis at the neighbourhood level.

7.3.2 Socio-economic Health Differences for the Elderly

Socio-economic health differences are age-dependent. They are small during early adulthood and for the elderly (75+). The differences appear during middle adulthood (45–54) and for the young elderly (55–75). An explanation for this pattern of age-dependency in SES differences is that the older people become, the more health problems they develop with a certain probability. This increases health differences. After a certain age, however, almost everyone is suffering from some kind of disease, which decreases health differences again and causes more homogeneity in health at older ages. Furthermore, people with low SES have higher risks of dying young. The healthiest survive. And thirdly, the difference in socio-economic status decreases with age. Since retirement causes a drop in income, income differences decline (Broese van Groenou and Deeg, 2000a, 2000b; House *et al.*, 1994).

Broese van Groenou and Deeg (2000a, 2000b) have investigated the relationship between socio-economic differences in mortality and health for Dutch elderly people aged between 55 and 85. The socio-economic position is determined at the household level: the highest

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[7] Rijksinstituut voor Volkgezondheid en Milieu (1997).

socio-economic position of both partners is chosen. For women in particular, this leads to a change in socio-economic status. The results are presented in Tables 7.5 and 7.6. Both men and women with low socio-economic status have lower health status. The differences are most pronounced for men below age 65 and for women between ages 65 and 75. Socio-economic health differences are highest when education and income are used as indicator for socio-economic status. Education is related with the propensity to invest. Higher educated people have invested more in human capital than lower educated people. The high propensity to invest can explain higher investment in health as well. Alternatively, the higher educated have more knowledge than the lower educated and may therefore be better able to adapt their behaviour. People with a high income can invest more in their health: they can have a better house, can afford healthier food and so on.

Table 7.5 Relation between socio-economic status and functional limitations

	Men			Women		
	Percentage with one or more functional limitations			Percentage with one or more functional limitations		
Age	**55-64**	**65-74**	**75-85**	**55-64**	**65-74**	**75-85**
Education						
Low	33	33	56	20	52	80
Medium	15	30	49	16	38	71
High	14	18	53	18	21	68
Income						
Low	29	34	58	24	52	82
Medium	22	29	45	18	44	72
High	13	22	50	15	27	73
Occupation						
Low	21	34	52	19	49	77
Medium	19	29	55	15	41	74
High	16	25	49	15	30	70

Source: Broese van Groenou and Deeg (2000b).

Table 7.6 Relation between socio-economic status and percentage of population feeling less than healthy

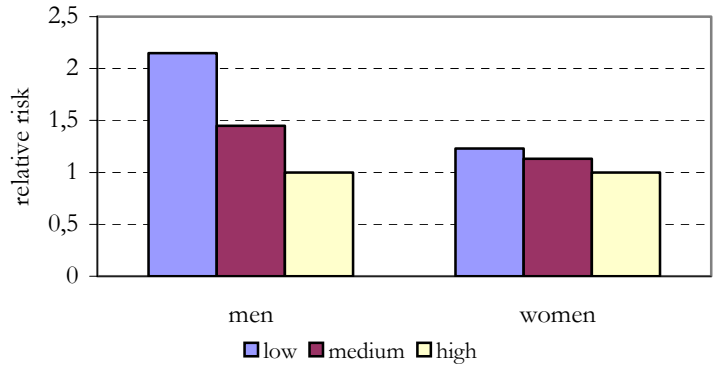
	Men			Women		
	Percentage feeling less than healthy			Percentage feeling less than healthy		
Age	**55-64**	**65-74**	**75-85**	**55-64**	**65-74**	**75-85**
Education						
Low	42	38	38	35	46	52
Medium	32	29	38	34	38	46
High	20	27	33	23	21	31
Income						
Low	49	36	40	40	48	51
Medium	38	30	37	38	39	50
High	24	27	33	27	32	41
Occupation						
Low	34	34	36	34	43	52
Medium	33	32	39	28	41	47
High	26	26	35	38	29	39

Source: Broese van Groenou and Deeg (2000b).

Socio-economic status not only influences health levels, it influences *changes* in health as well. Men with lower socio-economic status have higher risks of deteriorating health conditions (see Figures 7.5 and 7.6), even though men with lower socio-economic status have a relatively high risk of dying. The survivors, presumably the ones with the best health, still suffer from a stronger decline in health conditions. For women, socio-economic status is hardly related to changes in health.

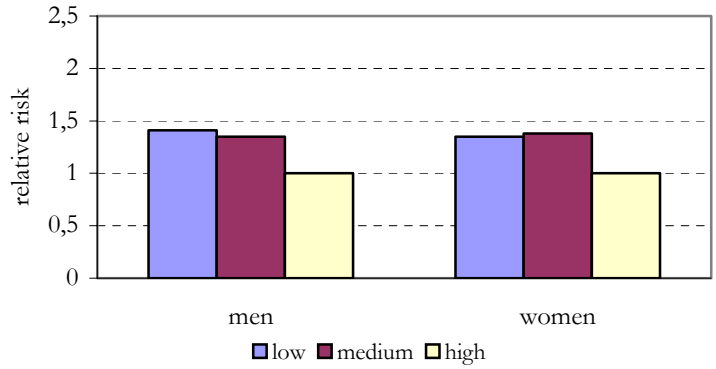
Van Rossum (1999) has investigated the relationship between socio-economic status and the prevalence of cardiovascular diseases among people aged 55 and older in the neighbourhood Ommoord in the city of Rotterdam. She found a significant relation for women, but no relation for men. There are socio-economic differences in the severity of heart attacks: men with a low income have a two and a half times higher risk of dying from a heart attack compared with men with a high income.

Figure 7.5 Relative risk of an increase in functional limitations for lower, medium or higher educated elderly people (aged 55 to 85)



Source: Broese van Groenou and Deeg (2000b).

Figure 7.6 Relative risk of a decrease in subjectively experienced health for lower, medium or higher educated elderly people (aged 55 to 85)



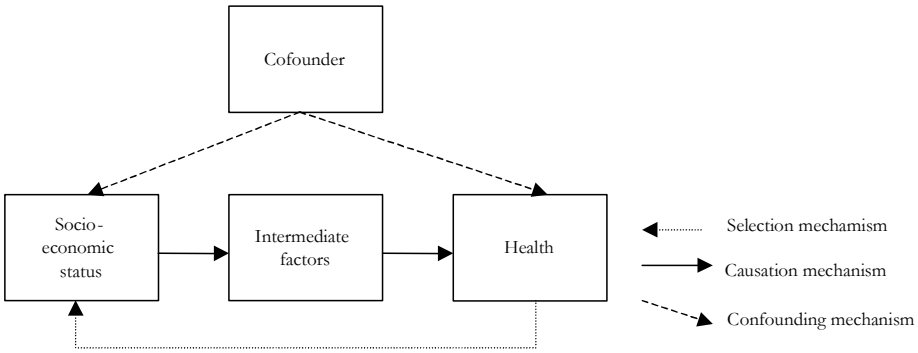
Source: Broese van Groenou and Deeg (2000b).

7.3.3 Explaining the Differences

There are several hypotheses that try to explain the relationship between socio-economic status and health: the causation mechanism, the confounding mechanism and the selection mechanism (see Figure 7.7). The idea behind the causation mechanism is that socio-economic status influences health through intermediate factors such as childhood

and the living environment. The selection mechanism states that health influences the socio-economic position. For instance, people with health problems may have difficulties getting a job, or may not be able to work and have, therefore, lower incomes. Alternatively, there could be an (unobserved) factor that makes people healthier and wealthier, a so-called confounder. In addition to these mechanisms, artefact explanations have been given for the relation between socio-economic status and health. See Goldman (2001) for an overview of these underlying mechanisms. Next, we will investigate the plausibility of these four hypotheses.

Figure 7.7 Causation, selection and confounding mechanisms



Hypothesis 1: Socio-economic health differences are caused by selection

The theory on the selection mechanism states that unhealthy people have lower chances of climbing the social tree. Hardly any of the studies on the relation between socio-economic status and health in the Netherlands take account of the selection process, presumably because "the general consensus among researchers from different disciplines is that observed disparities in health are driven largely (although not entirely) by a complex set of causal processes, rather than by selection or artificial mechanisms" (Goldman, 2001, p. 4). Two studies do investigate the effect of health on socio-economic status, but found hardly any results. Van de Mheen *et al.* (1999) found that health problems are not related to a higher risk of downward mobil-

ity in occupational class. Van Agt *et al.* (2000) found that the chronically ill have lower incomes than healthy people, even after controlling for socio-demographic variables, which was explained by bad health limiting labour force participation. The selection effect may be different for people at different ages. Smith (1998) found that health events have quantitatively large effects on wealth accumulation among those in their fifties and, therefore, that "studies that ignore the large impacts that health status can have on SES are simply missing a major part of the story" (p. 194).

It is plausible that the importance of the selection mechanism depends on the definition of socio-economic status. For instance, the level of education is determined early in life, while most health problems occur later in life. Therefore, health problems may affect the level of education for a small group of people only. Income, on the other hand, can much easier be influenced by health. For instance, if someone has to quit his or her job due to health problems, (s)he will certainly suffer a decline in income.

Not much attention is paid to this hypothesis in the Netherlands. It is therefore impossible to accept or reject the selection hypothesis. Further research is required.

Hypothesis 2: Socio-economic health differences are caused by the causation mechanism

The main idea of the causation mechanism is that the socio-economic status influences so-called intermediate factors, like unhealthy behaviour and the possibilities to use health services. These intermediate factors affect health. The following intermediate factors explain (part of the) relation between socio-economic status and health:

- health related behaviour: (des)investment in health;
- material circumstances: possibilities to invest in health;
- access to health care;
- psychosocial factors;
- life-time factors (in particular circumstances during youth and work).

Hypothesis 2a: Health related behaviour is an intermediate factor explaining socio-economic health differences

Health related behaviour, like smoking, drinking, eating habits or doing exercises, differs between people with different socio-economic status (Stronks *et al.* 1997; Droomers *et al.,* 1999; Hulshof *et al.,* 2003). Kunst *et al.* (1999) explain the variation in socio-economic differences in mortality due to ischemic heart diseases between northern and southern European countries by differences in unhealthy behaviour between low and high socio-economic classes. In northern Europe, socio-economic differences in mortality due to ischemic heart diseases exist, as do differences in health related behaviour. In southern Europe, both differences are less pronounced. It therefore seems as if health related behaviour is an intermediate factor that explains (part of) the relation between socio-economic status and health.

Table 7.7 Differences in health related behaviour of Dutch elderly people

	Education			Household income		
	Low	Medium	High	Low	Medium	High
Percentage of smokers	20	23	25	19	22	23
Percentage with excessive use of alcohol	2	5	6	2	4	6
Number of physical activities						
- 0 to 2 activities	20	15	16	18	15	17
- 3 to 4 activities	59	58	57	59	56	58
- 5 or more activities	21	27	28	22	29	25
Body Mass Index*						
- 20 or less	2	1	4	2	2	2
- 21 to 28	65	73	81	66	69	77
- 29 or more	33	26	15	32	29	21

* Weight divided by squared length.

Source: Broese van Groenou and Deeg (2000b).

Table 7.7 shows the differences in the prevalence of health related behaviour of Dutch elderly people. It provides a mixed picture. Elderly people with a lower socio-economic status smoke and drink less than people with a higher socio-economic status. This should contribute to

better health conditions. On the other hand, they participate in less physical activities (like walking, cycling, gardening and house-keeping) and suffer more from overweight (measured by the body mass index). Probably due to this mixed picture, Broese van Groenou and Deeg (2000b) did not find that controlling for health related behaviour (with a multivariate analysis) decreases the socio-economic differences in mortality. Kempen and Ormel (1996) found similar results for the Dutch elderly. Thus, health related behaviour explains, probably due to its mixed influence, only a minor part of socio-economic health differences among the Dutch elderly.

Hypothesis 2b: Material circumstances – possibilities to invest in health – function as an intermediate factor explaining socio-economic health differences

As suggested by van Doorslaer (2001), the relationship between income and health follows the law of diminishing returns, see Figure 7.8a. An increase in income causes more health gains for the poor. This implies that a reallocation of income from rich to poor leads to an increase of the average health level in society. This theoretical relationship is also proven empirically, see Figure 7.8b: countries with a very skewed income distribution also have a skewed health distribution (Mackenbach, 1994; van Doorslaer, 2001). The idea behind the relation between income inequal-

Figure 7.8a Relation between health and income

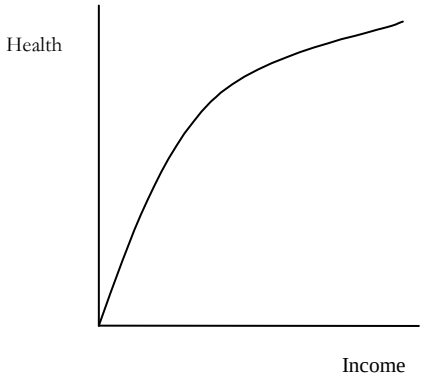
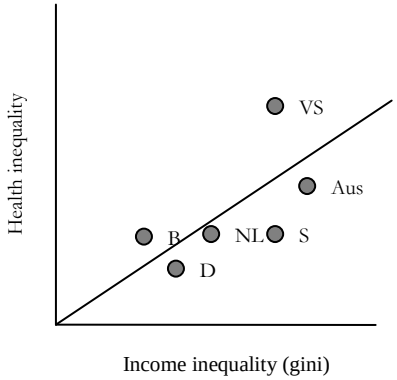


Figure 7.8b Relation between income inequalities and health inequalities



Source: van Doorslaer (2001).

ity and health inequality is that inequality in relative rank raises psychosocial stress. An empirical problem related to this, however, is the definition of the reference group: is it the society, the neighbours or the age group of people? (Smith, 1999)

But income differences do not only cause psychological stress. People with higher incomes have more possibilities to invest in their health: they can afford healthier food, can invest in better housing, can afford better labour circumstances and so on. Lower incomes and less healthy work conditions are more common among people with lower socio-economic status. This contributes to socio-economic health differences for the general public, partly because material circumstances influence health related behaviour (Stronks *et al.*, 1998; Droomers *et al.*, 1999; Schrijvers *et al.*, 1999). Differences in the living environment or the neighbourhood also contribute to socio-economic health differences (Bosma *et al.*, 2001). The influence of these material circumstances on the health condition of Dutch elderly people has not yet been investigated.

Hypothesis 2c: Access to health care functions as an intermediate factor explaining socio-economic health differences

Smits *et al.* (2002) have studied the Dutch literature with respect to the relation between socio-economic status and the accessibility of health care. Their main conclusion was that – taking differences in health into account – there were some small socio-economic differences in the accessibility of health care. For instance, people with a low socio-economic status make more use of general practitioners than people with a high socio-economic status, even after controlling for differences in health. On the other hand, people with higher socio-economic status make more use of specialists than people with lower socio-economic status. Broese van Groenou (2000) investigated the relationship between socio-economic status and access to the health care system for the elderly. She found that people who stand low on the social ladder make more use of health care than people on a higher spot. This is mainly caused by health status: elderly people with low socio-economic status suffer from more physical limitations. As already mentioned in Section 7.2, almost everyone in the Netherlands is covered by health insurance. Insurance companies also have to accept every customer. Therefore, every Dutch citizen has access to the health care system. This hypothesis therefore does not seem plausible in explaining socio-economic health differences for the Dutch elderly.

Hypothesis 2d: Psychosocial factors function as an intermediate factor explaining socio-economic health differences

People with low income suffer more from psychological stress and have less social support. This could influence their health condition: elderly people with the smallest social support have 2.5 times as high a risk of suffering from loneliness, 1.7 times as high a risk of suffering from a depression and 1.5 times as high risk of dying.[8] Highly educated elderly more often have a partner than lower educated elderly. Table 7.8 shows that low income groups have fewer people around than high income groups, probably because elderly with a low income have less financial assets to maintain relationships. Presents, travelling and visits cost money. Furthermore, people with lower socio-economic status are more often unhealthy: this could limit the ability to maintain relationships (Visser and Broese van Groenou, 2000). The lower social support for the lower educated and low income groups leads to lower emotional support received by this group. In contrast, the amount of instrumental support (help with daily activities or in the household) does not vary with socio-economic status.

Table 7.8 Differences in psychosocial factors for Dutch elderly people

	Education			Household income		
	Low	Medium	High	Low	Medium	High
Percentage with a partner	58	76	73	65	63	79
Social support (number of people around)	12,8	14,5	15,6	12,8	13,5	15,6
Received instrumental support (on a scale 0 – 36)	14.2	14.1	14.3	14.2	14.1	14.2
Received emotional support (on a scale 0 – 36)	20.5	21.0	23.4	20.5	21.3	23.1

Source: Broese van Groenou and Deeg (2000b).

[8] Van Tilburg (2000), but the question is whether these figures follow the causation mechanism (small social support causes bad health) or the selection mechanism (bad health leads to a small social network).

Broese van Groenou and Deeg (2000b) found that controlling for psychosocial factors does not decrease socio-economic differences in mortality for the Dutch elderly. Stronks *et al.* (1998) estimated that for people aged 15 to 74, inequalities in perceived health would decrease by approximately 10 to 15 per cent if exposure to stressors in the lowest socio-economic groups would be similar to that in the highest stratum. It is therefore questionable whether social support is a mechanism explaining socio-economic health differences for Dutch elderly people.

Bosma *et al.* (2005) investigated the influence of control beliefs on socio-economic inequalities in heart disease. Control beliefs refer to individual's beliefs regarding the extent to which they can influence outcomes (e.g. getting a job, improving one's health). They found that socio-economic inequalities in heart disease may be based upon differences in control beliefs more than upon differences in health related behaviour. This especially holds for middle-aged and older persons.

Koster *et al.* (2005) investigated the role of psychological factors on the relation between SES and risk of mobility decline. They found that people with a low SES have an increased risk of mobility decline. Psychological factors (like life-events, long-term difficulties, coping style, social support and personality) could not explain this relation.

In conclusion, the evidence for the above hypothesis is weak.

Hypothesis 2e: Life-time factors function as intermediate factors explaining socio-economic health differences

Broese van Groenou (2003) investigates the role of social mobility in explaining socio-economic health differences for the elderly. Based on the level of education of respondents and the level of education of their parents, she divides respondents into four categories: elderly with a historical low socio-economic status, elderly with an upward or downward mobility in socio-economic status, and elderly with a historical high socio-economic status. Table 7.9 shows her results: men with a low socio-economic status suffer more from chronic diseases and functional limitations than men with a high socio-economic status, independent of the socio-economic status of their parents. For women the pattern differs: circumstances during the youth do matter. These results only partly support the hypothesis: for men, circumstances during their youth do not affect health, so the hypothesis could be rejected. But for women, the hypothesis cannot be rejected.

Table 7.9 Age-adjusted relation between health by life-time socio-economic status: 95 percent confidence intervals for odds ratios

	Men			Women		
	Functional limitations	Chronic disease	Died within 6 years	Functional limitations	Chronic disease	Died within 6 years
Historical low SES	1.00	1.00	1.00	1.00	1.00	1.00
High to low SES	0.51–1.30	0.64–1.60	0.50–1.32	0.34–0.76	0.65–1.37	0.58–1.45
Low to high SES	0.54–0.98	0.53–0.96	0.40–0.76	0.45–0.81	0.89–1.54	0.50–0.98
Historical high SES	0.47–0.95	0.52–1.02	0.45–0.94	0.34–0.67	0.86–1.64	0.63–1.40

Source: Broese van Groenou (2003).

Hypothesis 3: Confounders explain socio-economic health differences

The relation between health and socio-economic status does not have to run directly from health to socio-economic status or from socio-economic status to health. It could be that (unobserved) factors influence both health and socio-economic status, so could confounders. An example of such a confounder is the propensity to invest. People with a higher propensity invest more in their human capital, resulting in higher education and a higher socio-economic status, but could also invest more in their health. The propensity to invest depends on attitudes towards risk and on the planning horizon.

In Dutch studies on socio-economic health differences among the elderly, no attention is paid to this explanation. Further research is needed to investigate how much of the socio-economic health differences can be explained by this hypothesis.

Hypothesis 4: Artefact explanations underlying socio-economic health differences

In addition to the causation mechanism, selection mechanism and confounders, artefact explanations can be given for the relationship between health and socio-economic status. Artefact explanations consider socio-

economic health differences as caused by measurement error. For instance, medical knowledge could differ between certain social groups, resulting in different answers in health questionnaires. Empirical research shows that people from lower social classes underestimate the amount of health problems. This would imply that socio-economic health differences are larger than showed by reported figures (Mackenbach, 1994). Therefore, this hypothesis is not very plausible in explaining the suggested relationship between health and socio-economic status.

7.4 Relation Between Health and Labour Participation

7.4.1 Nature and Extent of the Relation Between Health and Labour Participation

In addition to the relation between socio-economic status and health, one can study the relation between the labour market status and health. Lindeboom and Kerkhofs (2002) have estimated the relation between several labour market states and the Hopkins Symptoms Checklist (HSCL) index in order to measure the true health condition of Dutch people aged between 42 and 65. Corrected for characteristics like age, retired elderly were the most healthy, the disabled the most unhealthy, see Table 7.10. Note that a high score on the HSCL index corresponds to a low level of health.

Table 7.10 Mean of the total HSCL score by labour market state in 1993

Labour market state 1993	Mean HSCL score
Early retired (ER)	7.98
At work	10.01
Unemployed (UI)	11.85
Disabled (DI)	24.81

Source: Lindeboom and Kerkhofs (2002).

7.4.2 Explaining the Relationship Between Health and Labour Participation

Two major hypotheses are given in the literature to explain the relationship between health and labour participation. The first hypothesis gives an explanation from health to labour participation: people in bad health

have difficulties finding a proper job. Furthermore, they have the opportunity to apply for disability benefits. Therefore, bad health may lead to leaving the labour force. The second hypothesis looks at the relationship in the opposite direction: work can affect a person's health condition. For instance, work can be physically demanding, or work can cause stress. Next, we will investigate the plausibility of these two hypotheses.

Hypothesis 1: Unhealthy people exit the labour force

Dutch elderly face the decision at which age to retire and through which route. They have several possibilities. Firstly, elderly can use an early retirement programme. These programmes are provided by employers and generally are financially rather attractive. On average, Dutch elderly workers who retire through an early retirement scheme do so at age 61, receiving benefits which amount to 72 per cent of their most recent wage earnings (Dalen and Henkens, 2000). Secondly, elderly can apply for disability benefits. Until the beginning of the 1990s, both employers and employees considered the disability programme as an attractive route into retirement. To reduce the number of disability benefits recipients, eligibility conditions have been tightened in recent years. This has made it harder to use the disability programme as a retirement programme. Thirdly, employees can apply for an unemployment benefit. Unemployment benefits recipients of 57,5 years and older are exempted from the normal active job search requirement. Therefore, unemployment benefits may serve as a source of pre-retirement income for elderly people (see Section 7.2.2 for more details on the Dutch social security system).

Heyma (2001) shows that employees prefer to retire as soon as possible, but preferably through the early retirement programme. This programme is financially most attractive. If health deteriorates, preferences for retirement grow. People in bad health want to retire soon and prefer immediate retirement over income. Therefore, people in bad health will apply for the financially less attractive disability benefits if they are not yet eligible for the early retirement scheme. Van de Mheen *et al.* (1999) used panel data (first wave 1991, second wave 1995) to investigate the relation between labour market mobility and health for the whole working population. They found that health problems in 1991 were significantly associated with a higher propensity of mobility out of employment and a lower risk of mobility into employment in 1995.

The decision which retirement route to choose depends on both health and the financial attractiveness of the retirement route. Health is

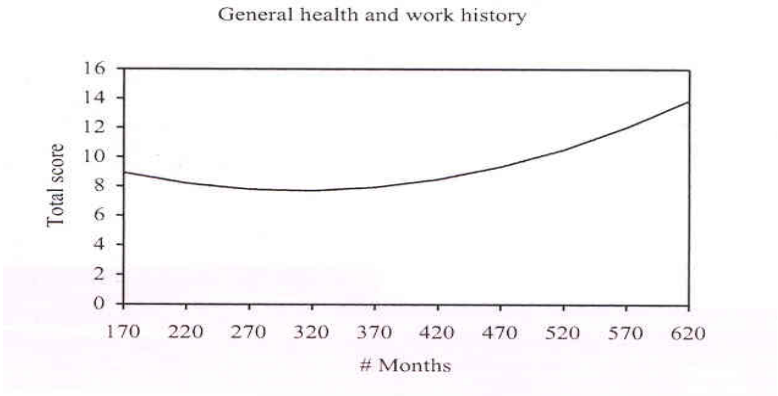
dominant in explaining the transition from participation into the disability insurance scheme, while financial incentives are most important in the choice to apply for an early retirement scheme (cf. Kerkhofs *et al.*, 1999). The hypothesis that health influences labour force participation can therefore not be rejected.

Bound *et al.* (1999) have suggested that the labour force participation of the elderly does not necessarily depend on the health level, but on changes in health status. In the short term, health shocks may cause job changes, while in the medium term, job changes may be an important mechanism by which people adapt to health shocks to be able to remain in the workplace. The relationship between health and labour force behaviour is dynamic: the later in life the health shock occurs, the higher the chance that the employee leaves the labour force.

Hypothesis 2: Work affects the health condition

In a study of the older workforce, Kerkhofs and Lindeboom (1997) conclude that working speeds up the process of health deterioration. Lindeboom and Kerkhofs (2002) show that after 300 months (25 years) of work, health starts to decline while still working, see Figure 7.9. In their panel survey of elderly people, the mean of the number of months ever worked is about 350 and more than 75 per cent of the sample have worked over 300 months. This implies that most elderly workers can be

Figure 7.9 Relation between health and work experience*



* Health is measured with the HSCL index. A lower score implies better health.
Source: Lindeboom and Kerkhofs (2002).

associated with worse health conditions.[9] This conclusion is in line with Heyma (2001). He concluded that not working is optimal for your health. But he also notes that once working, it is better for your health to keep working.

Health deterioration can be caused by a lack of control on the job and too much work pressure. Both causes stress, which has a negative impact on health. Furthermore, work can lead to physical limitations, for instance repetitive strain injuries, or health declining due to working with chemicals (Otten and Wieling, 1998). When workers become older, the pace of work, the work amount and the emotional burden for employees generally increase. On the other hand, the variety in the work, the amount of independence and work pleasure increase when workers become older (SER, 1999).

7.5 Conclusions

In the Netherlands, socio-economic health differences do exist. Highly educated men become almost five year older than lower educated men. In addition to dying earlier, men and women with a low socio-economic status live a larger part of their life in bad health. Socio-economic health differences are persistent over age. Several explanations can be given for this. Table 7.11 summarises them. Further research is needed to investigate the plausibility and exact role of each of these hypotheses.

The relation between socio-economic status and health affects and is affected by the relationship between health and labour participation. The relation between health and labour force participation is a two-way relationship. Firstly, health influences the labour participation decision of the elderly: if health deteriorates, preferences for retirement grow. People in bad health want to retire soon and prefer immediate retirement over income. Therefore, people in bad health apply for financially less attractive disability benefits if they are not yet eligible for early retirement benefits. Secondly, work conditions have negative effects on health, especially for elderly workers (better: especially when people have worked for more than 25 years). Burn-out and repetitive strain injuries are examples of work related health problems.

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[9] This relation could also be caused by the authors' use of a (quadratic) functional form.

Table 7.11 Hypotheses to explain socio-economic health differences for Dutch elderly people

Hypothesis	Plausibility	Empirical research results
1: Socio-economic health differences are caused by selection.	Different ideas among researchers.	Not yet investigated.
2: Socio-economic health differences are caused by the causation mechanism.		
2a: Health related behaviour is an intermediate factor explaining socio-economic health differences.	Many researchers mention this as an important factor.	No empirical evidence, possibly because lower and higher educated elderly show both healthy and unhealthy behaviour.
2b: Material circumstances (possibilities to invest in health) function as an intermediate factor explaining socio-economic health differences.		Countries with small income differences also have small health differences.
2c: Access to health care is an intermediate factor explaining socio-economic health differences.	In the Netherlands, access to health care is approximately equal for everyone.	No evidence of socio-economic differences in the use of health services (corrected for health) has been found.
2d: Psychosocial factors function as intermediate factors explaining socio-economic health differences.		Psychosocial stress caused by income differences explains some of the socio-economic health differences.
2e: Life-time factors are intermediate factors explaining socio-economic health differences.		Some evidence is found for women only.
3: Confounders explain socio-economic health differences.	Propensity to invest influences both health and socio-economic status (education).	Socio-economic health differences are most pronounced for education, which is in line with this hypothesis, but direct relation not yet investigated.
4: Artefact explanations explain socio-economic health differences.	No plausible explanation.	

This literature review has shown that several questions still need to be answered. The exact role of each of the hypotheses in Table 7.11 is unknown: which mechanism is dominant, the selection mechanism, the causation mechanism or the confounder mechanism? Which intermediate factors play a role in explaining socio-economic health differences for the Dutch elderly workforce? Until now, no clear explanations have been found. The triangular relationship between socio-economic status, health and labour force participation is a second topic that needs to be studied in more detail.

There are several issues that need to be accounted for when exploring the relationship between health, labour force participation and socio-economic status of the elderly. Firstly, what kind of health measure do we need? The disadvantage of using self-reported health measures is that these measures may be influenced by endogenous reporting behaviour. For instance, people with disability benefits may report worse health conditions than they actually have, since a bad health condition is the reason why they could apply for these benefits in the first place. An alternative is the use of objective health measures. The question is whether objective health measures are good measures for work related health. Some people with chronic diseases still participate in the labour market. A solution to the limitations of subjective and objective health measures is to use health indices that are constructed from several questions on physical and psychological health. From these health scores it is much easier to derive health profiles. The Grade of Membership method can also be helpful for calculating health profiles (Portrait *et al.*, 1999).

Secondly, what is a good proxy for the socio-economic status of elderly people? Education, occupation and income are often used as indicators for socio-economic status. It is questionable whether these indicators are also valid for the elderly. For example, many elderly have only received a lower education. When they were young, education was not widely available to everyone. The use of education as a proxy for socio-economic status would therefore lead to a very homogenous group. Income as an indicator may not be valid, as wage earnings stop once people retire. The level of retirement income is generally lower than the level of earnings before retirement, but this does not intuitively mean that retirees drop in socio-economic status. Also, since many elderly people do not work, they do not have any present occupation either.

Thirdly, health and labour market status are correlated because of (unobserved) individual-specific characteristics that determine both.

Research methods need to account for this. Furthermore, research methods need to be able to split the different mechanisms that affect the relation between socio-economic status and health. Controlling for selection is very important. Theoretically, instrumental variables (IV) estimation is the best method, but proper instruments are difficult to find empirically. Therefore, the size and nature of the selection effect must be investigated first when trying to account for it with additional assumptions in the functional form of the relationship between SES and health.

And finally, the question can be asked whether it is better to look at health status in general, or to look at health changes or health shocks. It is plausible that a change in health (or a health shock) has more influence on the labour force participation decision than the general health level. People tend to adapt to their situation.

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Table 7A.1 Available data sources

Data	Source	Years	Panel	Sampling	SES indicators	Health indicators	Other variables
CERRA	Leiden University	1993-1995	Yes	House-holds with a head aged between 53 and 63	Labour market position Occupation Education Income Home ownership Savings and wealth	Subjective health Activities of daily living Checklist chronic diseases Hopkins Symptoms Checklist Medical consumption	Health related behaviour Neighbourhood Working condi-tions Material circum-stances Labour market history Housing
SEP	Statistics Nether-lands (CBS)	1986-now	Yes	House-holds	Education Occupation Income Wealth Home ownership	Subjective health Limitations in daily activities Medical consumption	Social support Material circumstances Housing
GLOBE		1991	Yes	Individuals	Education Occupation Income	Subjective health Activities of daily living Checklist chronic diseases Health complaints Nottingham Health Profile	Health related behaviour Neighbourhood Working conditions Material circum-stances Life events Social support Circumstances in youth
LASA	Free University Amster-dam	1991-now	Yes	Elderly (55 and older)	Occupation Education Income	Subjective health Activities of daily living Checklist chronic diseases OECD health score VOEG-score (mental health) Medical consumption	Health related behaviour Social support SES of parents
POLS	Statistics Nether-lands (CBS)	1997-now	No	Individuals	Labour market positions Occupation Education Income	Subjective health Activities of daily living Checklist chronic diseases OECD health score VOEG (mental health) Medical consumption	Health related behaviour Neighbourhood Working conditions Material circumstances
SHARE	EU	2004	Not yet	Elderly (50 and older)	Labour market position Occupation Education Income Wealth	Self-reported health Physical functioning Psychological health Cognitive func-tioning Bio-medical data	Health related behaviour Labour market history Social support Material circumstances

Table 7A.2 Literature review

Authors	Data	Years	Method	Sample size	LHS	RHS	SES-indicator	Health indicator	IV	Focus on elderly	Other controls	Main conclusion
Van Agt *et al.* (2000)	GLOBE	1991-1993	Logit	4,206	SES	HS	Prevalence of poverty	Being chronically ill	No	No	Age, sex, marital status, religion, urbanisation, education	The higher prevalence of poverty among the chronically ill is the result of medical expenses and a low net income. The low net income is partly explained by socio-demographic factors.
Bosma, *et al.* (1999)	GLOBE	1991	Cox regression	2,462	SES	HS	Education, occupation and income	Mortality	No	No	Age, sex, health and perceived control	Low socio-economic status is related to mortality partly because people with a low SES more often perceive low control (such as powerlessness or fatalism).
Bosma *et al.* (2001)	GLOBE	1991	Logit	8,506	HS	SES	Education, occupation, being disabled or unemployed and presence of severe financial problems (all on neighbourhood level)	Mortality	No	No	Age, sex, baseline health status, housing conditions, social, psychological and behavioural factors	Both low individual socio-economic status and low neighbourhood status (controlled for individual SES) were related to mortality.

Table 7A.2 (continued)

Authors	Data	Years	Method	Sample size	LHS	RHS	SES-indicator	Health indicator	IV	Focus on elderly	Other controls	Main conclusion
Bosma *et al.* (2005)	GLAS	1993	Logit and analyses of variance	3,838	HS	SES	Education, occupation, income	Heart disease	No	Yes	Age, sex, health related behaviour and control belief	Socio-economic inequalities in heart disease may be based upon differences in control beliefs, more than upon differences in health related behaviour.
Broese van Groenou (2003)	LASA	1992/ 1993	Logit	2,926	HS	SES	Education	Functional limitations, chronic diseases, loneliness, mortality	No	Yes	Life-style psychosocial conditions, mobility in SES	Lower SES, more health problems, more unhealthy life-style and unfavourable psychosocial conditions.
Broese van Groenou (2000)	LASA	1992-1999	Multi-variate analyses	1,772	HS	SES	Income	Functional limitations	No	Yes	Use of health care, gender, age, marital status	The use of health care for elderly is mainly based on health status and not on socio-economic status.
Broese van Groenou and Deeg (2000a)	LASA	1992/ 1993	Cox regression	2,930	HS	SES	Education and income	Mortality	No	Yes	Health, SES parent, life-style, housing, social network and psycho-logical factors	Lower SES, higher risks. Socio-economic differences in mortality continue to exist at very high age.

Table 7A.2 (continued)

Authors	Data	Years	Method	Sample size	LHS	RHS	SES-indicator	Health indicator	IV	Focus on elderly	Other controls	Main conclusion
Broese van Groenou and Deeg (2000b)	LASA	1992/ 1993	Logit	3,107	HS	SES	Education, income and occupation	Functional limitations, subjective health and mortality	No	Yes	Gender and age	The amount of socio-economic health differences differs with age: little differences during youth, pronounced differences from 45-75 and decreasing differences afterwards.
Broese van Grounou *et al.* (2003)	LASA	1992/ 1993	Logit	3,107	HS	SES	Net household income	Functional disability	No	Yes	Sex, age, baseline health, behavioural factors, social and psychological conditions	Income differences continue to impact health status into the old age. Attrition needs to be corrected for when studying elderly.
Droomers *et al.* (1999)	GLOBE	1991	Logit	2,462	HB	SES	Education	Excessive alcohol consumption	No	No	Psychosocial and material stressors	Excessive alcohol consumption was more common among lower educational groups. Material stressors and income explain part of this relation.
Droomers *et al.* (2001)	GLOBE	1991-1997	Logit	3,793	HB	SES	Education	Physical activity	No	No	Age, health, life-style, working conditions	Material problems and poor health experienced by lower educated older people are responsible for educational differences in decreasing physical activity.

Table 7A.2 (continued)

Authors	Data	Years	Method	Sample size	LHS	RHS	SES-indicator	Health indicator	IV	Focus on elderly	Other controls	Main conclusion
Hulshof *et al.* (2003)	Dutch National Food Consumption Survey	1987-1988 and 1997-1998	Logit	1,2965	Dietary intake	SES	Education and occupation	-	No	No	Age and sex	Dietary intake among subjects in higher SES groups tended to be closer to the recommendations of the Netherlands Food and Nutrition council.
Van de Mheen *et al.* (1997)	GLOBE	1991	Logit	1,850	HS	SES	Education and occupation	Perceived general health, presence of chronic diseases	No	No	Environmental childhood characteristics	A substantial part of differences in health between educational and occupational groups can be attributed to differences in childhood environment.
Van de Mheen *et al.* (1999)	GLOBE	1991-1995	Logit	2,533	SES	HS	Labour market status	Perceived general health, health complains and chronic conditions	No	No	Age, sex, educational level and marital status	No influence of health on occupational class mobility; negative influence of health on mobility out of employment.
Kerkhofs and Lindeboom (1997)	CERRA	1993-1995	Two-stage estimation	2,422	HS	SES	Labour market status	Changes in Hopkins Symptoms Checklist	No	Yes	E.g. age, sex, life-style variables, education, occupation	Health deteriorates with employment and labour market history. Furthermore, there are strong differences in health outcomes for different age cohorts and gender.

Table 7A.2 (continued)

Authors	Data	Years	Method	Sample size	LHS	RHS	SES-indicator	Health indicator	IV	Focus on elderly	Other controls	Main conclusion
Kerkhofs, *et al.* (1999)	CERRA	1993-1995	Two-stage estimation	3,641	HS	SES	Labour market status	Self-rated health and Hopkins Symptoms Checklist		Yes	E.g. age, sex, life-style variables, education, occupation	Health and retirement are endogenously related. Subjective health measures overstate the effect of health on retirement.
Koster *et al.* (2005)	GLOBE	1991-1997	Logit	1,407	HS	SES	Education, occupation, income	Mobility decline	No	No	Age, sex, marital status, disease severity, co-morbiditay and psycho-social factors	Psychosocial factors cannot explain socio-economic differences in mobility decline in a chronically ill population.
Lindeboom and Kerkhofs (2002)	CERRA	1993-1995	Three models simul-taneously estimated	3,038	SES	HS	Labour market status	Self-rated health and Hopkins Symptoms Checklist		Yes	E.g. age, sex, life-style variables, education, occupation	Health deteriorates with employment. The use of subjective health measures leads to biased results, especially for people with a disability benefit.
Mackenbach (1994)	POLS	1989-1990	Cross-tabulations		HS	SES	Education, occupation, income	Subjective health	No	No	-	Socio-economic health differences exist. Each of the SES-measures has an independent relationship with health.
Mackenbach and Kunst (1997)	POLS	1983-1993	Cross-tabulations	22,229 14,369	HS	SES	Education	Subjective health	No	No	Age and sex	There has been an increase in socio-economic health differences in the period 1983-1993.

Table 7A.2 (continued)

Authors	Data	Years	Method	Sample size	LHS	RHS	SES-indicator	Health indicator	IV	Focus on elderly	Other controls	Main conclusion
Van der Meer and Mackenbach (1999)	GLOBE	1991-1993	Logit	173	HC	SES	Education	Health consumption	No	No	Age, sex, health and body mass index	People with diabetes with a low education use less health care.
Van der Meer, *et al.* (1996)	GLOBE	1991	Logit	2,867	HC	SES	Education	Health consumption	No	No	Age, sex, marital status and health	When controlling for health, socio-economic differences in the use of health care decrease.
Portrait, *et al.* (1999)	LASA	1992-1996	OLS and panel data	1,659	HS	SES	Education and income	Self-constructed health profiles with the GoM-method and mortality	No	Yes	Age, sex, marital status and urbanisation degree	Differences in mortality are mainly explained by differences in health. Socio-economic health differences occur, especially for arthritis and cardiovascular diseases.
RIVM (1997)	-	-	Literature review	-	HS	SES	Education, occupation and income		No	No	-	Socio-economic health differences exist, also for elderly. Next to health differences in SES, there are health differences due to employment status, ethnicity and marital status.
Van Rossum (1999)	ERGO	1990-1997		8,000	HS	SES	Income	Mortality, cardiovascular diseases	No	Yes	-	For the Dutch elderly, clear socio-economic differences in mortality exist.

Table 7A.2 (continued)

Authors	Data	Years	Method	Sample size	LHS	RHS	SES-indicator	Health indicator	IV	Focus on elderly	Other controls	Main conclusion
Van Rossum (2000)	ERGO	1989-1996	Cox regression	8,000	HS	SES	Education, occupation and income	Mortality	No	Yes	Age, gender	Among elderly Dutch people, there are clear differences in mortality across groups of different socio-economic status.
Schrijvers *et al.* (1999)	GLOBE	1991	Cox regression	15,451	HS	SES	Education	Mortality	No	No	Behavioural and material factors	The association between educational level and mortality can be largely explained by material factors.
Schrijvers *et al.* (1998)	GLOBE	1991	Logit	6,932	HS	SES	Occupation	Perceived general health	No	No	Working conditions, age, marital status, religion and urbanisation	A substantial part of the socio-economic health differences can be explained by different working conditions.
Smits *et al.* (2005)	Postal code area data	1999	Logit	15,3 million	HS	SES	Income	Mortality	No	No	Age, living situation and ethnicity	Substantial socio-economic differences exist.
Smits *et al.* (2002)	-	1980-2002	Literature review	-	HS	SES	Education, income and occupation	Several health measures	No	No	-	There are small socio-economic differences in the use of health care: low SES-people use more often a GP, high SES a specialist.

Table 7A.2 (continued)

Authors	Data	Years	Method	Sample size	LHS	RHS	SES-indicator	Health indicator	IV	Focus on elderly	Other controls	Main conclusion
Stronks *et al.* (1995)	GLOBE	1991	Logit		HS	SES	Education and occupation	Prevalence of chronic conditions and subjective health	No	No	Labour market status	The low labour force participation of women explains part of the less pronounced socio-economic health differences among women.
Stronks *et al.* (1997a)	GLOBE	1991	Logit	2,392	HB	SES	Education	Smoking	No	No	Material conditions, cultural factors and psychosocial factors	Both cultural and material factors contribute to the higher smoking rates among lower socio-economic groups.
Stronks *et al.* (1997b)	GLOBE	1991	Logit	2,802	HS	SES	Education	Self-rated health, perceived health problems	No	No	Psychosocial stressors: life-events, long-term difficulties	Inequalities in perceived health would decrease 10 to 15% if the exposure to stressors in the lowest SES-group was the same as in the highest SES-group.
Stronks *et al.* (1997c)	GLOBE	1991	Logit	13,391	HS	SES	Income, occupation and education	Prevalence of chronic conditions and subjective health	No	No	Age, marital status, religion and degree of urbanisation	The relatively strong association between income and health (in comparison to education/occupation and health) is due to a large concentration of long-termed disabled in the lower income groups.

Table 7A.2 (continued)

Authors	Data	Years	Method	Sample size	LHS	RHS	SES-indicator	Health indicator	IV	Focus on elderly	Other controls	Main conclusion
Stronks and Hulshof (2001)	GLOBE	1991-1997	Cross-tabula-tions	5,700	HS	SES	Education	Limita-tions, specific diseases, subjective health and mortality	No	No	Age and gender	Both subjective health and specific diseases are worse for people with a low SES.
Van Herten *et al.* (2002)	GLOBE, PPHV, LASA, ERGO	1987-2000	Cox-regression	+/- 70,000	HS	SES	Education	Life ex-pectancy	No	No	Age	Lower SES, lower life expectancy.
Visser and Broese van Groenou (2000)	LASA	1992	ANOVA	3,461	HB	SES	Income	Social network	No	Yes	Gender and marital status	Lower SES, smaller network.

LHS = left-hand-side variable; RHS = right-hand-side variable; SES = socio-economic status; HS = health status; HB = health behaviour; HC = health consumption; IV = instrumental variable

CHAPTER 8

Poverty, Unemployment and Health: Evidence from the United Kingdom

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8.1 Introduction

This chapter provides a survey of the current literature on the relationship between health and various socio-economic and occupational indicators, with particular reference to the older workforce (those aged 50 to 65) in the United Kingdom (UK). It also identifies data sets available that may be used for statistical analysis on the issue of socio-economic effects on the health of the older work force.

The publication of the Black report in 1980 sparked a renewed interest in the study of health inequalities in the UK. The findings of the report showed that socio-economic factors and health are highly correlated and affect mortality rates, suggesting that the 'poor' die younger than their wealthier counterparts. Importantly, this correlation seems to exhibit stronger effects for the older workforce.

The apparent paradox that health differs across different income levels within a country where the health provision is universal, requires investigation since these differences may be due to factors associated to the way people live rather than to the provision of health care itself. An ageing population has forced UK policy makers to look at the way these health inequalities affect the older workforce. Those approaching retirement age have different 'economic' needs in comparison with the rest of the workforce. Deteriorating health, financial restrictions and social isolation are among the most common problems faced at this stage of their productive life.

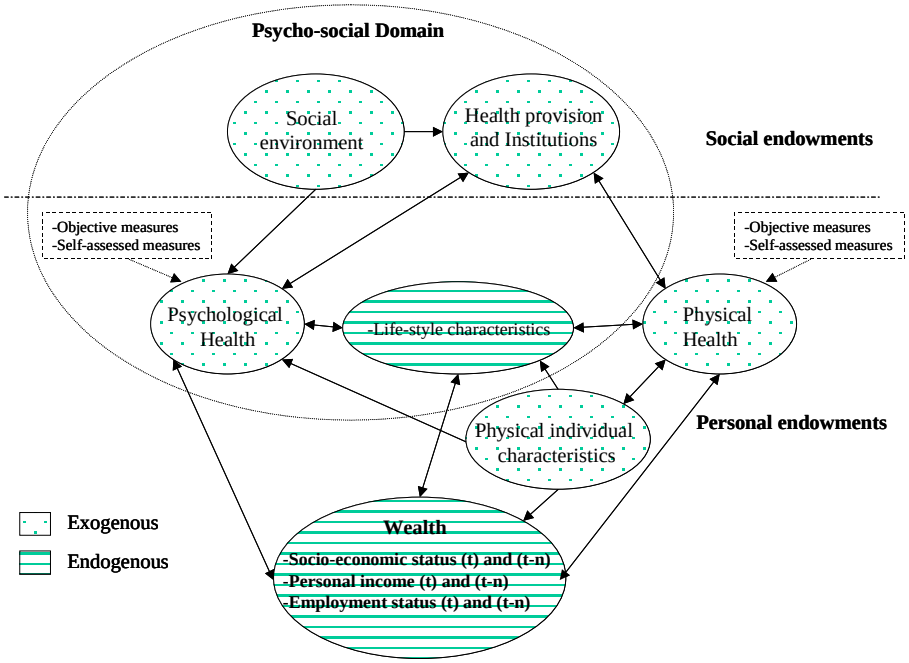
There have been significant efforts to explain the differences in health across socio-economic groups using a model of health derived from health maximization principles (Selden, 1993; Da Vanzo and Gertler, 1990; Dardanoni and Wagstaff, 1987). This literature review describes some of them and highlights the most significant contributions towards this research.

This review is organised around a model, represented in Figure 8.1, which identifies the inter-relationships between factors linked to the socio-economic status (SES) and health. The model is based on the analysis of social endowments (elements socially granted to the individual) and personal endowments (elements inherent and developed by the individual), dividing all the concepts envisaged by either exogenous or endogenous effects according to the economic literature. Emphasis is placed on the analysis of factors related to wealth (such as income, employment and socio-economic status and their effects on health) and its effects on health (income, employment and socioeconomic status). The

development of the report explores the links among the different factors encompassed in the model in order to offer evidence arising from the research debate to explain health inequalities in the older work force, as well as to identify possible gaps in the literature. In addition to revising the well-known connection between health and socio-economic status, the model contributes by revising links between factors that have not been well studied either due to a lack of data, or due to inappropriate statistical techniques, or due to a lack of interest by researchers. Current research in economics trends has showed that it is possible to use psychological variables (such as indicators of mental health) alongside more 'traditional' variables such as income, employment status, and so on. The present model takes advantage of these trends and reviews the research that has incorporated psychological health variables and social-oriented variables that could influence the individual's health in both the long and the short term such as housing conditions, the characteristics of the neighbourhood, life-style and the like.

Figure 8.1 shows in the two shadowed globes the main endogenous factors which affect health. These concepts are at the core of the report. The arrows provide the direction of the effects of factors that mediate in the relationship between SES and health, the so-called cofounders.

Figure 8.1 SES and health model



Each section specifies and explores the main literature associated with a specific part of the figure. In Section 8.2 the UK institutional set-up is described in order to provide a contextual framework of reference. Section 8.3 explores the concept of health and describes some of the most commonly used measures of health status. In Section 8.4 SES is defined, as well as the main personal characteristics of the older workforce. The following two sections explore the relationships between SES and health (in Section 8.5) and between health and labour market participation (in Section 8.6). In Section 8.7 the relevant methodologies are reviewed and the main available datasets are described. The final section links the different parts of the review and issues of measurement are discussed. This aims to assess the relationship between SES and health.

8.2 UK Institutional Setting

Created almost 60 years ago, the UK health care system covers all based on need, not the ability to pay, and is provided free at the point of consumption. The Labour government in 1948, following ideas initially set out in the 1942 Beveridge Report, set up the NHS (National Health Service) in July 1948, bringing into one organisation hospital services, family practitioner services and specialised health services.

Since its foundation the NHS has been subject to reforms and reorganisation to keep pace with the demands of the population and technological advances in health care. The two most recent sets of major reforms were those carried out by the Conservative Government in 1989 and, more recently, those began by the Labour Government in 1997.

The NHS is to 98% funded by the taxpayers, which also implies that it is accountable to the Parliament. It is managed by the Department of Health, which is directly responsible to the Secretary of State for Health. Ninety per cent of patient contacts with the NHS are made via primary care. Patients are registered in a general practice and their general practitioners (GPs) act as gatekeepers, controlling non-emergency access to the specialised services of the NHS. Most GPs are independent contractors rather than employees. Even with recent attempts to introduce greater regulation, GPs have considerable freedom in the services they choose to provide to their patients and in the way they organise their practices to do so.

Some reforms have been carried our recently in order to improve the services provided by the NHS, and to improve its coverage and efficiency. The single most important feature of the 1989 Conservative party reforms was the decision to introduce some elements of a market allocation system into the NHS. This 'internal market' divided the health service into providers and purchasers of health care. Purchasers (GPs) received funds from the government to buy the health services that their local population (patients) would require. Providers negotiated contracts with the purchasers: providing those services for an agreed sum of money. Both purchasers and providers were NHS organisations. Both were ultimately responsible to the Secretary of State for Health.

The second set of reforms took place under the Labour party in 1997, which introduced new organisations such as the National Institute for Clinical Excellence (NICE). The split between purchasers and providers has been retained but the emphasis is less on market forces and more on cooperation between organisations.

8.2.1 Health Care Provision for the Aged

Long-term care policy in the UK is based on the assumption that most people should bear responsibility for their own financial affairs in old age. However, the Royal Commission on Long-Term Care reported in May 1999 that the costs of long-term care should be split between living costs, housing costs and personal care. This implied that after assessment and according to need, personal care (including both health and social care) should be available and paid for from taxes. In contrast, living and housing costs should be subject to co-payment according to people's means. In practice, this recommendation implies that people in the top 20 to 30 per cent of the income distribution were deemed to be able to pay these costs from their incomes or savings, while people from the lowest part of the distribution would have to be supported by the state. However the government argues that it was not in a position to afford, free personal care due to the limited resources available. In Scotland, however, the Scottish Parliament decided to provide free personal and nursing care for older people while maintaining some other means-tested services.

8.2.2 Social Security System in the UK

The British social policy can be traced back to the 19th century 'Poor Laws'. The 'Poor Law' legislation led to the creation of 'overseers' of

relief and a provision for "setting the poor to work". The Poor Law's operation was not uniform between UK regions since no general mechanism was put in place to enforce them.

The Industrial revolution led to many changes: migration to towns, increasing population growth and the first experiences of the trade cycle. Negative effects were unemployment and increased poverty rates, which soon emerged and all of this produced a new resolution by the Poor Law Commission of 1834.

The lack of support by society and a low efficiency level of these 'Poor Laws' led to pressure for the development of improved social services. In 1942, the Beveridge report proposed a system of national insurance based on three assumptions: family allowances, a national health service and full employment. In 1946 the Labour government introduced three key acts: 1) the 1946 National Insurance Act, which implemented the social security scheme designed by Beveridge, 2) the 1946 National Health Service Act and the 1948 National Assistance Act, which abolished the 'Poor Laws'.

Other reforms during the 20th century may be categorised in three phases: Thatcherite retrenchment (1979-90); the new moral agenda (1990-97); and New Labour workfarism (1997-present). Since 1948 the 'welfare state' in the UK was not intended to respond to poverty, like the 'Poor Laws', but to provide social services on the same basis as public services. The British social security system has always looked for the best combination of resources to improve the quality of life of the population.

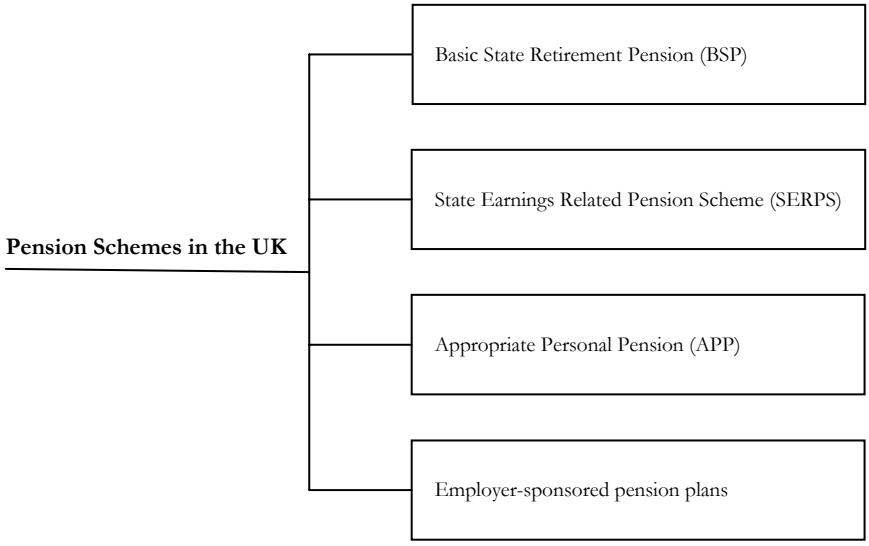
Dean (2000) claims that the UK social security system is a 'hybrid' system due to a combination of characteristics, a social democratic regime (some benefits are universal), a conservative/corporative regime (some benefits are contributory) and a liberal/residualist regime (some benefits are means-tested).

8.2.3 The UK Pension System at Present

The currently operating social security system regarding pensions in the UK consists of two tiers: a flat-rate basic state pension and an earnings-related pension. There are also some supplementary means-tested benefits, which can be a significant part of retirement income for many pensioners. Either tier of the pension system does not cover low earners for periods of low or non-contribution. If no contribution is made, there is no entitlement for the period of non-contribution.

Nearly seventy per cent of the National Insurance Contribution (NIC) finances go to both tiers of old age benefits; around 20% of the total fund goes to disability and survivors' pensions, and 7% goes to the NHS. The remaining 3% goes to maternity leave, absences from work due to illness, unemployment or work injury benefits.

Figure 8.2 Pension schemes available in the UK



The structure of the pension system in the UK is shown in Figure 8.2. The first tier of the UK Social Security programme is the Basic State Retirement Pension (BSP). This pension is provided through the government to all workers who have contributed to the system for a sufficient number of years. The current state pension is estimated to be between 10 and 15% of average earnings. Under this scheme, a portion of the national insurance contribution (NIC) payroll tax finances a flat-rate benefit for retired people. It is the same for all qualified retirees and it does not vary with the earnings history of the individual. In the fiscal year 2003/2004 this allowance was £77.45 per week for a single person and £128.80 for a couple.

The State Earnings Related Pension Scheme (SERPS) is a pay-as-you-go or pay-as-you-work option. It already covers one quarter of the British workers, mostly the female labour force due to temporal retirements for maternity reasons. Its benefits are based on earnings his-

tory and funding provided by the NIC payroll tax. In 1978 when this pension system was introduced it was more generous than at present. Subsequent reforms have decreased its attraction particularly to middle and upper income earners. The majority of people who remain enrolled in SERPS earn less than £10,000 a year.

Appropriate Personal Pensions (APP) are individual accounts deposited with private firms who manage the funds aiming at increasing their value over time. Workers can opt out of the SERPS system and open one of these accounts. Nearly twenty-five percent of British workers are currently holding such accounts. The main benefit for employees is that the money usually generates enough interests to cover for inflation and increase the total value of the savings.

Employer-sponsored pension plans are also known as occupational pensions. Both employers and employees pay reduced contributions to the NIC and the money is managed by companies who usually invest in low-risk government bonds. About 50 per cent of the employees in the UK are participating in these plans.

8.2.4 The UK Unemployment Benefits System

In 1911, The National Insurance Act established the first unemployment insurance programme. Since then, the system has been subject to many reforms. In 1920 amendments were made in order to extend the coverage to more workers. In 1934, due to financial difficulties, the 'Unemployment Act' reduced provisions for unemployed workers.

The Unemployment Insurance System underwent major reforms as part of the restructuring of the Social Security System Programme during the mid-1990s. In 1995, the Jobseeker's Act was introduced to reform the unemployment benefits system. It was created to protect people from the problems generated by the lack of income when looking for a new job and as a means to avoid poverty or extreme poverty in case of jobseekers with dependants. The act emphasised the obligation by the person to constantly look for a job as a condition to receive the benefit and established a maximum of 182 days in a period of two years. After these reforms the government introduced a new type of unemployment benefit (the Jobseeker's Allowance) that replaced the Unemployment Benefit and modified the Income support schemes. Currently the unemployment benefits provision in the UK consists of the following:

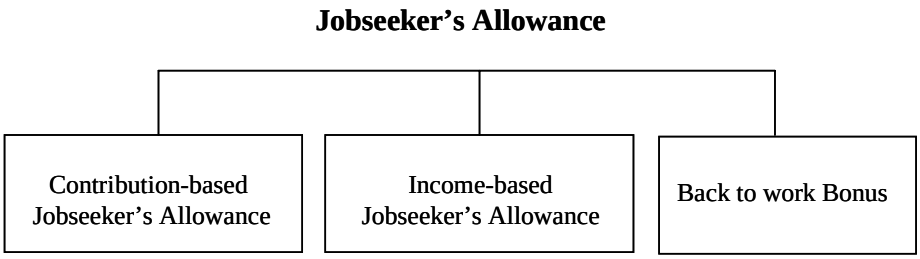
Jobseeker's Allowance

The main aim of the Jobseeker's Allowance was to help people to return to work after a spell of unemployment. With the introduction of the Jobseeker's Allowance, all unemployed people were required to sign a Jobseeker's Agreement. This has been established as a condition of benefit receipt and also as a commitment for the unemployed to look for work.

This benefit is available in the first instance to claimants that fulfill the following eligibility conditions, namely: (a) available for employment, (b) actively seeking employment, (c) capable of work, (d) under pensionable age (60 for women and 65 for men), and (e) signed a Jobseeker's agreement.

Applicants to either the Contribution based or to the Income based Jobseeker's Allowance would have to wait three days before their respective employment office provides an answer to them. There are three allowances for those either seeking employment or employed but not earning enough to cover their basic needs. Figure 8.3 presents these categories.

Figure 8.3 Types of jobseeker's allowance



In order to qualify for receiving *Contribution-based Jobseeker's Allowances,* claimants should have paid contributions on earnings equal to at least 25 times the minimum weekly earnings limit (i.e. £66 a week in 1999) in any one of the last two years, and on earnings equal to at least fifty times the minimum weekly earnings limit in the last two years. Claimants of this allowance have to be out of work or working less than 16 hours a week. Their earnings, if any, will reduce the amount of contribution-based Jobseeker's Allowance received.

Income-based Jobseeker's Allowance comprises an age-related personal allowance and allowances for dependent children. The allowance rates range from £31 a week for a single person under age 18 to £81 for a couple both aged 18 or over. Claimants of this allowance have to be out of work or working less than 16 hours a week. Their earnings, if any, will reduce the amount of contribution-based Jobseeker's Allowance received. The earnings of the claimant's spouse will also reduce the amount of allowance provided. In case that the spouse works 24 hours a week or more, the claimant may not qualify for this allowance. Some savings and capital restrictions also apply since this is a means-tested benefit. Sixty-five per cent of unemployed people received this allowance in 1998, which is financed by the government.

The back to work bonus is a tax-free lump sum of up to £1,000 that can be claimed by an unemployed person that moves off the Jobseeker's Allowance because he or she found work, or worked more hours, or received increased earnings.

Other Benefits Provision in the UK

In the UK there are three groups of recipients of benefits, namely (a) recipients of only unemployment insurance, (b) recipients of only social assistance, and (c) recipients of both.

The last group of recipients is possible in the UK due to the peculiarity of the unemployment compensation system. In Britain, some recipients of unemployment benefits can also be claimants of social assistance. This only occurs when the amount of unemployment benefits is lower than the amount of social benefits that the claimant is entitled to. Some of the most important social benefit programmes in the UK are:

- *Income Support*

This programme provides financial support to those whose net income falls below a minimum level. In addition, other means-tested benefits have also been put in place. Income support is directed to people aged 16 or over who are not required to be available for work, and to those whose income and capital is below some minimum level. Lone parents, pensioners, long-term ill and disabled people are the main recipients of this assistance. People with savings over £8,000 are ineligible. Also those with savings between £3,000 and £8,000 obtain only a proportion.

- *Working Families Tax Credit*

This benefit is a tax-free credit originally payable to low-income working families with children. However, it was extended to all families earning up to a certain limit and with children aged 16 or less. One of the parents has to work for at least 16 hours a week, and it is payable also to lone parents. If the family net weekly income is less than £81 a week, they will be entitled to receive the maximum amount of the credit. In 2004, this benefit underwent a further revision in order to reduce the amount payable to those families earning above the average income in the country.

- *Housing Benefit*

This benefit helps people on low incomes meet the cost of rented accommodation. It can pay up to 100% of the rent, depending on the claimant's circumstances. People whose savings do not exceed £16,000 are entitled to receive this benefit. In 1998, 4.5 million people were receiving this benefit. It is also received through subsidised housing provided by local councils who rent out accommodation well below the market price. It is intended for people in low income and those socially disadvantaged, like pregnant mothers, single mothers, the elderly, and recently asylum seekers are also becoming an important group of recipients of this benefit.

- *Council Tax Benefit*

The Council tax is one of the main sources of revenue for local authorities in the UK. It is a tax on domestic property. Based on its capital value, each property is allocated to one of the valuation bands. The Council tax benefit helps people with low income to pay their council tax. The scheme offers help to people in low incomes exclusively. Depending on the personal circumstances, an individual can receive up to one hundred per cent of their council tax. It is important to note that this benefit varies according to the place of residence since the council tax varies from council to council.

- *Concessions*

People in low income receive financial support in order to meet the cost of health services, legal aid, spectacles, school meals, fuel bills, etc. Concessions are also in the shape of reduced charges for museums or performances, or transport fares. Some of these concessions are granted immediately at the age of 65 for men and 60 for women, as in the case of transport fares and other services provided by councils.

8.3 Health in a Social Context

8.3.1 Psychological Health and the Social Environment

Literature in the field has documented the effects of psychosocial characteristics on objective and also subjective measures of health. Mackenbach *et al.* (2002) established four main psychosocial factors in their study of the Netherlands: 1) social support, 2) psychosocial stressors, 3) selected personality traits, and 4) coping styles. However, there is also strong evidence available for indicators of social integration such as a) social ties, b) social networks, and c) social support. Moreover, researchers are focusing their attention on the external factors that affect the health of a person. Thus the study of socio-economic status plays a determining role to understand those circumstances influencing a person's health.

Fernández-Ballesteros (2002) argues that social support is a key concept when studying the health of the population and, specifically, the older population. The author defines social support as "the density of an individual's social relationships, the degree to which an individual interacts with others and how much the individual receives and gives affection, instrumental support, and/or services" (p. 645). The author measured social networks using the following proxies: household characteristics, frequency of social contact, satisfaction with social relationships, and loneliness. The empirical evidence shows a close relationship with health, well-being, quality of life and social support in old age.

Andersson (1985) and Arnetz (1985) undertook two separate studies aimed at implementing strategies to improve social networks and social activity of older people. They reported that loneliness was the most sensitive variable among all quality of life variables. Andersson (1985) found that interaction with friends, rather than contact with relatives, was the best predictor of well-being and health. He argued that rather than providing more money, policy makers needed to establish policies to increase social interactions, such as social clubs. Arnetz (1985) found that while receiving instrumental support from spouses and relatives, older people value friends for the emotional and companionship that they provide. Thus friends were found to be a driving force for keeping a positive attitude. Those with friends carrying out an economic activity seemed to be more active and healthy than those with no friends or reduced social contacts. Finally, Prince *et al.* (1997) carried out 'The Gospel Oak Project VI' in the UK, which aimed to uncover the risk factors for depression in old age. The results of this study indicated a strong association between social support deficits, disability and late-life depression in

contrast with previous studies claiming that when disability was considered, the association between socio-demographic variables and depression was less strong.

8.3.2 Health Defined

Health has implications for all aspects of life. Good mental and physical health are extremely important factors to achieve increasing levels of well-being. It is possible to argue that quality of life is the framework encapsulating how health is defined, and how much it can affect different domains of life satisfaction.

The World Health Organisation (WHO) in its 1946 Constitution, defined health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity". This definition represented a departure from defining health only in terms of death and disease. Health is a very important component of overall well-being, influencing individual's performance in day-to-day activities and their capacity to work.

The WHO also defined health inequality as the differences in health across individuals in a population. It proposed to use health expectancy as the most adequate measure of health. Population health is measured according to the estimate of Healthy Life Expectancy (HALE), which combines age-specific mortality with estimates of age-specific prevalence of ill health, weighted by severity. Health expectancy is the number of years that an individual born today is expected to live in the equivalent of full health. It reflects the risk of mortality and the risk of non-fatal health outcomes that an individual faces in each year of his/her life. It is important that the measure of health reflects not only a risk of death but also the risk of being in ill health.

Health has an impact on the way people work and how they feel about work. However, mental and physical health are integrated into two different domains of affectation: mental health belongs to a mind domain and physical health is usually considered as part of the body domain. This distinction seems to raise some questions about whether or not they are entirely separated, since it has been proved that physical problems cause mental deterioration and mental disorders cause physical damage (Ruhm, 2000).

Turning to the issues of psychological health, it has been argued that mental health and mental disorders are strongly correlated, but globally each one is independent and, therefore, they should be treated as two

separate constructs (Masse *et al.* 1998). The authors argue that mental health is a state of harmony or balance between social, economic, professional or living conditions that allow the individual the optimisation of mental capabilities. Disorders such as lack of sleeping, loss of energy, stress and burnout are acknowledged as symptoms of bad mental health.

Mental and physical health are intertwined and self-reinforce each other over time. The causality direction is unknown since researchers have acknowledged that mental disorders have also physical manifestations, and it is well-known that patients suffering from terminal diseases present mental disorders as well. West (1991) claimed that the typical notion of health tends to neglect the mental component mainly due to a lack of connection between disciplines. In their study about optimal health of women, they found that women do not take into account the mental aspects of their health. Mental distress and sleeping disorders were attributed to 'bad physical habits', like sleeping on an inappropriate mattress, not doing enough exercise or not eating healthy food.

Mental and physical health are important components of well-being, and Diener *et al.* (1999) argued that health is strongly correlated with happiness and life satisfaction. Well-being and health are intrinsically linked in various ways. According to Masse *et al.* (1998) high levels of well-being imply an equilibrium between physical and mental health. As Crosby *et al.* (2003) argued, general well-being can also be defined as a balanced nourishment of the mind, body and spirit. Mind includes a healthy way of looking at life with a sense of proportion. In terms of the body, well-being is not only the absence of disease, but also the capacity of the individual to carry out any physical activity demanded by the social system (community and its constituents) in which he or she interacts. In conclusion, well-being can be portrayed as the catalyser of all physical and mental expressions of a person and the product of social assets, shaping mood and disposition to carry out any activity individually or in groups.

8.3.3 Measures of Health

Health is not a unidimensional concept, and social inequalities in a number of different dimensions are now considered as important factors for understanding differences in health. Measures of health status (a relatively long-term property of the individual) have been found to show more marked social differentials than measures of health state (relatively short-term properties of the individual such as current symptoms).

Mortality

The Black report (1980) employed the age/sex-standardised mortality ratios (SMRs) as their measure of population health. However, in more recent studies, new measures such as 'Life Expectancy Free of Disability in Years', or 'Potential Life Loss', and mortality amenable to medical treatment have been used. Recently, a number of health expectancy measures have integrated some assessment of the quality of health such as disability-free life expectancy (DFLE), known also as the Disability Adjusted Life Expectancy (DALE) rate, or expected years of life free of disability, which introduces the concept of quality of life. This indicator measures the number of years a person could expect to live free of any activity limitation.

Age-specific mortality rates have also been used to examine trends in health status over time. Empirical evidence shows that the effect of life course influences is more apparent on objective than on self-reported measures of health. Berney *et al.* (2000) suggested that self-reported measures of health might be capturing current social circumstances and psychological well-being, while objective measures might be capturing the impact of combined life course exposures on an individual's physiological state.

Some researchers have related to the so-called 'diseases of poverty' (tuberculosis, bronchitis, or pneumonia), which in developed countries tend to diminish, while other diseases called 'diseases of affluence' seemed to appear. These diseases (heart disease, motor vehicle accidents, lung cancer) have been associated with new life-styles that appeared when the standard of living rises.

Life Expectancy or Health Expectancy for Groups

It is possible to split a population into groups that are expected to have similar health expectancies and to measure directly the health expectation for those groups. Small-area analyses indicate that this is one of the most refined methods for revealing the underlying distribution of health expectancy in a population. For example, a detailed age-sex-race group analysis of counties in the United States has revealed a range in life expectancy across states of 41,3 years, almost as large as the range across all countries of the world.

Non-Fatal Health Outcomes / Self-reported Health

Measurement of non-fatal health outcomes on continuous scales provides more information from which to estimate the distribution of risk

across individuals. Numerous surveys provide information on self-reported health status using a variety of instruments. The main problem to date with this information is the comparability of the responses across different cultures, levels of educational attainment, and incomes. Problems of comparability must be resolved before such data sets can be used to contribute to the estimation of health expectancy in the population.

8.4 Socio-economic Status Defined

The relationship between socio-economic status and health has originally been linked to a sociological framework. This framework considers socio-economic status as a way of ranking a relative position in a society based on social institutions and social rules like class, status, and power (Liberatos *et al.* 1988).

Prince *et al.* (1997) point out that the identification of socio-economic risk factors and their linkage to particular mental health outcomes has generally been treated as endogenous with job satisfaction, as well as subjective and objective well-being. This issue is not yet well researched in the literature. The underlying assumption is that consistent relationships are found between population characteristics (earnings, marital status, years of education) and mental outcomes (expressed behaviour) which alter the states of equilibrium in different sections of the society such as the workplace, community, and households.

Empirical research has shown a recurrent relationship between mortality and occupational class, while timetrends have been one of the most basic measurements used to support the fact that inequality is widening.

8.4.1 Measures of Socio-economic Status

Although there has never been a complete consensus among researchers from different disciplines on the definition of socio-economic status (Bradley and Corwyn, 2002), literature studying the impact of socio-economic status on health typically uses education, occupation and financial resources as proxies of SES.

Education can affect health status through various channels. An often-cited advantage of education is that better educated people have more information about the effect of good nutrition on health and

thus may make healthier choices in eating habits and refrain from smoking or drinking and other damaging vices than their less educated counterparts. Education may also alter the efficiency of the process by which various inputs are transformed into health (e.g. preventive activities). It can also be related to one's willingness to invest in health in order to have future improvements in health (Fuchs, 1982).

In the health literature the individual's *financial resources* are proxied by some form of individual or household annual income. This measure of contemporaneous income as a measure of socioeconomic status presents some conceptual problems. First, income in a single year may not adequately measure the financial resources available to an individual over the lifetime in which decisions affecting health are made. Secondly, income may not be the best measure of economic resources among older individuals, specifically retired. In this respect, total individual wealth may well be a better proxy of individual socio-economic status. Since after retirement, income is usually lower than in pre-retirement, wealth captures an important dimension of socio-economic status, since it is an indicator of long-term income (Benzeval *et al.*, 2000; Brunner, 1997).

Occupation is usually referred to as a measure of socio-economic status. This is because occupation is considered to be a better measure of long-term economic status than current income. Rank in employment within an organisation has also been used as a measure of position within a social hierarchy. Occupation is related to several important factors in later life. First, it is related to occupational injuries and exposures to environmental conditions that have an impact on health. Second, occupation is related to both education and income. However, there are some measurement problems in the sense that broad groupings of occupation cannot capture significant variations within occupational categories. In later stages of life, there is a controversy over how to measure occupation. In the case of occupational exposure to health hazards, it is commonly found that the temporal relationship between the exposure and the outcome operates through long-time lags (e.g. exposure to asbestos and subsequent lung cancer).

In Britain, area-based indices of deprivation have been developed, such as the Castairs (1991) one used in Scotland (based on the percentage of unemployed males, overcrowded households without cars and persons in social classes IV and V that is, semi-skilled manual and unskilled manual workers, respectively, in each postcode sector at the most recent census).

8.5 The Relationship between SES and Health

8.5.1 Introduction

One of the important studies on the link between SES and health status carried out in the UK is the Black Report (1980). It was commissioned by the Labour government (1972–1979) and covered the period 1930–1970 in England. The report concluded that there were marked inequalities in health between social classes in Britain. Its central finding was that death rates for many diseases were clearly higher in lower social classes.

The Black Report showed that the gap in death rates between the rich and the poor had widened between 1930 and 1970. In 1930, unskilled workers were 23% more likely to die prematurely than professional people, whereas in 1970 they were 61% more likely than professionals to die prematurely. Specifically, people in unskilled occupations had a two-and-a-half times greater risk of dying before retirement than professional people (e.g. lawyers and doctors). Several subsequent studies, like the *Health Divide* (Whitehead, 1992) follow-up report in 1987 confirmed the findings of the Black Report. The aim of the *Health Divide* study was to update the evidence obtained in the Black report as well as to establish some policies in order to tackle the persistence of the health gap between the 'rich' and the 'poor'. It also assessed new terms associated with health such as quality of life and life-style with the purpose of finding better ways to measure the wide spectrum of health. At the core of the study was the idea of finding out the role of economic elements affecting not just the health of individuals but also the complete communities where they lived.

The *Health Divide* report confirmed that occupational class was strongly related to some specific causes of mortality. In addition to confirming such a fact, the report also revealed that the lower social classes had fewer resources available to cope with illnesses and that the 'divide' was not just a matter of class but also of sex and age. Whitehead (1992) established that in some cases, the divide was at regional level and more accentuated within communities where long-term unemployment, ethnic minorities and social exclusion were the common factors. The author concludes that in order to reduce health inequalities it is necessary for the policy-makers to take into account fours elements of policy: a) an adequate income for all, b) an improvement of living conditions and assessment of the housing conditions, c) an improvement of working conditions, and d) the removal of barriers to improving personal life-styles.

After the Black report (1980), asset based measures of socio-economic status namely income, ownership of cars or housing, became increasingly used in UK research, either as alternatives or in conjunction with other indicators of social stratification such as occupational class, area of residence or the status of the job. In many countries outside Britain, education was used as a proxy for SES. Following the Black report there was some convergence between these two approaches as education was also used by British researchers in cross-national comparisons. In addition, for gender comparisons regarding occupational status, own occupations, husbands' occupations, or the higher of the two were also used.

There is a strong debate on whether or not the effect of income distribution is independent from the effect of absolute income on health. Many studies (Muller, 2002; Selden *et al.*, 1993; Benzeval *et al.*, 2000) have questioned the robustness of the 'income inequality' hypothesis after controlling for possible cofounders such as income, race, education and urbanisation. Gravelle (1998) pointed out that the relationship might be a statistical artefact, due to the use of aggregated data and the non-linearity in the relationship between income and health.

8.5.2 Socio-economic Status and Health Inequalities

There is increasing recognition of the effect that health and risk of disease in adult life, and socio-economic inequalities, are in part determined by influences operating during the life course, and across generations. Health status at any point in life is clearly affected by cumulative exposures and experiences since birth. There is considerable evidence that socio-economic circumstances in childhood influence later behaviour and health.

The topic of health in later life stages has become the focus of attention for research activity in the field of health inequalities. The evidence suggests that health in adult life is the outcome of experiences and exposures across the life course. This approach, known as 'the life course perspective', describes how exposure to disadvantage takes its toll on health through childhood and across adult life. These studies suggest that inequalities in the structure of society shape life opportunities, and as a result advantages and disadvantages cluster around certain periods of life when individuals are more vulnerable (Smith *et al.,* 1997).

Berney *et al.* (2001) suggested that there might be at least three models describing the way in which the life course influences health in early old age. First, in deceases such as the lung function, they found that influences might accumulate across the whole life course, including fac-

tors in childhood, adulthood and early old age. Second, in cases such as blood pressure, the relationship might be conditional upon influences from different stages in the life course, which occur sequentially before the later life effect is produced. Different health hazards, socially and biologically plausible, were examined as well. It was found that differential exposure to these hazards might explain observed social class differences in morbidity and mortality.

Overall, these studies find that disadvantage and ill health in childhood predict disadvantage and ill health in adulthood. There is an increasing body of evidence of the negative impact of childhood deprivation on adult health.

The Acheson Report (1998) deals with the potential policy importance of trans-generational and life course factors by emphasising that interventions aimed at improving the health of mothers are a key component in the strategy to reduce future inequalities. Studies to date have demonstrated that these inequalities have consistently illustrated the socio-economic differences in birth outcome. There is now substantial evidence that a woman's own prenatal circumstances and size at birth affect her own reproductive performance.

The above report showed also that while there had continued to be an improvement in health across the social classes in Britain during the first 35 years of the National Health Service; there was still a correlation between social class, as measured by the Registrar General's Scale and infant mortality rates, life expectancy and inequalities in the use of medical services. The Registrar General's Scale (renamed in 1990 by the government "Social class based on occupation") classifies the British population into seven categories: Professional occupations, Managerial and technical occupations, Skilled non-manual occupations, Skilled manual occupations, Partly-skilled occupations, Unskilled occupations, Armed forces and long-term unemployed. This scale is an attempt to measure the correlation between occupation and socio-economic performance by individuals and small homogeneous groups. It has to be noted that the scale has changed as well as its categories, including now eight instead of seven.

The Stress and Health study or Whitehall II, has been carried out since 1985 up to date (Marmot *et al.*, 1997). This study originally aimed at understanding the effect of the social environment on health and the causes of social inequalities in health. It examined the health of British government employees over two decades and found a 3-fold difference in death rates between the highest and lowest employment grades. For a list of UK datasets that have been used in this type of research, see Appendix 8A.1.

Several studies have shown the risks that unemployment is detrimental to an individual's health. Overall, the literature in this field reveals how unemployment means not only an economic loss but also a decrease in happiness and general well-being (Clark and Oswald, 1994; Winkelmann, 1998; Theodossiou, 1998). Controlling for individual characteristics that may have a negative effect on health in the long term (i.e. income, age, gender, immigration, education, marital status, and the number of children), unemployment has been found to be a health hazard in itself (Gerdtham *et al.,* 2003).

The detrimental effects of unemployment on health have been widely recognised. For instance, Rantakeisu *et al.* (1999) interviewed young unemployed people in Sweden in order to test the assumption that differences in health among the unemployed could be seen as a function of financial hardship and of experiences of shame. They found that the unemployed who experienced the greatest financial hardship and shaming experiences reported the worst health outcomes. In addition, it appeared that their life-styles had also deteriorated, their social life was reduced, their self-confidence had diminished and they would carry less leisure activities like going to the cinema, exercising, etc. In old age, some studies have also found that inactivity can lead to rapid health deterioration. This was not limited to physical activity but it would be linked to social or productive activity of any kind (Glass *et al.*, 1999).

8.5.3 Inequalities, Immortality and Morbidity Explained

Several authors have studied health inequalities by comparing inequalities in mortality and morbidity in Western Europe. One of the most relevant cross-country comparisons was the project "Equity in the Finance and Delivery of Health Care in Europe" (known as ECuity Project), which was funded in part by the European Community's Biomed I programme. In this study, Van Doorslaer *et al.* (2000) stratified the samples by income and confined the cross-country comparisons to self-assessed health. It was assumed that underlying the responses to the question regarding self-assessed health was a continuous latent variable. The authors argued that their measure of the concentration index used, satisfied the three basic requirements of an index of inequality in health since: (i) it reflects the socio-economic dimension to inequalities in health, (ii) it reflects the experiences of the entire population; and (iii) it is sensitive to changes in the distribution of the population across socio-economic groups. Their results suggest that the

poor are heavier users of the services provided by general practitioners, but this could be explained by the fact that usually this section of the population tends to be more ill than the others. Another important finding concerning social class is that the rich tend to use the services of specialists more than the poor.

Mackenbach *et al.* (1997) used data on morbidity obtained from nationally representative health surveys, standard of living surveys, and multipurpose surveys for 11 European countries over 1985–92. Inequalities in health were found in all countries. The relative index of inequality showed variations between countries for perceived general health by education level. For men, inequalities were larger in Great Britain, the four Nordic countries, the Netherlands, and Italy than in Germany.

The study showed that while Sweden is well positioned for income-related inequalities in health, this is not the case for education-related and occupation-related inequalities in health. In the authors' view these findings suggest that differences between countries might show up not so much as generalised differences for all three socio-economic indicators but as differences within the countries.

Recently, a number of studies have also investigated differences in health inequalities among various groups (such as older adults, children and young people) and specific cohorts at given ages. These studies have shown that the magnitude of social inequalities in health may vary across different stages of life. Wagstaff *et al.* (2002) and (Navarro (2001)) argued that commonly used measures of health inequality have ethical judgments built into them. In the context of the WHO report (2000) on health care systems performance they express their disagreement in different ways. Wagstaff *et al.* (2002) suggest that achievements in health can be thought of as reflecting the average level of health and the inequality in health between the poor and the better off. The authors consider that it would be more adequate to think about achievement as a weighted average of the health levels of the members of the community, where higher weights are attached to the poorer people than to the better off. Navarro (2001) argued that technological-scientific medical interventions like those that would be derived from the WHO report about Health systems (2000), need to make reference to changes in the social, political, and economic environments in which these problems are produced.

The research regarding the effect of SES on health inequalities is mainly focused on two hypotheses:

1) *Absolute income hypothesis:* There is a two-way causality between income and health: low income leads to poor nutrition, and poor health reduces the earnings potential.

2) *Relative income hypothesis:* Income inequality itself has a negative effect on health. Consequently individuals who live in a more unequal society have a higher probability of mortality and morbidity.

Anderson (1985) investigated the cross-country relationship between life expectancy and income per head. He argued that the level of income strongly affects health in low-income countries, but weakly affect health in rich countries. His analysis is one of the first that suggest that the health of individuals in a society depends on the degree of income inequality in that society.

Daniels *et al.* (1999) argued that prosperity is related to health, whether measured at individual or national level. This might lead to the conclusion that 'income health gradients' or dislocations are inevitable. They found that although there is an association between GDP per capita and life expectancy, it is only up to a certain extent that this relation holds. They indicate that the levelling of the relationship between wealth and health was true within individual countries as well. The case of the USA was also highlighted, who despite of being one of the wealthiest countries in the world, have surprisingly poor health indicators.

Fernandez-Ballesteros (2002) from a life course perspective looked at the individual's biological development and how it interacts with an individual's social context. It is argued that there might be 'critical periods' both for psychosocial development and for the biological development of individuals. The critical periods in human development identified by the author were: the transition from primary to secondary school, school examinations, entry to labour market, leaving parental home, establishing own residence, transition to parenthood, job insecurity, change or loss of job, onset of chronic illness, and exit from the labour market.

In line with the last argument, several authors have argued that an individual at each stage of the life course follows a pathway towards a determined disease risk which is linked to both childhood and adulthood socio-economic position (Smith *et al.*, 1997).

8.6 Relationship Between Health and Labour Market Activity

8.6.1 Introduction

Changing work patterns in economic activities, the need for higher productivity levels to compete successfully in international markets, and an ageing population are important reasons to seek to improve our understanding of the effects of health on the labour force. A number of explanations can be found in the literature that link health status with labour market participation. Some studies refer to what is known as the social causation hypothesis, while others support the so-called health selection hypothesis. The first hypothesis indicates that social and economic deprivation damages the individual's health while the second hypothesis suggests that ill health would take individuals into unemployment.

Recently some researchers (West, 1991; McDonough *et al.*, 2001; Nordenmark *et al.*, 1999) have tried to overcome the apparently mutually exclusive pathways that connect health and labour market participation. Several authors consider health selection as a social process that reflects the embodiment of social inequality. They found a high correlation between health and labour market participation. According to the evidence, ill employees are more prone to absenteeism and, therefore, have lowered productivity. Nordenmark *et al.* (1999) also found a high correlation between long periods of absenteeism from work due to illness. Those who go back to work after long periods of illness tend to have lower productivity and overall motivation. This is a consequence of lack of energy, a need to adjust to new fixed periods of time or schedules, and to catch up with advances in technology, among others.

Fryer *et al.* (1997) maintained that it is important to differentiate between unemployment from work and unemployment due to worthlessness. Employment, as opposed to work, can be understood not in itself as an activity but as an institutionalised social relationship. This is a relationship between two agents that is institutionally regulated and that entails rights and responsibilities from both sides. Given the above psychological benefits in addition to the financial benefits, when an individual is employed, one could expect that unemployment severely decreases individual's mental well-being.

8.6.2 Health and Labour Market Activity for Older Individuals

From early to mid-1970s to 1998 there was a decline in the activity of the older male workforce in the UK. In the last five years, this trend seems to have been levelling out for men while for women it has always been more or less the same (Duncan, 2003).

Instead of early retirement, the term commonly used by scholars to denote this phenomenon described above is 'early exit'. Early exit encompasses the variety of routes out of employment that people in old age followed in the UK (Duncan, 2003). The 'early exit' concept besides retirement, includes voluntary and compulsory redundancy, dismissal and ill health.

In the 1960s the government's priority was to tackle youth unemployment and measures of job sharing were implemented like the Job Release Scheme that operated between 1977 and 1988. Only during the post-war period were policies implemented to induce people in old age to return to work. However, in recent years there is a concern regarding early exit and several policies have been introduced in order to make older workers return to work. Some of these policies aim to eliminate ageism while others aim to reduce retirement costs for the state, rather than alleviating labour shortages.

In line with the above, the UK government adopted the EC General Framework for Equal Treatment in Employment and Occupation Directive (Council Directive, 2000/78/EC), which outlaws workplace discrimination on grounds of age, religion, disability and sexual orientation. Thus the UK anti-age discrimination measures will be in place by December 2006. Compulsory retirement by the employer is also outlawed unless there are objective circumstances that justify it.

However, rates of re-entry to the labour market remain low in old age. Thus the government introduced the '50 plus' programme following the 'Welfare to Work' programme in 1998, which targeted young unemployed (aged18 to 24) within the New Deal framework of action. The government implements a number of other measures outside the framework such as stakeholder pensions which would shift the cost of exit from the state to employers and individuals.

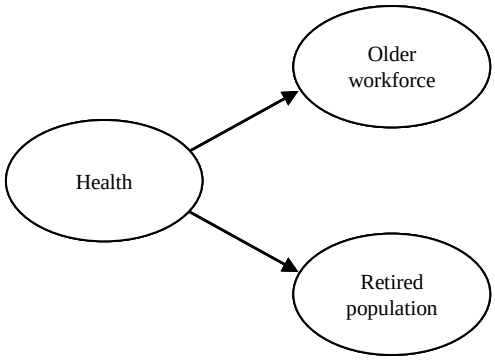
8.6.3 Health Factors in the Older Workforce and the Elderly

The UK is facing the prospects of having more than 60% of its workforce between the ages of 55 and 64 by the year 2025 (EC, 2003), gen-

erating a bigger demand for health care. Greater use of the national health service (NHS) by a larger older population of British workers will increase the problem of maintaining health care (short and long-term) both affordable and accessible.

The study of the health factors, the older workforce and the elderly has been practically ignored by the health research agenda around the world (Grundy and Sloggett, 2003). As a consequence of this, unobserved factors causing health problems in old age have not been studied from a socio-economic perspective. This sub-section addresses some of these factors and presents a survey of the literature aimed at discussing the effects of health on the older workforce and the older population as illustrated in Figure 8.4.

Figure 8.4 Health and its effect on the older workforce and the retired population



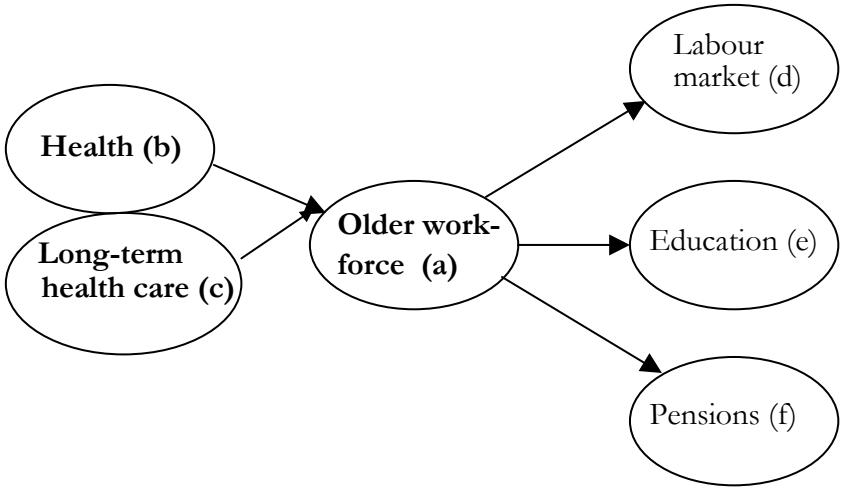
8.6.4 Health and the Older Work Force

The older workforce (aged 55 to 65) has special characteristics in comparison with other age groups. While the younger labour force is more committed to enhancing its development, the older labour force thinks about the prospect of retirement and the consequences of it, in terms of the financial situation and health needs. As ageing has the inherent problem of reducing physical and mental activity, health care demand increases at the later stages of life. Health problems also increase due to mental problems associated with the feeling of not being useful for society. Different studies (Adda *et al.*, 2003; Prince *et al.*, 1997) have demonstrated that the closer the retirement age gets, the higher probabilit of depression and mental distress the individual has. In consequence, the study of health in the older workforce represents a very important issue

for any economy. Figure 8.5 portrays the main impacts of the health status of the older work force in an economy.

From Figure 8.5, it is possible to observe the important impacts of an older workforce from an economic perspective. Health determines whether an individual can perform an activity or not. Ill employees have higher rates of absenteeism than those with good health. People aged between 55 and 65 tend to demand more health care than young people simply as a natural consequence of becoming older. The effects of an ageing population depend basically or the allocation of time for work, learning and the giving and receiving of care by people of different ages. For example, formal education is traditionally concentrated amongst the youth, work amongst those in the 25–55 age group, and leisure amongst older people (Glass *et al.*, 1999).

Figure 8.5 Relationship between the older workforce, health and economic factors



The analysis of the relationship between health and the older workforce and its consequences in the UK (a and b in Figure 8.5) is encompassed by Healy (2002). She argues that the emphasis given by the British government to the costs and growth of government-provided health care for the old population is not going to be enough to contain the problem. The problem, according to the author, is that once people foresee the date of retirement as a fact, they tend to look for more health assistance as a way to prevent possible illnesses in later stages of life. This is the time when this population can still afford private medical care (if required). This is relevant in countries like Britain where ba-

sic health provision is free at the point of delivery. As a consequence, Healy (2002) claims that there is an excessive pressure on governments to spread the costs of health care for the ageing workforce about to retire between the public and the private sector.

Healy (2002) compared the British and the Australian health care systems and their policies in order to see the main differences between countries with similar age structures in their labour force, as well as a different approach to health issues. Her findings suggest that a system based on a homogeneous health care tends to reduce the possibility of higher benefits for mature adults and the elderly. It was found that the Australian institutional framework has a special provision of resources for these two segments of the population and has a reduced level of coverage for younger populations, allocating more efficiently the resources available, favouring also the charge of a fee in earlier stages of life and no charge in late adulthood and retirement.

Another specific characteristic of the older workforce deals with its propensity to suffer from health problems more than any other sector of the population. Duncan (2003) found in his research that people between 55 and 65 years of age have the highest risk of heart failure and strokes, at least in Britain. Work-related stress, lack of adequate diets in early adulthood, malnutrition in childhood and financial difficulties are the most common causes for such problems according to this research.

The above result is confirmed by Deeming and Keen (2002) and Grundy and Sloggett (2002) for the UK, who claimed that it is at this stage of life (55–65) when many workers face not just work and financial stress but also family separation mainly due to children leaving home to pursue studies or other reasons, marriage break-ups, death of relatives and friends, to name but a few. All these facts impact on the mental and physical health of the worker facing the prospects of a 'lethal' combination of work and family pressure (Bultmann *et al.*, 2002).

Bardasi and Jenkins (2002) suggest that the older workforce faces the risk of not obtaining a pension sufficient enough to make their ends meet. A relative reduction of the population at the bottom of the age distribution makes this risk more plausible. When the ICT-revolution died bringing down the value of pensions, millions of dollars were just wiped out from pension funds around the world. The collapse of companies all over the world made it almost impossible to provide a pension for many workers. The real effect of this financial cataclysm will be seen in the years to come when all the workers left without a pension start ageing and with no money to afford long-term health care, poverty will be a natural consequence (Bardasi and Jenkins, 2002).

Smith *et al.* (2002) estimated that the older labour force presents different characteristics depending on the kind of work performed. Factory workers see a reduction in their productivity levels due to health problems. Health problems exhibited by these workers are mainly chronic injuries and illnesses associated with jobs demanding intensive physical activity. On the contrary, workers at management level exhibit increasing levels of stress, high levels of cholesterol, heart problems and fatigue. In some cases, mental distress is so high that nervous breakdowns are becoming more and more common. According to Deeming and Keen (2002), this segment of the labour force in general has a 240% higher probability of being off work for more than three days than any other segment.

Statistics published by the European Commission (2003) show that in Great Britain, the employment rate of the older work force is 53.5%, the third highest in Europe, just after Sweden (68%) and Denmark (57.8%). The previous statistics can be read in two ways. First, most of the European countries are ageing very fast and, as a consequence, they rely more on the older workforce to carry out economic activity. The fact that many workers retire at this age getting generous retirement packages, makes retirement more attractive than to continue to work. As a consequence the total native labour force has decreased in many countries and this reduction is compensated for by immigrant workers (European Science Foundation, 2001). Second, the efforts carried out by each country's national authorities to integrate the older labour force in the labour market, in turn, benefit the younger workers with the experience and knowledge of their older counterparts.

However, these benefits can be troublesome in the long term, since a higher dependency in older workers exposes the labour market to health factors associated with the fragility of the older workers. In this case it could be argued that in countries where the older labour force is large, the need to invest heavily in health is very urgent; in that way workers do not reduce their productivity output. As can be expected under these circumstances, the free provision of long-term health care will represent a huge economic burden for governments in developed countries (Lewis, 2001).

Education and the older workforce play an important role in the development of a culture of health (Valkonen *et al.*, 1997). Education needs to be converted into something else than training for workers or 'learning'. According to Valkonen *et al.* (1997), the notion of health education is required to make not just workers but the whole population more aware of the benefits of being healthy at all stages of life. According to the authors, the notion of 'healthy eating' is just taking

off in many European countries. Some evidence from Mediterranean countries suggests that certain food is good for health, but some precautions must be taken in order to avoid problems in late adulthood. Education must stress the point that any excesses in the life-style will have repercussions for the later stages of life.

The last interrelation in Figure 8.5 corresponds to the older workforce and the pension system. This point has already being covered extensively in Section 8.2 of this review.

8.6.5 Health Factors and the Old and Retired Population

Conducting research about the health of retired people based on socioeconomic status poses some complications because the validity of an occupational-based index decreases since these persons no longer work (Berney *et al.*, 2001). However, more than socio-economic status, the notion of social class has been applied to self-reported health in later life. The main findings suggest a strong positive statistical correlation between income-related variables and health. These findings also suggest that, due to the relationship between income and work activity, health seems to deteriorate mainly due to the activity performed by the worker rather than due to the income received. Oil industry workers, in spite of being paid considerably more than factory workers with similar skills, once retired their health deteriorates faster than the health of their counterparts from other industries. The evidence suggests that activity, rather than income, could have greater influence on health.

Smith *et al.* (2002) claim that this segment of the population is characterised by a higher percentage of woman than men, who face the challenge of chronic illness and physical and mental impairments. According to the authors, the concept of health for the elderly should be treated carefully since health cannot be defined for that group as 'absence of disease'.

Findings of a study reported in Smith *et al.* (2002) established a strong statistical correlation between subjective well-being and physical well-being. The Berlin Ageing Study established in 1989 aims to study questions related to old age combining four disciplines: psychiatry, psychology, sociology and internal medicine. According to this research, the physical deterioration of ageing seems to be lower for those individuals reporting high levels of happiness and a positive approach to life. However, the causality path is not analysed due to the physical limitations of the sample (those aged 65 and over in Germany), which in some cases suffered from pain and other ailments not allowing the interviews to be carried out in the predicted time intervals.

Health in older age seems to be strongly correlated with socio-economic factors. Thobecke and Charumilind (2002) claim that the socio-economic impact of poverty permeates to later stages in life, not just in the form of malnutrition or lack of opportunity, but also in a form to approach life that goes beyond the possibility of any economic measure. They argue that even in those countries where steady economic growth has increased the life standards of some segments of the population (Chile and Far East Asian countries), those who were poor in their 30s and 40s and now are part of the middle class in their 50s, 60s and 70s seem to go backwards in the social class ladder, or at least they are not capitalising new opportunities generated by the economic expansion of their economies. The explanation according to the authors can be attributed to the lack of 'good examples' obtained when they were young, and apathy has taken root in such a way that it is impossible for them to break free.

Another issue related to health and the elderly is solitude. In Western European countries where family ties are not seen as important, the elderly live a life of solitude in many cases (Kendig *et al.*, 1999). Relatives are essential for the provision of support in almost all societies. Kendig *et al.* (1999) argued that social networks are as important as income to keep the older population mentally and physically healthy in developed countries. Family ties reinforce the feeling of belonging and contribute to reinforce any positive approach kept by the elderly, thus helping them to desire to keep alive and well.

Siegrist (2000) argued that 'social exchange' is not just the interaction between the elderly's families and friends, but also the capacity of the society to provide the opportunity for interaction with this population. This social exchange influences health because it transfers good or bad feelings of other people. Yet the simple conveying of information provides a sense of utility to those who listen. In the case of the elderly, the author claimed, social exchange enhances civil participation, providing a purpose for being alive.

With more coherent and more comprehensive life-cycle analysis, policies can be developed, which give more recognition to the fact that what happens at one stage of life often has a large impact on other stages, or that policies in one sector can influence outcomes in another (as argued by life course theory). There is mounting evidence that nutrition problems during childhood lead to a higher propensity of degenerative and other diseases many decades later in populations which no longer suffer from chronic food scarcity (Wagstaff *et al.*, 2003).

8.7 Methodological Issues

The problem of endogeneity between health and socio-economic status factors has been an issue that preoccupies the research on the above relationship. Furthermore, it is an important policy issue to analyse the causation in this relationship and study its implications for policy. However there is surprisingly not a substantial volume of research in this methodological problem.

Past research usually recognises the relevance of endogeneity, but only few studies follow the relatively traditional econometric methods of dealing with this statistical problem. For instance, some research uses panel datasets and information on past health to address the endogeneity issue. Chapman and Hariharan (1994) used measures of previous health in regressions of current health to control for causality between wealth and health. Gerlach and Stephan (1996), Smith and Kington (1997), and Winkelmann and Winkelmann (1998) examined changes in health and income while controlling for individual fixed effects in panel datasets. Only Hurd *et al.* (2001) employ a more standard correction for wealth health endogeneity, but they examine only the relationship among those who have already retired or otherwise withdrawn from the labour market. To our knowledge, there is no research that endogenises the health and labour force status relationship in order to investigate, for example, whether current unemployment influences current health or if current health influences current unemployment.

In the past, the determinants of health have been revised in separate categories. In health research there has been a trend towards the integration of the biological and behavioural components of health along with their underlying socio-economic and environmental factors into a single conceptual model (Bongaarts, 1978). Since then, progress has been made to incorporate these relationships into an appropriate methodology.

In the UK, authors have controlled for endogeneity following the econometric methods described in Zohoori (1997). Grundy and Sloggett (2003) used data from a large nationally representative sample to analyse differentials in the health of older adults according to variables selected to represent personal capital, social resources, economic resources and life-style factors such as smoking. The authors used a logistic model to test for endogenous components. In order to control for endogeneity, the authors applied an instrumental variable procedure using as instruments the age intervals and smoking. The results showed that social resources (marital status and social sup-

port) had the greatest effect on the indicator of psychological health (GHQ) and also contributed to the variation in self-assessed health. The findings, according to the authors, were consistent with the view that self-rated health may provide a holistic indicator of health in the sense of well-being, whereas measures such as taking prescribed medications may be more indicative of specific morbidities. However, the literature on health and socio-economic status shows the difficulty of knowing or demonstrating that a potential instrument is exogenous, in the sense of being uncorrelated with the disturbances of the health regression.

An additional issue that preoccupies the research is the strong effects of cofounders on health. Cofounders are factors associated with both the outcome and the exposure of a relationship. However, they are just indirectly related to the causal pathway of the relation while effect-modifiers can be found in it. The presence of confounding can be tested using stratified analysis in case there are just two variables related, the outcome and the exposure variable. Its effects can also be minimised in general at the study design level by the use of randomisation at the recruitment stage. If the sample size is large, this will make sure that the cofounders are equally distributed among each study group.

In the data analysis stage any attempt of compensation for confounding is more difficult and can also be incomplete. Another way of controlling for cofounders is by mathematical adjustment rather than control in the study design. These methods try to minimise the effect of cofounders by making adjustments in logistic regression or multivariate analyses. These methods have some practical advantages over stratification that is characterised by its efficiency.

8.8 Conclusions

The most recent and extensive methodological and substantial research developments tend to endorse the view that social inequalities in health and premature death are still an important issue in the UK, as in the other industrialised countries, and that their observed magnitude depends on indicators of social position and health. Socio-economic factors and health are highly correlated and affect mortality rates, suggesting that the 'poor' die younger than their wealthier counterparts. Importantly, this correlation seems to exhibit stronger effects for the older workforce. In addition, while there is a continuing improvement in health across the social classes in Britain, there is still a correlation be-

tween social class and infant mortality rates, life expectancy and inequalities in the use of medical services.

Finally it appears that not only wealth, but also social organisation and government policies are important for the population state of health. Overall, health research supports the idea of a more integrative approach to assess the effect of psychosocial factors on health. The importance of early socio-economic conditions and its impact in the individual's life course is most strongly highlighted in the literature.

Important as these findings are, there are a number of issues that currently preoccupy the research agenda. In particular, the problem of the endogeneous relationship between health–SES still contaminates most of the empirical findings.

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Appendix 8A.1 UK Data Sources

- ✓ *British Household Panel Study*: follow-up ongoing micro level study. It is part of the European Community Household Panel (ECHP), which observes a representative sample of individuals and their households and includes sufficient information on their health status (physical and mental) and on occupational, educational and SES characteristics. The dynamic character of the survey gives the opportunity to researchers to capture the accumulated effect of socio-economic inequalities on health status (Theodossiou, 1998).
- ✓ *General Household Survey*: it is an annual survey, conducted from the Office for National Statistics and comprises about 10,000 households (about 25,000 people) (Bartley and Owen, 1996; Sacker *et al.*, 2000).
- ✓ *Retirement and Retirement Plans Survey*: a follow-up study on adult men and women with information on their occupational history, financial circumstances, disability and marital and fertility history (Grundy and Holt, 2000).
- ✓ *Health and Lifestyle Survey*: a national survey of adults in England, Wales and Scotland in 1984-1985 with sufficient relevant data (Ecob and Davey Smith, 1999).
- ✓ *Twenty-07 Study*: it is performed in Scotland and it is a longitudinal study aiming at the social patterning of health. This study follows up three age cohorts, aged around 15, 35, and 55 years in the first wave (1987-88) (Hunt, 2002).
- ✓ *Whitehall II Study*: a longitudinal cohort study in Great Britain. This project gathers information on morbidity, mortality differentials, and SES characteristics in a sample of civil servants (Ferrie *et al.*, 2000; Griffin *et al.*, 2002).
- ✓ *Medical Research Council's National Survey of Health and Development*: collects a wide range of information on a nationally representative British cohort of men and women since their birth in March 1946. It includes information on various aspects of their physical health and health related behaviours and measures of individual SES at different life stages of the participants (Kuh and Wadsworth, 1993).