

Equity in health and health care in Hungary: health status, finance, and delivery of health care

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Abstract

The objective of this research is to provide a comprehensive assessment of income-related equity in health and health care in Hungary and to explore the value of using a quality of life instrument, the EQ-5D, in this application. Cross-sectional analyses were performed based on data from post-transitional period, covering the years of 1999-2000, including the Hungarian Household Budget Panel Survey, Informal Payment Survey, and the National Health Monitoring Survey. The concentration index method was applied for the measurement of income-related inequity in health and health care. The overall Kakwani index for the health care finance system was -0.0181 indicating a slightly regressive overall structure. The regressive impact of direct, indirect general taxes, and the fixed component of health insurance contributions was almost fully offset by the slightly progressive income-related social insurance contribution component and the highly progressive income taxation. Important income-related inequalities exist in the health status of Hungarians. The relationship between income and health is revealed by the negative values of the ill-health concentration index, which was -0.2128 for the EQ-5D index. The decomposition has revealed that problems with pain/discomfort are the principal contributor to income-related health inequalities in Hungary. Thirty-nine percent of inequality can be explained by this dimension alone. This finding has a major implication for health policy-making by highlighting the potential role of pain management programmes. Health inequity index for GP and inpatient care show that people in lower income groups use proportionally more health care of these types of services than would be predicted by their health status. On the other hand, positive values of the HI index for outpatient specialist and dental care indicate inequity favouring the rich. A significant part of income-related inequity in delivery of care turns out not to be directly linked to income but to other social, economic and geographical characteristics that are, however, associated with income level.

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Results on the progressivity of informal payments have been presented at the International Health Economics Association conference in 2001. Results on income-related inequalities in health have been presented at the EuroQol Group's annual meeting in 2001.

The chapter on the Hungarian health care system was published in a country report prepared for the European Commission. (Gal R, Mogyorosy Z, Szende A, Szivos P (2003) Study on the Social Protection Systems in the 13 Applicant Countries: Country Study Hungary. Study financed by the European Commission - DG Employment and Social Affairs. Brussels. (http://europa.eu.int/comm/employment_social/soc-prot/social)

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I intend to submit the following thesis components to peer reviewed journals in collaboration with my supervisor, Professor Tony Culyer:

- **Distribution of burden of informal payments for health care: evidence from Hungary (Chapter 7)**
- **The application of the EQ-5D in the analysis of income-related health inequalities (Chapter 8)**
- **Public preferences for health inequality aversion: policy-makers versus physicians' views (Chapter 8)**
- **The role of international organisations in promoting equity in health and health care: a comparative review (Chapter 1)**
- **Equity in the finance of health care in Hungary (Chapter 7)**
- **Equity in the delivery of health care in Hungary (Chapter 9)**

PART I. MOTIVATION

Chapter 1

Motivation and introduction

While the improvement of the overall *level of health* of the population continues to be a high priority, there is an increasing concern about the *distribution of health* within the population and the *fairness* of health care systems.

Extensive empirical evidence has been accumulated that mortality and morbidity are not randomly distributed among the population but systematic differences exist between socioeconomic groups and geographic areas. The clear relationship between socioeconomic status and health have become a continuous concern among public health researchers and policy-makers, and has been discussed in a number of publications, government reports, and textbooks (for example, Evans 2002; Mackenbach 2002; Acheson Report – Independent Inquiry 1998; Wilkinson 1992, 1996, 1997; Mackenbach et al. 1997; Doorslaer et al 1993; Black Report 1982).

In addition to inequalities in health among the population, a connecting concern is the fairness of health care systems. Equitable health care systems may prevent a widening gap in health between the least and most advantaged socio-economic groups and help each individual to fully participate in society. In response to a need to address this concern, equity has recently become an important aspect of the evaluation of health care system performance. Wagstaff and van Doorslaer (1993, 2000) played a pioneer role in exploring and measuring equity characteristics of health care systems. They argued that *equity of health care systems* can be assessed based on at least two main characteristics:

- (a) *equity in the finance of health care* reflect the extent to which payments towards health care are related to ability to pay rather than to the use of medical services;

(b) *equity in the delivery of care*, on the other hand, reflect the extent to which individuals in equal health needs receive similar treatment regardless of their socio-economic characteristics, such as their ability to pay for health care.

In general, this dual interpretation of equity in health care is widely accepted today, although some debates exist over the details of interpretation and measurement issues.

Despite the rapid increase of studies on the measurement of equity in health and health care, relatively little attention is devoted to addressing the question as to why bother at all about equity in health and health care.

The first part of this chapter discusses the motivation of the thesis in terms of the continuing concern about equity in health and health care, and the justification to address inequity. The second part introduces the increasing responsibility of international organizations over equity in health, and the future challenges they highlight for their member countries. This is followed by the discussion of the lack of information about the nature and extent of inequity in health and health care in Hungary, and an explanation for the need to generate useful data to support health policy makers to promote equity. The final part summarizes the objectives and the structure of this thesis.

1.1 Why bother about equity in health and health care?

When discussing the various concepts about the need to address equity in health and health care, it is important to make a distinction between the terms “inequality” and “equity”. The term “inequality” has a descriptive (or positive) nature and refers to the magnitude of variations in the population in terms of level of health status, access to treatments or in terms of contributions paid for health care. “Equity”, on the other hand, has a normative content and carries a value judgement of what people regard fair. Accordingly, not all inequalities are necessarily regarded inequitable.

Furthermore, it is important to note that several of the arguments for reducing inequalities are not purely based on the concept of fairness. Based on empirical findings or logical

arguments, some researchers argue that reducing inequalities can in fact improve overall efficiency in health care and society in general.

Approaches to the justification of reducing inequalities do vary to a great extent in terms of whether they follow a purely moral or a more prudent argument, and whether they are more philosophically based or empirically driven. The aim of the remainder of this section is to review various approaches to the justification of reducing inequalities in health and health care.

Alleyne et al (2000) distinguish three major reasons for bothering about inequalities in health: moral considerations, social instability, and a human capital argument. Other authors, such as Wall and Owen (1999), build on Wilkinson's relative income's thesis in their justification for reducing health inequalities. A more recent approach is based upon public choice theory and calls for the collection of evidence on public preferences on inequality aversion to feed policy decisions (Murray et al. 2000, Dolan 2003).

(a) Moral considerations

Moral arguments about inequalities have in common that, although some rational reasoning is always part of these approaches, they are primarily based on a natural sense of fairness in terms of equality of opportunities. Alleyne et al (2000) build their argument on Sen's theoretical approach on essential freedoms and mechanisms through which other freedoms can be enjoyed. They argue that it would not be morally justifiable not to allow all human beings to enjoy health that enables them to enjoy other freedoms. This argument is somewhat similar to Rawls's first principle of justifying the entitlement of every individual to the so called "primary goods" that enable them to enjoy the most extensive basic liberty and equal opportunity of participation in society (Rawls 1973). Other authors use moral arguments to distinguish inequalities that are unfair from those that are fair. Woodward and Kawachi (2000) argue that inequalities are unfair if poor health is the consequence of unequal opportunities or unequal distribution of risk factors within the population. On the other hand, some argue that certain types of inequalities,

such as giving priority to the young over the old in access to health care based on the “fair innings” argument are indeed equitable (Williams, 1997).

(b) Rational reasoning about inequality reduction

Social instability. Alleyne et al (2000) highlight that inequalities in health may be a cause of social instability. Likewise the differences between countries that contribute to the instability of the world, inequality in health or in access to care can be seen as a threat to the more favoured ones. People in general do not usually regard health as an achievement but they regard it almost as a right to be as healthy as others and to have access to the means of being so.

Human capital and its role in tackling poverty. A more pragmatic consideration is that health is one of the ingredients of human capital that is essential to other aspects of development. Unequal access to measures that lead to the formation of human capital inhibits the reduction in poverty. Improvement of health status and the reduction of health inequalities are more and more recognized as essential parts of tackling poverty.

Relative income thesis. A somewhat related argument is the relative income thesis published by Wilkinson (1992, 1996, 1997). Wilkinson observed that in countries with relatively high socio-economic inequalities (measured along income level) the average level of health tend to be lower than in those countries with more equal societies. This hypothesis first seemed to be supported by both international cross-sectional and national historical data. Furthermore, Kaplan (1996) and Kennedy et al (1996) confirmed the validity of the relative income thesis based on data from different states of the USA. However, the relative income thesis has been challenged shortly after its publication. First, Judge (1995) criticized Wilkinson on the selectivity of the choice of income inequality measures and countries involved in the analysis. Later, empirical evidence was provided that the real impact of income inequality on the level of health has been previously overestimated or the relationship never even existed (Osler *et al.*, 2002; Shibuya *et al.*, 2002; Sturm and Gresenz, 2002; Muller, 2002).

“Relative health thesis.” Interestingly, the WHO’s World Health Report’s (WHO, 2000) ranking of countries based on the measure of overall health inequalities health (measured by child survival by the age of five) also highly correlated to the ranking of countries based on average health (measured as disability adjusted life expectancy, DALE). According to my own calculations, the Spearman’s rank correlation between average health and health inequalities was 0.912 ($p < 0.01$). This extremely high level of correlation suggests that smaller inequalities in health are associated with higher level of average health. However, as the WHO did not take demographic, social and economic factors into account in the measurement of health inequalities, it is not possible to identify a direct cause-consequence relationship. If a causal relationship exists then tackling social inequalities in health (for example, by improving the health of the most disadvantaged groups) can be associated with a benefit in terms of the overall health of the population.

Empirical evidence on societal preferences about inequity aversion. A yet not widespread approach of justifying the need to pursue equity in health and health care is surveying representatives from the public on their preferences regarding equity. Murray et al. (2000) surveyed a group of members from the general public and another group of representatives of WHO employees about their views on an equitable health care finance system. They found that the majority of respondents preferred a system in which higher income individuals pay more towards health care than lower income individuals. In another survey with over a hundred members of the English population, Dolan (2003) looked at whether people are willing to give up efficiency in terms of overall health in order to achieve greater equality in health. Indeed, he found that people were willing to sacrifice a year from average life expectancy to achieve equality between the life expectancy of social classes. As part of the thesis work, I also collected data on individuals’ preferences on health inequality aversion in Hungary. As later described in more details (Chapter 8), a group of public health care workers were asked to express their preferences between programs that improve overall health and/or reduce inequalities in health. Indeed, results reflected a view of the median respondent that a sacrifice in improvements in overall health is worthwhile if social inequalities in health can be reduced. In summary, early evidence suggest that social preferences might reflect a need to achieve greater equity in health and health care.

Growing international concern about equity and need for comparative data. As international concern over equity in health and health care grows, there is a need to provide empirical data for respective countries. Data on equity in health and health care can be used in comparing and evaluating health care system performance and as input data for recommendations on new health policy programmes.

While moral and rational arguments towards reducing inequalities in health and health care are important components of developing policy interventions in individual countries, the role of the international environment is at least that important factor. Hungary as a smaller country in a transition period is eager to look for well-established models, and the guidance and approaches represented by international organizations can influence internal policy development. The following section provides a summary of the role of selected international organizations in health equity issues.

1.2 Growing international concern about equity in health and health care

International organizations have recently gained an expanding role in the analysis and promotion of equity in health and health care. Depending of their actual role and objectives, these organizations can play a role in funding research on equity, develop methods to measure and monitor equity, and provide recommendations to their member countries on strategies to design and implement policies, so that greater equity in health and health care can be promoted.

The special importance of international organization in promoting equity, as compared to individual researchers or academics, is that they have more direct influence on governments of their member countries, who in turn have the actual tools to tackle inequalities. Three organizations, of which Hungary is part of, are discussed in this section: the World Health Organization (WHO); the European Commission (EC)¹; and the Organization for Economic Co-operation and Development (OECD).

1.2.1 The World Health Organization

The World Health Organization has been traditionally concerned for equity in health. Since the 1980s, this concern has been reflected in a number of WHO publications that included reference to equity, such as *The concepts and principles of equity and health* by Whitehead (1990), *Policies and strategies to promote equity in health* by Dahlgren and Whitehead (1992), *Measuring socioeconomic inequalities in health* by Kunst and Mackenbach (1994), *Health21 - health for all in the 21st century* (WHO 1998) and the recently published World Health Report 2000 (WHO 2000).

¹ Hungary joins the European Union in May, 2004.

In the strategy outlined by the WHO's publication, *Health21 - health for all in the 21st century* (1998), target one has been defined as achieving equity in health: *"By the year 2000, the differences in health status between countries and between groups within countries should be reduced by at least 25%, by improving the health of disadvantaged nations and groups."*

This statement reflected the view that equity is best interpreted as equality in health status. Kunst and Mackenbach highlighted that *"socioeconomic inequalities in health can be defined as differences in the prevalence or incidence of health problems between individual people of higher and lower socioeconomic status"*. The reason for reducing inequalities is not only because these inequalities are "unfair" but also because *"reducing the burden of health problems in disadvantaged groups offers great potential for improving the average health status of the population as a whole"*.

Until the publication of the World Health Report 2000 (WHO 2000), the WHO have not specifically adapted an official approach how inequalities and reduction in inequalities should be defined and measured. Kunst and Mackenbach had pointed out though that there was a great need for standardized measurement tools and more empirical analysis on equity. They suggested the use of regular monitoring systems based on interview surveys and registries. They recommended to measure health both in terms of mortality and morbidity and to measure socioeconomic status by three main indicators: occupational status, education, and income level. To measure morbidity, the recommended tools included perceived health, disability status and quality of life measurements. For measuring the association between socioeconomic status and health status they recommended the use of relative and absolute inequality indices.

An influential and much debated publication of the WHO with reference to equity was the annual World Health Report published in 2000. The World Health Report 2000 had the objective to evaluate and rank the performance of health care systems of its 191 member countries. The report examined goal attainment of the health care system in relation to health care expenditures per capita. Goal attainment in health care included five aspects:

1. *Good average health of the population*: Life expectancy weighted by level of disability (Disability Adjusted Life Expectancy, DALE). Disability is calculated such that years lived with illness count less than 1, and less the more burdensome the illness is.
2. *Equity in health*: Equality in probability of surviving the first 5 years of life in children within the overall population.
3. *Responsiveness to legitimate non-health expectations in the population*: Index covering respect for patient's dignity, confidentiality, patients' autonomy, prompt attention, quality of amenities, access to social support networks, freedom to choose provider.
4. *Equity in responsiveness*. The more subgroups that are treated with less responsiveness than the majority, and the greater these subgroups are, the lower is the country's score on equity in responsiveness.
5. *Fairness in financing*. Defined as proportionality between a household's total expenditure on health care (taxwise and out of pocket) and its permanent income above subsistence level (defined as total private expenditure plus direct tax payments minus expenditure on food).

The fact that three of the five aspects of the performance the evaluation system (equity in health, equity in responsiveness, and fairness in financing) included reference to equity issues, gave a clear message about the increasing responsibility of health policy-makers over equity. Each country was ranked based on performance along the five indicators and an overall rank was also assigned based on overall performance. Japan was ranked first in average health, Chile in equity in health, the USA in responsiveness to non-health expectations, the United Arab Emirates in equity in responsiveness, and Colombia in fairness in finance. France was indicated as the best health care system based on overall performance. Hungary was ranked as 62, 40, 62, 58, 105-106 in the five goal achievement indicators respectively, and 66th in overall performance (WHO, 2000).

The World Health Report 2000 prompted a great deal of criticism and controversy mainly for its pointlessness in its goal of ranking countries (Williams, 2001) and for the - lack of complete - data and deficiencies in methodology used (for example, Shaw 2000, Wolfson

and Rowe 2000, Braveman et al 2001, Navarro 2001 Szwarcwald 2002). Most of these criticism focused on the limitations of the WHO's underlying concept of measuring equity in health in terms of overall health inequalities (as presented by Murray et al 1999 and Gakidou et al 2000) while failing to measure social inequalities that are more important from equity perspective. However, no one has really doubted the role of the WHO and its World Health Report 2000 in emphasising the importance of equity in health care and generating debate and further research in the area. It has also highlighted the potentials in improving the Hungarian health care system in terms of equity, and achieving more fairness in financing health care in particular.

1.2.2 The European Commission and the ECuity project

In the European Union, the organization of health care systems is still largely the responsibility of individual member states. Although long-term plans exist about the harmonization of social policies, including health care, the speed of this process may well depend on other factors, such as the speed of the economic integration of Europe.

Some general objectives of public health have already been defined in the Amsterdam Treaty, but more specific aims and joint EU actions are to be pursued in the future. The European Commission has recently published its plan to adapt a programme of "Community action in the field of public health: 2001-2006" (EC, 2001). This plan has amongst its objectives the improvement of sharing information and knowledge about health care systems of its member states, responding rapidly to health threats, and addressing social and economic determinants of health. While respecting the principle of subsidiarity and the responsibility of Member States for the organization and delivery of health care, the EC programme takes a broader view on public health, including tackling the factors underlying disease.

The programme addresses equity to an important extent. It includes the objectives of improving information and knowledge for the development of public health in order to

optimise health status, strengthen efficient health systems, conduct effective health interventions, and to “*develop methods to tackle health inequalities*”. The programme also aims to address health determinants through (interdisciplinary) health promotion and disease prevention actions and “*by means of measures to achieve equity in health*”. Amongst health determinants to be addressed are listed lifestyle-related, environment-related, and *social, and economic* health determinants.

More specifically, the programme aims to develop methodology for benchmarking and linking strategies to identify health inequalities using data from the Community health information data; review and identify obstacles to access to health services across internal borders in the EU and develop guidelines; develop strategy for analysing and addressing the impact of social and economic factors on health; and define and disseminate good practice on actions and policies related to reducing inequalities (EC 2001).

Apart from introducing action plans to improve strategies to tackle inequalities in health and health care, the European Commission has already played a role in funding research in the health equity field. Through its Biomed programme, the EC has funded the “ECuity Project”, with the aim to analyse the level of inequalities in health and equity in health care within European and other developed countries. Under the leadership of Doorslaer and Wagstaff, the equity project has concentrated on three main areas:

1. *Inequalities in health*. One of the aims of the ECuity Project was to compare the levels of inequalities in health in the European countries and to establish the role of economic factors in accounting for (a) cross-country differences in health inequality and (b) intra-country health variations.
2. *Equity in the finance of health care*. Another objective of the project was to examine the fairness of financing health care by examining whether payments for health care are proportional to people’s ability to pay. Countries with varying financing mixes (such as taxes, social insurance, or private sources, e.g. private insurance or out-of-pocket payments) have been compared.
3. *Equity in health care delivery*. The third main research question of the project was to investigate whether people in equal need of health care are treated the same,

irrespective of how well-off they are, and whether the degree to which this is true vary from country to country.

Indeed, the ECuity Project has led to significant methodological advances towards a more convenient analysis of equity in health care and generated substantial empirical evidence on the level of equity in health and health care in a number of European and other developed countries (as described in Chapter 5 in more details, these studies included, Wagstaff and van Doorslaer, 1993, 1994, 1997, 1999, 2000, Kakwani et al. 1997, van Doorslaer and Koolman 2002, Doorslaer and Jones 2003, etc).

Hungarian data have not been analysed as part of the ECuity Project, as it was the case for other Central European countries. The production of comparable data is of particular importance in the light of the objectives of the EC to measure and tackle inequity in health and health care.

1.2.3 The Organization for Economic Co-operation and Development

The OECD groups 30 member countries with a commitment to support governance in the public sector and in corporate activity. Based on its country surveys, statistics, and reviews, the OECD advises policy-makers to adopt strategic orientations and select policies that work.

The Health Policy Unit of the OECD is devoted to the systematic collection of data on health status and health care systems in member countries and is involved in conducting health policy analysis. Their policy analysis work mainly examines the performance of OECD health systems and the causes of variation in performance across countries. The OECD's explicitly stated objective is to evaluate the performance of health care systems "*against efficiency and equity objectives*" (OECD, 2003).

In fact, previous OECD economic papers on comparative analyses of health care systems (for example, OECD 1992, OECD 1994, OECD 1996) or more recent country level

reports (for example, Orosz and Burnes 2000, Docteur et al. 2003) did address the issue of equity in health care to some extent. However, the sections on equity analysis in these publications have been generally limited to the brief discussion of equity in terms of *entitlement* to health care or *utilization* of health care. The evaluation of health care systems in terms of equity in payments for health care, equity in actual access to health care, or achievements in terms of reductions in inequalities in health status got generally less or no attention. The low emphasis on equity in the OECD's publications might be a result of a lack of availability of local data together with a lack of published guidance how OECD's analysts should incorporate equity aspects in the evaluation of health care systems. Its key database product, the OECD Health Data, also lacks any indicator or other information on the level or nature of inequity in its member countries.

A recent OECD publication, however, attempted to develop a guidance on indicators for the evaluation of the performance of health care systems, including some recommendations on evaluating equity in health care (Hurst and Jee-Hughes, 2001). The report has identified five different dimensions of equity:

- health,
- health outcome,
- access,
- responsiveness,
- and finance.

In addition, the report highlights that disparities can be monitored across many population groups, including:

- age,
- gender,
- ethnic group,
- income,
- and geography.

The report does not give further details, such as definition of the identified equity components or specific recommendations on how analysts should measure them.

A new initiative, the OECD Health Project, which was launched in 2001, may lead to more empirical research on equity in health and health care. The OECD Health Project has amongst its objectives the detailed analysis of equity issues, including the distribution of health status. As part of the initiative, the OECD commissioned a multi-country analysis of equity in access to health care. Relying on external experts, a study is being carried out to gather more empirical evidence on equity in access to physician visits and hospital stay in selected OECD countries. This initiative is underway now and will expand the earlier analysis of Doorslaer et al. (2000) on equity in access to health care in the OECD countries, and will include Hungary.

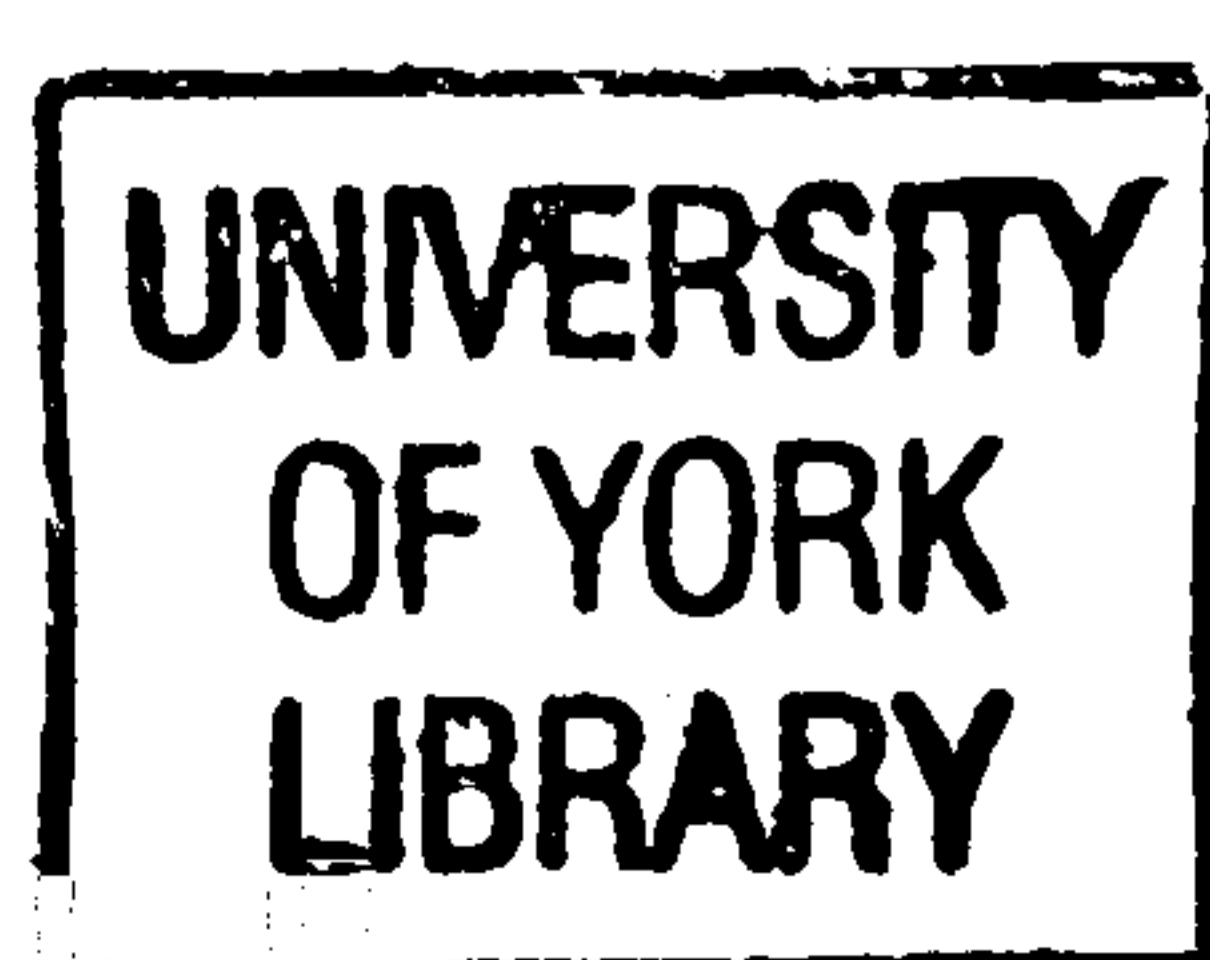
1.2.4 Summary of the role of international organizations in promoting equity in health and health care

Although their actual role and history differs to a great extent, the three international organization reviewed here had in common that they placed an increasing emphasis on equity in health and health care. Currently, the approaches of these organizations seem to vary in terms of the aspects of equity they emphasize, definitions used, and the preferred methodology to the measurement of equity.

Selectivity can be observed across the international organization in emphasizing one or another aspect of equity in health and health care. The WHO has traditionally been concerned about inequalities in the health status of the population. However, its approach reflected in the recent World Health Report 2000 also highlights the importance of equity in the finance of health care and in responsiveness regarding non-medical expectations. Equity in access to health care is not, currently, considered in the WHO's evaluation criteria. The EU, in contrast, has been traditionally concerned for access to health care and now its new public health programme also has amongst its objectives the measurement of social and economic determinant of health and tackling inequalities in health. Although equity in payments for health care is not explicitly mentioned in the EC policy documents, the ECuity Project, which was funded by the EC, did pay attention to this aspect of equity. The OECD publications have mainly focused on equity in terms of entitlement to and utilization of health care.

Some of the differences in approaches may be partly explained by that international organizations often rely on individual experts and their specific experiences and opinions. Internal and external experts used by the different international organizations may suggest different ways of measuring equity in health and health care. For example, while the WHO relied upon the expertise of Mackenbach, Murray, and Gakidou; the ECuity Project and the recent OECD studies adapted the methodology developed by Doorslaer and Wagstaff. Consequently, individual countries that are members of several international organizations can receive different information about equity based on different data sources and methodologies from international organizations. As a result, individual countries have an increasing need to develop their own expertise in the evaluation and interpretation of complex information on equity, and using this information in policy-making.

Finally, it has to be mentioned that information provided by international organizations may not be sufficient to inform health policy of an individual country. Multi-country studies often need to consider trade-offs between using accurate data sources and extending the analysis to large geographical areas. Some studies seem to prefer collecting data from all its member countries and limit data analysis to what is available, while others prefer to limit the data collection to those countries from which reliable and informative data are available. The WHO's World Health Report, for instance, took the approach of covering all its member countries at the expense of limitations in using real data from a substantial number of countries. This has led to results that are highly criticised for being flawed and unsuitable to inform policy-makers. On the other hand, the ECuity Project or OECD studies have focused on using more accurate data sources and more established analytical tools but could only cover a limited number of countries. In the case of Hungary, only the WHO estimated some equity indices, while no alternative information is available. According to several publications, however, the WHO measures of equity are substantially flawed, not comprehensive, and are unsuitable to inform policy makers (Richardson et al 2003, Nord 2002, Wagstaff 2002). Research on the comprehensive evaluation of equity in health and health care in Hungary is an important need today.



1.3 Motivation to study equity in health and health care of Hungary

Since the late 1980s and early 1990s when the socialist system collapsed, Hungary has been undergoing major changes in society and economy. Transition from a socialist system towards a market economy lead to significant changes in the public sector, including health care. One of the key focuses of the transition period was the preparation of Hungary for joining the EU. This process involved harmonization with the EU law and also the adaptation of principles based on which the EU builds its policies. Within the light of these characteristics of the transition period, the evaluation of the performance of the health care system in terms of equity is important for several reasons.

Up till today, the evaluation of the health care system of Hungary has mainly concentrated on efficiency aspects but little research has been done on equity. The lack of commitment to the measurement of equity in health care was a key feature of the socialist period. At the heart of the political rhetoric was the claim that every citizen had the right to have access to comprehensive and free health care services. On the other hand, no data collection system was set up to monitor equity in practice. It was not regarded “politically correct” even to question the presence of equity. The claim about equity was taken for granted rather than being based on empirical evidence. Interestingly, a similar view was held in the UK during the early years after the establishment of the National Health Service (NHS). It was not regarded “friendly” to even question the equitable nature of the NHS as it was so widely believed that the NHS operated on the principles of fairness. Perhaps, the only acknowledged aspect of equity to look at was regional inequalities in health and health care. Consequently, early work by health economists in Hungary (e.g. Orosz 1994, Bojan 1994) focused on regional inequalities.

Despite the lack of empirical evidence, the presence of social inequities in access to health care was widely perceived in Hungary. A popular joke about access to health care in the past can well illustrate how people perceived the equity characteristics of the system. While health care was officially declared to be “*high quality, free, and available*

to all”, according to the joke only two of these three characteristics could be fulfilled at one time. If it was free and available to all then it was not regarded to be of high quality. If anyone wanted to access high quality care then it was not available for free but at an expense of informal payments. Finally, if health care was high quality and free then it was most probable only accessible at distinguished health care providers offered for people belonging to privileged political groups or professions.

An understandable expectation of the majority of the population was to achieve higher efficiency and fairness through reforms and joining the EU. Instead, the transition period proved to be rather difficult for many and challenged the sustainability of the existing public services. The health care system has been undergoing continuous reforms that first affected the finance of health care services, then ownership structures, and health care delivery arrangements. While most evaluation of reforms focused on efficiency and sustainability, no or little evidence has been collected on the equity aspects of the current health care system.

Without a good understanding of the current nature and causes of inequity in the current health care system it is difficult to address existing inequities and plan future health policies to promote greater equity. To provide a full picture of any potential inequities in the health care system, a comprehensive equity analysis of both the finance and the delivery sides of the health care system is needed. In addition, the understanding of inequalities in health status among population can help identify those subgroups where targeted policies can potentially improve health care and health and reduce overall inequalities.

1.4 Objectives of the thesis

The main objective of the thesis is to provide a comprehensive assessment of income-related equity in health and health care in Hungary. Cross-sectional analyses were performed based on survey data from post-transitional period, mainly covering the years of 1999-2000. Results from this period may serve as baseline data for longitudinal analyses on changes in equity in health and health care in future studies on equity.

The aim was to provide a complete evaluation of equity in the health care system by assessing both fairness in the finance and delivery of health care. The evaluation of fairness in the finance of health care focused on the assessment whether individuals with different income level pay for health care in proportion to their income. The evaluation of fairness in the delivery of health care, on the other hand focused on the assessment whether individuals receive health care in proportion of their ill health rather than their income level.

Income-related inequalities in health status was also analysed as part of the evaluation of equity in the delivery of health care. However, since data on income-related inequalities in health status is important information on its own, these results were presented as a distinct part of the thesis.

Instead of providing a single measure on the overall level of equity in health and health care, the objective was also to identify the nature, causes, and components of inequity. In the finance of health care, the equity aspect of each of those payment methods were evaluated that play a role in funding health care in Hungary. This analysis can help policy-makers to identify those payment methods the burden of which fall proportionately more on population sub-groups with lower income level. This information, in turn, can be useful in introducing reform initiatives to achieve more fairness in the finance of health care. Similarly, the analysis of equity in the delivery of health care also went beyond the calculation of an overall equity index. A detailed decomposition analysis was performed to identify what factors contribute to income related inequity in the delivery of health care. The objective of this analysis was to

contribute to the understanding to what extent income level itself determines one's access to health care, and to what extent other factors that are linked to income level, such as geographical location, play a role in inequity.

A methodological objective of the thesis was to explore the feasibility and opportunities in applying a health-related quality of life measure, the EQ-5D, in the analysis of income-related inequity in health and health care. A potential advantage of the EQ-5D in this application is its ability to identify a unique health inequality profile of the population along the five quality of life dimensions it captures. Such information is useful in better understanding how income determines inequality along specific quality of life domains, which in turn can help decision-makers to better target health care interventions. The results of this analysis can also be interesting internationally as EQ-5D population surveys are available in many countries and may be used to explore the nature of health inequalities within and across countries in the future.

PART II. BACKGROUND

Chapter 2

Review of the health care system in Hungary

For the analysis of equity in the Hungarian health care system, it is important to provide an up-to-date review of the characteristics of the health care system itself. Some of the information about the health care system is directly needed for the measurement of equity. For example, data on the share of different payment methods in funding health care is incorporated in the measurement of equity in health care finance. Other types of information may be needed in the interpretation of results. For example, the understanding of the system of provider incentives or entitlement to care is helpful in the interpretation of results on equity in delivery of health care. This chapter provides an overview of the Hungarian health care system, including the basic organisation structure, finance and delivery of health care, recent reform steps and current challenges to ensuring equity.

2.1 Organization of the health care system

The Hungarian healthcare system operates on a comprehensive, centralized, compulsory, employment-based national health insurance scheme that provides close to universal coverage both in terms of treatments and in terms of population.

The organizational structure of the Hungarian health care system has changed significantly during the last decade during the transition process from a formally socialist block country to a Newly Associated State to the European Union.

2.1.1 Health care system and the transition period

As a socialist block country, Hungary had an integrated type of health care system before the transition period. A comprehensive range of health care services were offered to the population free of charge at the point of delivery. The system was financed out of general taxation. Services were provided by salaried employees in mainly publicly owned hospitals and general practices. Health care providers were financed by annual budgets received on a historical basis. Management and resource allocation was controlled centrally by the Ministry of Health. An extensive informal payment system has emerged since the 1960s. Small official private sector supplemented the publicly dominated system. Private providers included few specific treatments such as those provided by small dental surgeries, or publicly employed doctors in out of office hours, or some of the GPs who operated private surgery. Table 2.1 summarizes the most important differences between the health care system before and after the reforms.

Table 2.1: The main aspects of the health care reforms

	OLD SYSTEM	NEW SYSTEM
FUNDING	General state revenues	Mainly social insurance
ENTITLEMENT	Universal	Shift to contribution-based but near universal coverage
FINANCING PROVIDERS	Fixed budget	Mixed finance methods

Reforms have been gradually implemented after 1989. Main changes included the establishment of *earmarked funding* of health care through social health insurance, *cash-limited* finance of health care providers, and the introduction of performance-based finance methods.

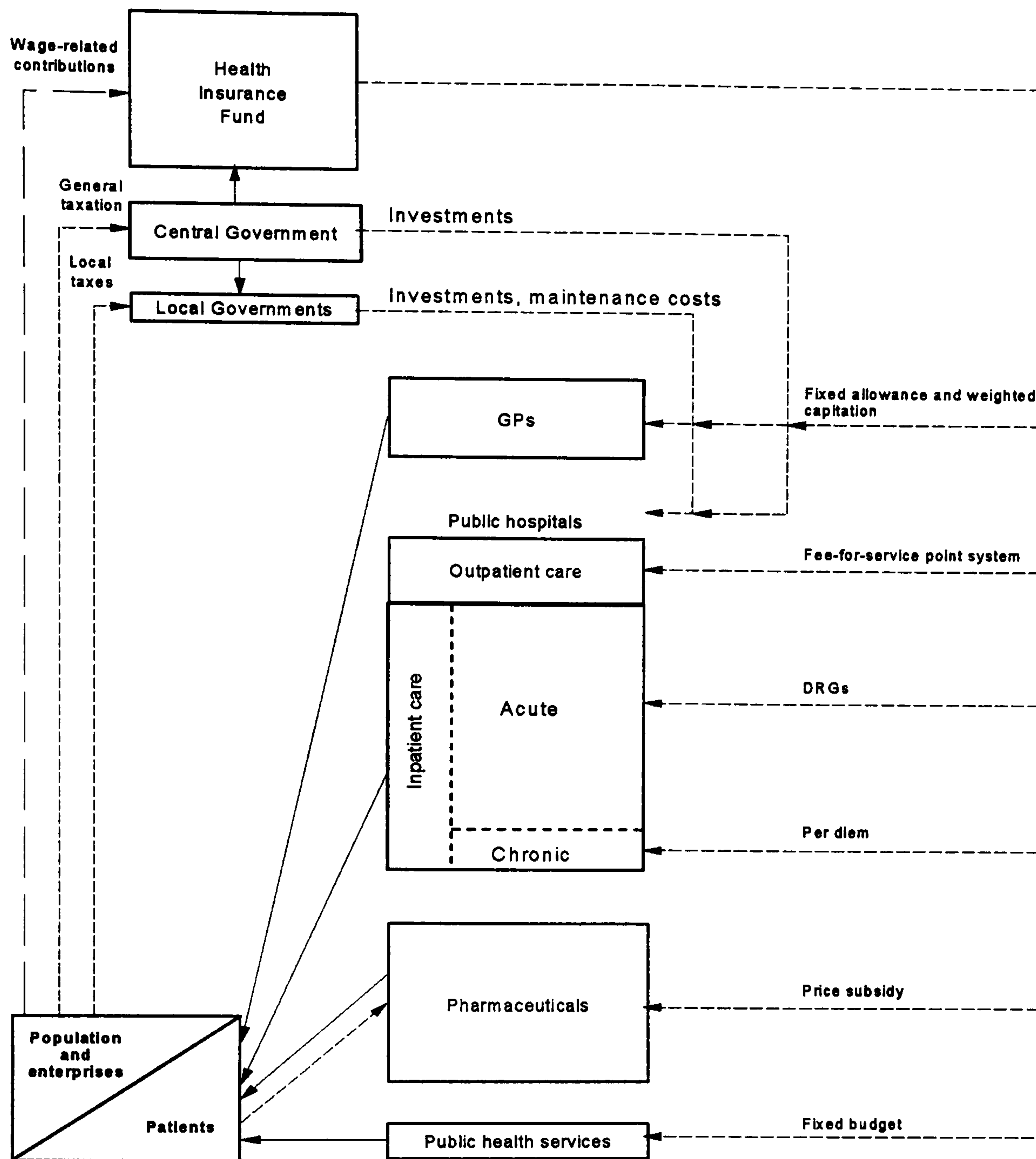
Organization of the health care system after the reforms

Today, the responsibility over the health care system is shared between the Ministry of Health, the Health Insurance Fund, the Ministry of Finance, and the local governments.

Overall health policy is determined by the government with the Ministry of Health in conjunction with the Health Insurance Fund proposing and implementing reforms. Reforms on the financial aspects of the system (such as payment rules, central budget contributions to health care, and annual budget of the Health Insurance Fund) are proposed and drafted by the Ministry of Finance in consultation with the Health Insurance Fund and are decided and promulgated by the parliament. The management and supervisory structure of the Health Insurance Fund has changed several times. Currently the Ministry of Health, Family and Social Affairs supervise the Health Insurance Fund Administration, with the exception of budgetary issues, which are still supervised by the Ministry of Finance. The general director of the National Insurance Fund is nominated by the Minister of Health, but appointed by the Prime Minister.

The Ministry of Health operates the National Public Health and Medical Officer Service which is, in turn, responsible for the licensing, accreditation and supervision of healthcare providers in addition to its traditional health surveillance, immunization logistics, (e.g. supplying vaccines), environmental safety, food and water safety, health promotion, hygiene, school health services and epidemiology functions. The local governments are normally the owners of the health care provider institutions, such as hospitals, outpatient clinics, and (until very recently) general practices. In this function, local governments are responsible for the everyday management of health care institutions and for the finance of their maintenance costs. Running costs of health care providers are financed and monitored by the national Health Insurance Fund and its network of 19 County Health Insurance Fund Offices (Orosz and Burns, 2000). Figure 2.1 illustrates the detailed structure of the Hungarian health care system. Flows of services are shown as solid lines and flows of finance as broken lines.

Figure 2.1: The Hungarian health care system: finance and provision of services



2.2 Finance of health care

As Figure 2.1 illustrated, both raising revenues for health care and the finance of providers are based on a mixed system. This section first describes how health care is funded in Hungary, before summarizing the main methods of financing providers.

2.2.1 Raising revenues for health care

As the Hungarian health care system operates on a social insurance scheme, the majority of revenues are raised through compulsory health insurance contributions paid by

employers and employees. Table 2.2 describes the three components of the health insurance contributions and the payment rules in 2002.

Table 2.2: Payment rules for health insurance contributions in 2002

Component of contribution	Payment rule
<i>For active (non-pensioners) individuals</i>	
Income-related contribution paid by the employer	11% of gross salary
Income-related contribution paid by the employee	3% of gross salary ²
In-kind related contribution (company care) for the employer)	e.g. 25 % of the compulsory care tax,
Fix component (EHO) paid by the employer to the Health Insurance Fund	4500 HUF per month from 2002 ³ .
<i>For pensioners, who are employed</i>	
Income-related contribution paid by the employer	11% of gross salary
Fix component (EHO) paid by the employer to the Health Insurance Fund	4500 HUF per month from 2002.
Income-related contribution paid by the employee	0 % of gross salary

Largely due to the complex organizational structure of the health care system, finance of health care is not exclusively raised through the health insurance system. The identification of finance sources is a complex task due to multiple sources of information. My calculations are summarised in Table 2.3. These data do not capture cash transfers (e.g. maternity-related benefits) made by the health insurance fund. Figure 2.2 illustrates the share of each payment method in generating revenues for health care.

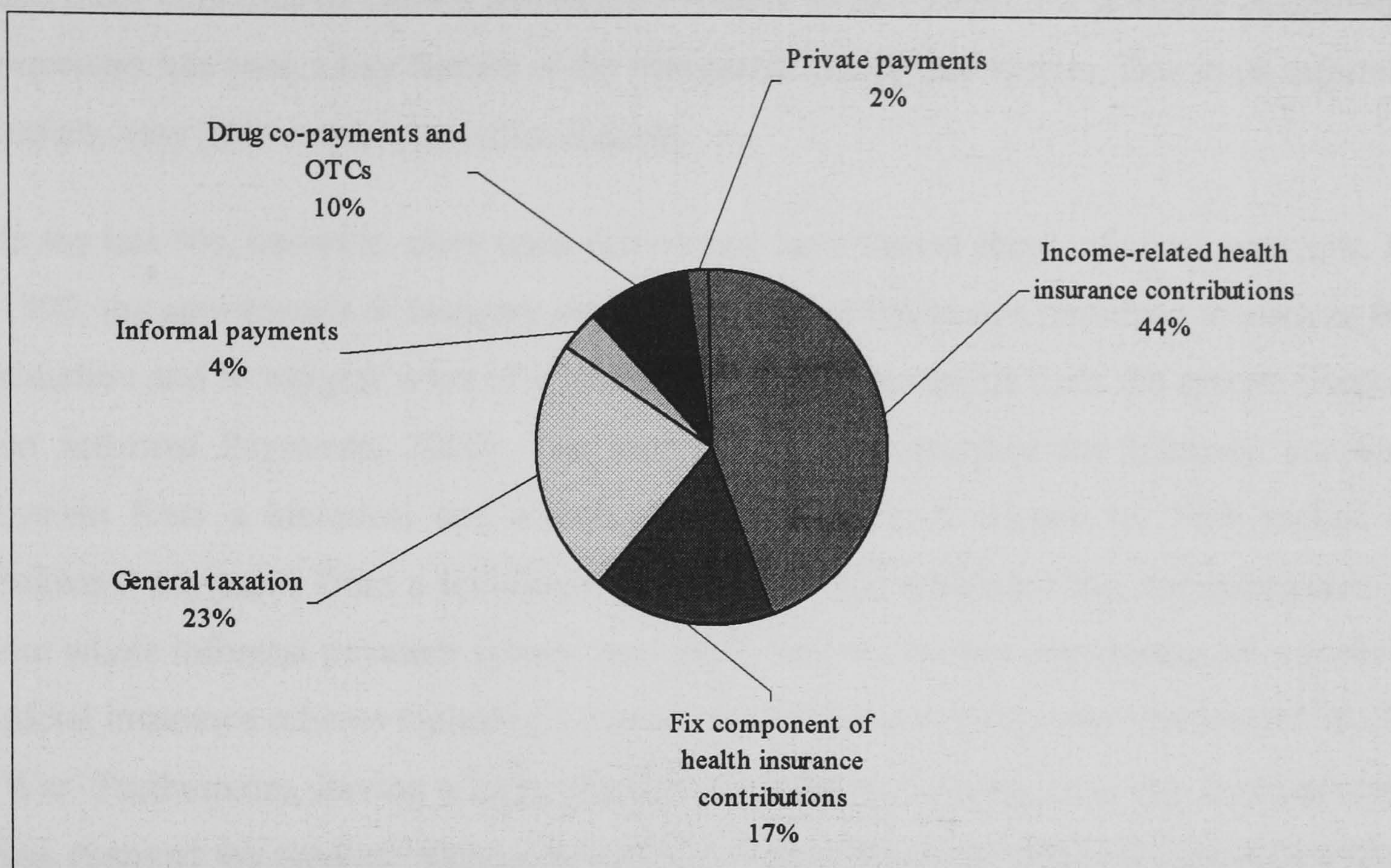
² There was a ceiling above 1.9 million HUF (approximately 7661 Euro), which has been removed from the financial year 2001.

³ This fix contribution is 18.2 Euros (exchange rate 1 Euro=248 HUF). The fix health insurance contribution is reduced to 3450 HUF (13,9 Euros) in 2003.

Table 2.3: Funding health care: description of finance sources, data sources, calculation methods and results

Payments	Data source	Calculation method
General tax revenues		
Contribution from the central budget to the Health Insurance Fund	Health Insurance Fund (Balance sheet, 1999)	Two items are involved: planned contribution to the Health Insurance Fund for the year 1999 and the deficit of the Fund during 1999 supplemented from the central budget. These were 30 and 48 billion HUF, respectively.
Operating costs of the Ministry of Health and the national institutions (including tertiary hospitals, public health and ambulance services)	Central Budget (Balance sheet, 1999)	Annual income of these institutes was taken (82 billion HUF) minus finance for operation of hospitals received from the Health Insurance Fund (27 billion HUF).
Hospitals operated by other ministries (MoI, MoD, MoTTW, MoE (universities))	Estimate based on number of hospitals	Estimate was based on number of such hospitals and the average annual budget of one hospital in Hungary (a total of 10 billion HUF)
Depreciation, infrastructure maintenance costs and service development (investments) spent by/or financed through local governments	APEH-SZTADI (Annual report, 1999)	Maintenance is the responsibility of the owner of hospitals and general practices, which is normally the local government. The majority of income of local governments comes from the reallocation of central revenues. Maintenance cost items covered GP, outpatient care and hospitals and included investments awarded by the Ministry of Internal Affairs (a total of 26 billion HUF).
Revenues raised through the national health insurance system		
Income-related contributions paid by the employer (11%) and the employee (3%) and the fix "EHO" component (3600 HUF per month) paid by the employer	Health Insurance Fund (Balance sheet, 1999)	Only that part of total revenues were taken that was spent on the provision of health care (such as medical care and drug subsidy). This total sum of 447 billion HUF, therefore, did not include transfers (such as sick leave payments) financed by the health insurance fund.
Out-of-pocket payments		
Drug co-payments and OTC drugs	Health Insurance Fund (Balance sheet, 1999)	Drug co-payments were calculated by multiplying total expenditures on drugs by the average co-payment rate (35%), resulting a total amount of 70 billion HUF.
Informal payments	TARKI informal payment survey (Omnibusz 1999/2 survey)	Total amount of informal payments was estimated from the informal payment survey that covered over 1000 people from the general population and asked about informal payments at each level of health care. The estimation for the total population of Hungary was an average of 30 billion HUF.
Payments for private care and medical devices, spa	Household Budget Survey (1998)	Households reported their spending on medical care and medical devices. 1998 prices were transformed to 1999 by using health-care specific price index, resulting a total amount of 15 billion HUF.

Figure 2.2: Share of different finance methods in total health care revenue



As Figure 2.2 shows, 61% of revenues for health care are raised through the health insurance system and 39% are raised through other finance sources. 23% of funding comes from general taxation. General taxation includes four main components: value-added taxes (VAT), excise taxes, corporate taxes, and personal income taxation. The major part of private payments are generated through drug co-payments and a small part includes informal payments for the use of public health care and formal payments for the use of private care.

Since informal payments are an important element in Hungarian health care, it is important to understand its characteristics. Giving informal payments, also called as “under-the-table” payments or gratuity money, to health care providers is a wide-spread practice in Hungary. Informal payments can be regarded as unofficial and unregulated co-payments made by the patients typically after the receipt of a health care intervention. It is typically a direct out-of-pocket cash payment made by the patient to the physician and other medical staff. However, in-kind payments, such as giving gifts is also common. Although informal payments are traditionally made voluntarily, there are beliefs that health care providers commonly expect that these payments are made. Informal payments have been a feature not only of the medical profession in Hungary but they have been quite wide-spread in professions in the service sector.

Due to its potential adverse impact on equity, a better understanding of the history and role of informal payments is important. Similarly to the Former Soviet Union countries and other countries of Central and Eastern Europe (Ensor 2000), the presence of *informal payments* has been a key feature of the Hungarian health care system. Due to its informal nature, very little empirical evidence exists.

In the late 90s, however, more open discussions have started about informal payments. In 1998, the government of Hungary set up the Informal Payment Committee to analyze the situation and to suggest ways of eliminating informal payments from the system (Report on Informal Payments, 2000). The report explicitly described the informal payment system from a historical and sociological perspective. A chapter by Tóth looked at informal payments from a sociological perspective and concluded that the emergence of the whole informal payment system was mainly due to the fast introduction of a general social insurance scheme replacing a mainly direct payment system after the second World War. Furthermore, having a large proportion of doctors coming from the working class has changed the medical ethics substantially. Balázs discussed informal payments within the context of society and medical ethics. According to him, the emergence of informal payments was in close relation to the low respect of the medical profession within the society. At the same time, the strict hierarchy within the medical profession enabled doctors to reinforce informal payments. Bondár and Bordás examined the economic aspects of informal payments in the report. They argued that informal payments would exist until doctors can differentiate in the services they provide. Differentiation in services may include better quality of care or shorter waiting lists. They advised that several methods should be simultaneously used to eliminate informal payments. These included better incentives through official payments, better quality control in care, legal tools and the introduction of formal co-payments. Although the report highlighted several important aspects of the informal payment system and increased the transparency of its public discussion, it failed to come up with an agenda to eliminate problems and lacked a political will. The committee was dismissed in 1999 without replacement.

In 1999 the TARKI Social Research Centre (Bognár et al., 1999) conducted a general population survey about the size and nature of the informal payment market. The original purpose of the survey was to explore if there was a need in Hungary for formal private health insurance as an alternative to the current informal payment system. According to

the results, the estimated amount of informal payments were 30 billion Hungarian Forints (HUF), which corresponded to 4,6% of total health care expenditures. Results also revealed that informal payment is more widespread in gynaecological, surgical hospital services, than internal medicine or mental services. Informal payments are also less frequent in outpatient specialist services (e.g. diagnostic services). The amount of informal payment also varies significantly by specialty groups. According to the survey, a GP home visit involves about 3 – 3.5 Euros, a gynaecologist after child delivery 40-78 Euro, while a cardiac surgeon receives about 117 - 197 Euros for an operation⁴ (Bognár et al., 1999). Despite their relatively low share in health care expenditures, informal payments may have important impact on efficiency and access to health care.

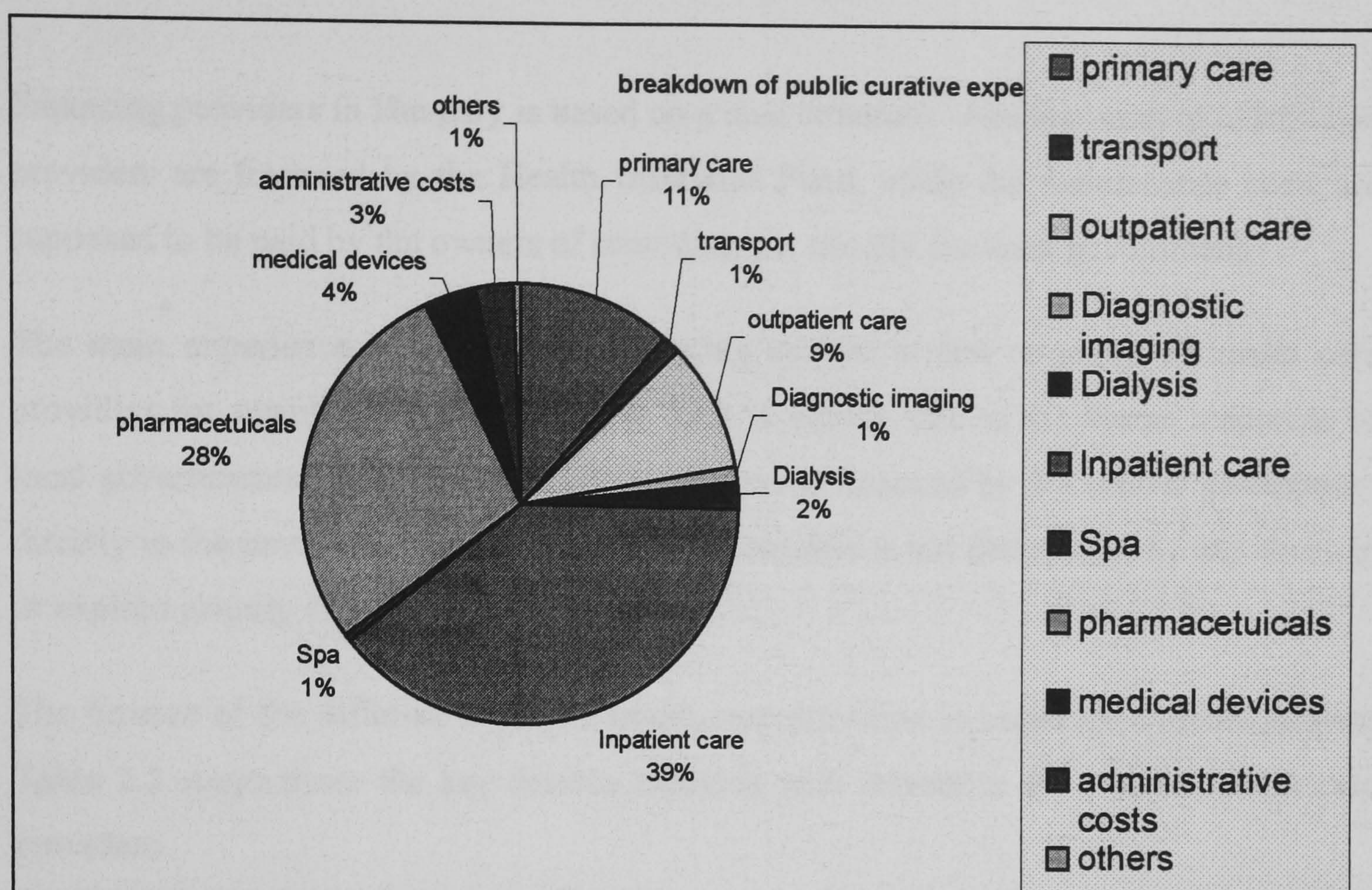
2.2.2 Health care expenditures

With the exception of private payments, it is not possible to specify the share of each type of revenues in the finance of particular health care services. The reason for this is that revenues (such as the various components of general taxation) are not labelled with respect to their use for health care.

Figure 2.3 illustrates the share of each type of health care from the total expenditures. Primary care account for 11% of in-kind health care expenditures, whereas specialist care (outpatient specialist, inpatient acute, or inpatient chronic care) account for 48%. A large proportion of in-kind benefits include pharmaceuticals (39%).

⁴ Exchange rate used was 1 Euro = 248 HUF

Figure 2.3: Relative share of in-kind health care services in 2001



Source: Health Insurance Fund data, 2001

Finally, table 2.4 illustrates that while the GDP of Hungary has been gradually increasing in the last couple of years, health care expenditures as proportion of the GDP have decreased slightly (Orosz, 2001). Expenditures on pharmaceutical were the only exception that could follow the growth of the GDP.

Table 2.4: Trend in health care expenditures as percentage (%) of the GDP

	1991	1995	1996	1997	1998	1999	2000
Primary, secondary and tertiary care	3.9	3,4	3,3	3,2	3	3	2.8
Pharmaceuticals and medical devices	1.4	1,5	1,4	1,4	1,5	1,4	1.4
Investments	0.6	0,5	0,3	0,4	0,4	0,3	0.3
Other	0.6	0,8	0,7	0,5	0,6	0,6	0.7
Total public	6.5	6,3	5,9	5,6	5,6	5,4	5.2
Private out-of-pocket expenditures (including pharmaceutical co-payments)	0.8	1,2	1,3	1,3	1,2	1,3	1.3
Total	7.3	7,5	7,2	6,9	6,8	6,7	6.8

2.2.3 Financing health care providers

Financing providers in Hungary is based on a dual structure: running costs of health care providers are financed by the Health Insurance Fund, while the maintenance costs are supposed to be paid by the owners of providers, i.e. usually the local government.

The main experience with this dual financing system is that revenues of health care providers for maintenance are very low. This is mainly due to the scarce resources of local governments. Large part of the *investments* is financed by the central government directly to the providers. The allocation of investments is not determined by any formula or explicit priority setting.

The finance of the different levels of health care provision is based on a mixed system. Table 2.5 summarizes the key finance methods with respect to the various health care providers.

Table 2.5: Finance of health care providers

Health care service	Methods of finance
General practitioners	Weighted capitation from 1992 and fixed allowance depending on the size and location of the practice, plus fee-for-service for certain preventive activities and a case payment for attending non-registered patients. Capitation payments are adjusted to the age structure of the patients, the qualifications of the family physicians.
Home care and spa	Fee-for service
Outpatient care	Fixed budget and fee-for-service point system (each activity has a point value. The actual value of the points is calculated in the following way: all the points sum up nationally and the monthly budget divided by the total points. ("floating" or relative point systems)
Community specialist care (mental health services, pulmonary and STD service)	Yearly fix global budget and partly fee-for-service point system.
Acute hospital care	DRGs (or HDGs Homogenous Disease Groups)
Chronic hospital care (including rehabilitation)	Weighted per diem (complexity adjustment)
Few tertiary care services (such as transplantation)	CASE BASED
Certain public health care tasks	Fix budget

From table 2.5, it can be seen that Hungary adopted various finance methods, including the American origin DRG system in the acute inpatient care, the German point system in the outpatient care, the per diem base system in the case of the chronic inpatient care which was operated for example in Canada or Japan. These finance methods have in common that they are all "performance-based" and reflect the "money follows the patient" principle.

In order to avoid escalation of expenditures due to the introduction of the new payment methods, Hungary started to operate a cash-limited (relative) financing system (using capped budgets for inpatient and outpatient care). This means that the actual fees for health care provision depend on both the available budget and the total number of services provided in a certain period of time. All provided services are aggregated at the country level, and the available budget is divided by the volume of services (sum of provided units), which finally gives the financial value of one provided unit. The available budget is then allocated among providers according to the volume of their health care provision. In this floating fee or point payment system, if there is an increase in the provision of services then the budget is divided between an increased volume of health services, and therefore the fee after a particular provided service would be smaller. This floating point system is used for reimbursing outpatient and acute hospital services as well as diagnostic imaging, diagnostic laboratories, and renal replacement therapy.

Importantly, the introduction of the performance-based reimbursement methods has led to the increased provision of services. Particularly in the acute inpatient care, there is a strong incentive for hospitals to admit patients and report as serious diagnosis as possible in order to maximize the income of the hospital. This phenomenon, which is also known as the "DRG creep", has been present in the health care system and resulted in the devaluation of the value of one unit health care provision. The positive consequence of this payment incentive on equity in the delivery of health care is that providers face an immense pressure to provide health care to everyone in need.

This incentive structure may partly offset the impact of informal payments on inequity in the access to health care. Although there is a widespread belief that making informal payment is necessary to have access to certain health care services, the actual impact of informal payments on equity is not well understood yet.

2.3 Delivery of health care

2.3.1 Health care providers

In Hungary, health care is provided at three main levels of care: primary care (general practitioners), outpatient specialist care, and inpatient care.

General practices can be owned and/or organized on a private basis or can be operated by the local government. Citizens have *free choice about the GP* they want to register with. Individuals are free to change their GPs, but choice is very limited in rural areas, and GPs have the right not to accept patients living in districts other than the one in which the practice is located. Consultations with GPs are free of charge but informal payment to doctors is regular.

General practitioners enjoy clinical autonomy, which includes the freedom to prescribe and the freedom to refer patients for diagnostic tests or consultations with specialist hospital departments. No budgetary restrictions limit GPs, however, an information system has been developed by the Health Insurance Fund to monitor variations in drug prescription rates among different practices.

General practitioners can refer patients to a hospital or outpatient clinic for specialized diagnosis or treatment. The strict referral system has been relaxed, however. In the case of certain diseases (such as mental disorders, sexually transmitted disorders, dermatological and gynaecological problems) GPs' referral is not necessary. Due to the scarcity of some highly specialized services such as diagnostic imaging (CT/MRI, ultrasound exams), angiographies, coronarographies, psychotherapy, hip replacement, etc. waiting lists exist in hospital and outpatient care settings.

Despite several policy efforts to increase the preventive and gate-keeper role of primary care, health care in Hungary is still hospital based. There are excess capacities in acute hospital care and oversupply of specialists, which in combination with a performance-based finance system results in high health care utilization of hospital level care.

Social care is not clearly separated from health care services. A significant part of the chronic inpatient services are substituting social services. New and more specialized institutions such as nursing homes and respite homes are to be created in the future by

both local municipalities and private providers (including charity organizations). Private medical care has a small complementary role to the mainly public system, offering a better choice of doctors, avoidance of long queues in the surgeries, better privacy of care, and a better doctor-patient relationship as no inconvenient feelings of informal payments are present.

In addition, the ratio of the privatized health care providers (in terms of ownership of practice) has been gradually growing. Today, 87 % of the GPs are micro-enterprises. Outpatient specialist services are also increasingly run by one-person micro-enterprises or by small groups of specialists (for example in the form of an ltd.). Most of these enterprises have an outsourcing contract with the local government or the main health care provider of the given catchments area. More than two third of the haemodialysis providers are owned by private owners (mainly affiliates of multinational private providers), and the majority of the CT and MRI services are run by private companies. In 2000, 98 % of pharmacies, about 90 % of homecare providers, and around 70 % of dental service providers had private owners. The structure, ownership, contracting conditions and management responsibilities of public (contracting with the public insurance company) hospitals are planned to be regulated by a new, comprehensive act parallel to a new act on the legal status of health professionals (working hours, contracts, employment rules, etc.). The aim of the new legislation is to support the regional cooperation of the county and town hospitals, to have a better control on the health expenditures and guarantee the care of patients.

Another new initiative is the introduction of quasi-managed care organizations in the Hungarian health care system. The so far mainly experimental managed care organisations started to operate from 1999 in Hungary. The National Insurance Fund (NIF) calculates a hypothetical age and gender adjusted capitation budget that the providers would receive under a real managed care system. In practice, the NIF pays providers as in the rest of the country. If there is a surplus, the quasi-managed care organization can keep it, and use it for improving the service infrastructure and to reward good performance of doctors and nurses. If they run to deficit the Insurance Fund may withdraw the managed care status. This structure provides strong incentives to monitor and influence patient care pathways. The overall objective of the pilot is to improve efficiency and quality at the same time. Presently 7 quasi-managed care organizations operate in Hungary. These organizations recruited about half million citizens in 2001

(i.e., approximately 5 % of the population). The current government plan is to expand the pilot to cover two million people (20 % of the population). If these organizations will become widespread in Hungary, they can re-shape the current health care system.

2.3.2 Benefits and entitlement to care

The Hungarian health care system provides an almost complete range of health care services free of charge at the point of delivery of care. Exceptions are limited to certain treatments, such as particular dental care services, e.g. inlays and crowns, bridges with expensive materials, or expansive obstacles and cosmetic interventions.

The mandatory health insurance package has changed several times in the last few years. In 1992 a “full package” was offered to the citizens, in which the preventive care as well as the whole range of therapeutic services were covered by public funding. In 1995 the occupational health services were taken out, and transferred to the responsibility of employers. At the same time, special dental care, the non-medical services of in-patient rehabilitation was placed on a co-payment basis. In 1998 a definitive list was set up on the services, which are not available in the frame of social insurance. During the last four years most of these services were re-included into the insurance package, and consequently, there is only a tight room for complementary or private health insurance.

Payments for out-of-hospital pharmaceuticals and medical devices are, however, shared between the Health Insurance Fund and the patients. Public subsidies depend on the drug prescribed but vary between zero and 100 percent (and can be 0, 50, 70, 90, 100 %). In average, about 32% of drug prices are paid by the patient and about 68% paid by the Health Insurance Fund.

Due to the fact that almost a full range of health care services are covered under the compulsory scheme, from which opting out is not allowed, currently there is very little demand for private health care services or private health insurance. In addition, due to the unpredictable morbidity and mortality conditions of some age groups of the population (such as males over 45) private insurance companies are not offering even supplementary health insurance packages to these high-risk age groups. Act XCVI of 1993 on Voluntary Mutual Insurance Funds opened the market for non-profit insurance plans, which is very similar to the model of ‘mutualité’ movement. Purchasing voluntary health insurance from mutual funds enjoys tax rebate up to a certain limit. Since 1994, mutual health funds are allowed to

operate. The Supervisory Authority of Financial Services supervises them. There are about 30 voluntary mutual health insurance funds, but their role is marginal at the moment. These mutual funds had recruited about 61 000 members by the end of 2000 (i.e. less than 0.5% of the Hungarian population). Most of them are employment-based, and tax-favored. The voluntary health insurance fund's health related expenditure was less than 1 billion HUF (4 million Euros) in 2000, so their role in healthcare financing is limited (about 0.1 % of the total health expenditure) (Schneider, 2000.). Therefore, without any major changes in the health care system of Hungary, the role of private health insurance is likely to remain little in the near future.

Prior to the reforms *entitlement* for free health care was universal, based on citizenship from 1973. After the introduction of the health insurance system entitlement is determined by paying contributions. Act LXXX of 1997 on Social Insurance determines the entitlement for in-kind and cash benefits, as well as the rules of paying the contribution. As a general rule, entitlement for health insurance benefits is linked to paying contribution, however certain population groups are exempt such as pensioners and the unemployed. However, still almost all the population is covered as the central and local government pay the contributions for the insurance of the unemployed and people in social need. Pensioners are exempted from payments. The Government pays contribution as a bulk sum for the unemployed, people in social need, and the pensioners.

The coverage is practically universal. About 1% of the population is not covered. They usually work in the unofficial market and therefore they are not registered with the Health Insurance Fund. They might not apply for free entitlement on social basis at the local government, or if they do then the local government is to decide about the eligibility. The local government and the social security system gained some responsibility in bringing back people who suddenly got outside the health care system.

The perception of the public about the health care system is not well understood yet. Until recently, surveys that measured patients satisfaction with health care showed extremely high satisfaction. There was always a suspicion though that these results were flawed due to methodological problems (patient filled in the questionnaire prior to departure from hospital). Recently, however, a survey showed that only 55.7 % might be satisfied with the current health care system.⁵ Resent patients and elderly population

⁵ The following question was asked: After an average insured individual 16000 HUF contributions is paid by the employer. Your contribution could be less or more. What do you chose if you could

prefer more the current system, than the rest. The current system is less favorable among the young and wealthy groups (Janky, 2000). This result is in the line with the EU average (Mossialos, 1997).

2.4 Recent reform steps and current challenges

2.4.1 Evaluation of recent and planned reforms

Since 1989, a number of important changes have been implemented in the Hungarian healthcare system particularly in relation to its finance structure. The current Hungarian healthcare system at the macro level is very similar to other OECD countries, having universal coverage and dominant public funding with about 70% of total health care expenditure. Most of the problems are very similar to other European countries, including challenges of cost-containment, perverse incentives, lack of efficiency, and quality of care.

The following table provides a brief chronology of reforms since 1987 until today. The table highlights the year of the reform steps, a brief description of the reform, and the objectives that the reforms intended to achieve.

Table 2.6: Chronology of health care reforms in Hungary

	Reform steps	Aim of the reform
1987	Experiment on DRG finance launched in 26 hospitals	Performance-based reimbursement to increase efficiency
1989	Private practice authorized	Market liberalization
1990	Switch from tax-based funding to compulsory insurance	To secure earmarked funding for health care and to introduce a split between purchaser and providers
	The 1990 Local Government Act changed the division of responsibilities between central government and local government.	Decentralization
	New system of consensus management in hospitals introduced	Increase efficiency
1991	Establishment of National Public Health Service (responsibility for local hygiene stations transferred from local governments)	Improve public health services

determine whether your insurance contribution should be paid to the current (state owned) health insurance fund or a private insurance fund, what you would choose?

1992	Social Insurance Fund separated into a Pension Fund and a Health Insurance Fund	Increase transparency and accountability
	Parliament eliminates universal entitlement to healthcare and defines conditions for eligibility	Strengthening the insurance system principles
	Insured people are entitled to freely choose their family doctor.	Enhance consumer choice
	Family Physician Service is created and capitation-based payment introduced.	Strengthen primary care services
1993	Voluntary non-for profit, mutual health insurance funds (supplementary insurance operated by non-profit institutions) were authorized	Opening the supplementary health insurance market.
	First election of members of Self-Governments of Social Insurance Fund with employer and employee representation	Expand electoral system to health care administration
	Outpatients care remuneration based partly on a fee-for-service scheme, and acute inpatient services reimbursed using DRG.	Performance-based finance system to increase efficiency
1994	New National Health Promotion Strategy is adopted by the government	Improve the health of the nation
1995	Hospital capacity reduction program initiated	Cost-containment
1996	Act LXIII of 1996 on norms of hospital capacity	Hospital capacity reduction, 18 000 beds (15% of bed capacity) were removed
	Decree No. 19/1996. (VII. 26.) NM of the Minister of Welfare on the Minimum Standards of Certain Institutions Providing Health Services	Quality improvement
1997	The 1997 Health Act.	Public health approach, strengthening patients rights
	The 1997 Health Insurance Act	Redefine entitlement, and coverage policy
1998	Abolition of the Health Insurance Self-government	Improve efficiency of the administration
	Separated the Ministry of Social affairs and the Ministry of Health	Provide more attention to social affairs
1999	Pilot project on managed care launched	Financing reform
2000	Privatization of the practices of GPs	Improving efficiency
2001	New 10 year Health Promotion and Prevention Program started.	Health promotion
	Hospital and outpatient centers privatization	Allow hospitals to transform into public – utility companies
2002	Depreciation costs gradually will be introduced, starting in primary care.	Improve management
	Publication of the methodological guideline for economic evaluations in Healthcare	Improving efficiency and value for money

2.4.2 Health status of the population

Another key challenge in health policy-making in Hungary is the remaining need to improve the health of the population. The life expectancy gap between Hungary and Western Europe started to grow from the early 1960s. In many currently developed countries average life expectancy in 1930 was lower at birth than in Hungary, such as in Japan (44.8 years) or in Spain (48.4). At the age of forty, life expectancy in Japan was 25.7 years, while it was 29.1 years in Hungary (Orosz, 1994). After the mid-1960s, life expectancy at birth stagnated and later deteriorated. These trends were similar for all former socialist countries (Velkova, 1997). Broadly speaking, the health status of the Central and Eastern European countries was similar to that of the population of Latin America and the Caribbean (Preker, 1995). The probability of survival of a Hungarian men between age 35-65 was slightly worse in 1994 than in 1920 (Mortality Studies, Hungarian Central Statistical Office, 1996). The widening gap in life expectancy and mortality between East and West was particularly striking in middle-aged adults. In the communist countries, death rates for males aged 45-48 years increased, with 7 percent in the GDR, and 131 percent in Hungary between 1965-1989, while they decreased in the highly industrialized countries. The risk of death between 15-59 year old men in the late 1980s was higher in Hungary than in Zimbabwe (Preker, 1995) Furthermore, the life expectancy of Gypsies in Hungary is estimated to be ten years less than the Hungarian average (Bíró, 1996). In Hungary, women also showed increasing mortality rates during the last two decades (Watson, 1995), although these figures improved slightly from the late 1990s.

2.4.3 Equity in health and health care in Hungary

In addition to the improvement of the health status of the population, another important challenge is promoting greater equity in the Hungarian health care system. While equity has several important dimensions, it is only its geographical aspect about which detailed empirical evidence exists in Hungary. The reason for this is that the new provider finance

system requires the reporting of each treatment provided to individual patients. The permanent living area of patients is recorded in the National Health Insurance Fund's database and hence detailed utilization data can be calculated by geographical locations. On the other hand, social or economic characteristics of patients are not recorded. There is little evidence on social, and income-related inequalities in health or health care finance in particular. Consequently, there are beliefs about inequalities without hard data to support them.

Data collection on social inequalities would be particularly important in the light of new legislations, such as the new Act on Health (Act CLIV of 1997 on Health) or the new 10-year health promotion programme (Decision of Parliament 46/2003.).

The new Act on Health requires the equal treatment of individuals with different social background characteristics: *“Each patient shall have a right, within the frameworks provided for by law, to appropriate and continuously accessible health care justified by his health condition, without any discrimination...”*

Healthcare shall be considered free from discrimination if, in the course of delivering healthcare services, patients are not discriminated against on grounds of their social status, political views, origin, nationality, religion, gender, sexual preferences, age, marital status, physical or mental disability, qualification or on any other grounds not related to their state of health.”

Furthermore, the new health promotion programme published in 2003 (Decision of Parliament 46/2003.) aims to achieve greater equity in terms of social inequalities in health status.

Inequalities in health and health care by the income level of individuals is a particular concern. There is evidence to suggest that income inequalities have been growing during the transition period. Comparatively low income inequalities during the socialist era (especially the sixties and seventies) reflected a fairly high level of social security. During the transition, the poor disproportionately suffered. According to the EBRD Transition Report, income inequalities have been increasing, with a Gini coefficient increasing from 0.30 in 1992 to 0.34 in 1997 (EBRD 2001). Since, there is substantial evidence on that increasing socio-economic inequalities are reflected in increased inequalities in health status, it may be the case that inequalities in health status also

increased during the transitional period. An important implication for the Hungarian healthcare system is that there is an urgent need to measure (and tackle) income-related inequalities in health status, and in the finance and delivery of health care.

Chapter 3

Literature review on concepts on equity in health and health care

The purpose of this chapter is to provide a theoretical basis for the analysis presented in the thesis. For this reason, the review of concepts on equity in health and health care focuses on literature linked to health economic approaches. Health economics literature, have applied general theories of justice to health care when discussing equity. This section provides a summary of these theories based on a literature review. The theoretical review is followed by the description of definitions and concepts of equity in health care.

3.1 *Distributive and procedural justice*

As Olsen (1996) argues, theories of justice can be distinguished according to that if they put emphasis on distributive or procedural issues. *Distributive justice* focuses on possible distributive outcomes in the society. Equity is discussed in terms of a state at a specific time independently from the process that can lead to this particular state. On the other hand, theories of *procedural justice* discuss that procedures themselves leading to certain distributive outcomes can be just or unjust independently from the nature of the particular outcome.

The arguments of Nozick are based on discussing the way in which a certain situation is achieved. Nozick (1974), for example, defines a system of just acquisition. He argues that individuals are entitled to that what was acquired justly. This implies that the final distribution of goods and services among individuals is less important. Theories based on these arguments, therefore, necessarily lead to the conclusion that state intervention into distribution is incompatible with procedural justice. As a result, they support the idea of a minimal state.

In summary, it can be said that theories based on distributive justice have more influence on applied science than those based on procedural justice. The reason for this is that the latter does not provide practical implications for current policy-making. The dominance

of distributive approaches, such as utilitarianism and egalitarianism, is clearly present despite the fact that they are often criticised for disconnecting from historical aspects of society.

3.2 Utilitarianism

Most probably utilitarianism has had the largest impact on social theories in economics for many decades. The routes of this theory can be found in the early 18th century and are associated with the names of Bentham and Mill. This theory is based on the assumption that human well-being depends on pleasure and pain and that these can be cardinally measured with the amount of “utils”. The main principle of the theory is to reach the “*greatest happiness of the greatest number*”. According to the utilitarian approach, optimal distribution of goods is determined by the efficiency criteria rather than equity considerations, suggesting that there is a trade-off between the two. Utilitarianism can be associated with those health policies which aim to maximize the health (or utilities gained from the improvement of health state) of a population. In priority setting, this aim can either be stated explicitly or implicitly through different priority setting tools. Such an explicit priority-setting tool is the application of QALY league tables in the delivery of health care.

3.3 Rawls and Harsanyi

Although utilitarianism has had a dominant role in economics, some alternative theories were developed about distributive issues. One of the most important examples was the *A Theory of Justice* by Rawls published in 1973 with the aim “*to work out a theory of justice that represents an alternative to utilitarian thought generally and so to all of these different versions of it*”(Rawls 1973).

Rawls's theory of justice is grounded in the traditional *concept of social contract* developed by philosophers like Rousseau, Locke, and Kant. The theory of social contract is based on the idea of looking at how a group of individuals in a certain situation would create a future society, if they were to do so. The ‘*original position*’ that Rawls describes is, however, not based on a historic situation but takes place in a non-historic *hypothetical*

situation. The assumptions of this situation and the process how individuals under these conditions would create rules regulating a just future society will be introduced in this section.

In the so-called 'original position' the participating individuals have very limited information about themselves, their positions and roles in the future society.

According to Rawls the basic features of this hypothetical situation are as follows:

"no one knows his place in society, class position, his fortune in the distribution of natural assets and abilities, his intelligence, strength...." And not even knows *"his conceptions of the good or his special psychological propensities..."* Because of the lack of information, individuals have to create the main rules and basic arrangements of the future society under a very special situation that Rawls calls a situation *"behind a veil of ignorance"*.

These features of this hypothetical situation have at least the following three consequences:

- *no bias when creating the rules*

Because of the lack of information about their own circumstances, individuals are to disconnect from their own personal interests. *"None is able to design principles to favour his particular condition."* The choices of individuals will reflect their pure belief of a just society.

- *equal parties at creating the rules ('justice as fairness')*

In the original position every individuals relations to each others are *'symmetric'* so - as Rawls argues that *"this initial situation is fair between individuals as moral persons, that is as rational beings with their own ends and capable"*. This explains why Rawls sometimes refers to his theory as justice as fairness.

- *individuals have to face uncertainty*

Another important consequence of the lack of information in the "original position" that individuals have to face a high level of uncertainty.

These consequences will all influence the individuals' preferences about the rules which would organise the common society in the future. Rawls argues that in the 'original position' the following *two principles* of justice would be chosen by individuals creating the rules:

First: “each person is to have an equal right to the most extensive basic liberty compatible with a similar liberty for others”. This principle requires equality in the assignment of basic rights and duties. Rawls also call them: `primary goods`. `Primary goods` are defined in a more general meaning and include not only income and wealth but also equal liberty, and the equality of opportunity.

Second: `social and economic inequalities are to be arranged so that they are:

(a) reasonable and are expected to be to everyone`s advantage Inequalities are just only if they result in compensating benefits for everyone, and in particular for the least advantaged members of society. This part also reflects the notion that individuals themselves who set up the rules wanted to avoid to get into the position of the worst-off (i.e. followed the *maximin* decision strategy).

(b) `attached to positions and offices open to all`.

While the first principle is a more general one and can be found in many previous theories, the second one is more original, and made Rawls` theory famous.

Rawls argues that both parts of the second principle (`everyone`s advantage` and `equally open to all`) have two natural senses, therefore the principle has four possible meanings. `Equally open` can mean that careers are open to talents but also can mean that there is an equality of fair opportunity. The term `everyone`s advantage` can be based on the principle of efficiency (according to the Pareto criterion) or can be based on the so called `difference principle`. According to the different interpretation of the terms, the second principle can have the following four meaning:

Table 3.1: The four interpretations of the second principle (Rawls, Theory of Justice, page 65)

		'Everyone's advantage'	
		Principle of efficiency	Difference principle
'Equally open'	Equality as careers open to talents	System of Natural Liberty	Natural Aristocracy
	Equality as equality of fair opportunity	Liberal Equality	Democratic Equality

The famous Rawlsian '*difference principle*' states that a change is just if and only if it results in compensating benefits for everyone, and in particular for the least advantaged members of society. This reflects that individuals in the original position follow a maximin decision strategy: they try to avoid their worst possible outcome. The '*difference principle*', therefore, reflects a strongly egalitarian conception: an equal distribution is to be preferred unless there is a distribution that makes both/all individuals better off.

Another possible interpretation of Rawls' difference principle can be explained with the State Preference Theory. Individuals in the 'original position' are uncertain about that which individual they will be in future society. Simplifying the situation to a two-individual society we can say that there are two possible outcomes (states of world) in the future, i.e. becoming individual one (with a utility level one) or becoming individual two (with a utility level two).

The utilitarian approach tries to maximise the total welfare in the society by simply adding together the utilities of all individuals. This so called Benthamite utilitarian social welfare function is not sensitive to the distribution of utility between individuals. As here risk means that individuals do not know which individual they will be in society we can also say that the utilitarian welfare function is not sensitive to the risk. However, in the Rawlsian case where individuals try to avoid the worst situation - whatever the risk is - social indifference curves shows an extremely high level of risk aversion.

Harsanyi developed an alternative approach to 'ethical preferences' in which he relaxes the strong Rawlsian assumption that individuals are extremely risk-averse. He assumed that people have equal probability of being any particular individual in society.

If there are 'n' individuals in the society then this probability is equal to: $1/n$. Harsanyi applied the standard utilitarian assumption that individuals (j) are rational and try to maximise their expected utility, which is: $U(X) = 1/n u(X_1) + \dots + 1/n u(X_n)$

The expected utility maximisation choices therefore take risks into account (as weights to the utility level) but the level of risk aversion is not extremely high here. In practice this means, that in order to get know the expected utility of an individual we have to find out the utilities that the individual associates with the different possible states, and weight these by the equal probabilities. It can be also seen that the equation above can involve a particular form of the Bergson-Samuelson social welfare function: $W(X) = F [u_1(X), \dots, u_n(X)]$. Finally, it can be said that through the relaxation of Rawls's egalitarian 'difference principle' we can get to a formula which is very similar to a utilitarian social welfare function.

Rawls did not apply his theory of justice to health care specifically but its implications can be discussed along the following questions.

We may consider whether health care is a 'primary good' in the Rawlsian sense or not. As it was described, Rawls argued that individuals in the 'original position' would agree on providing an equal right to the most extensive liberty for everyone. This principle requires the equal access to what Rawls calls 'primary goods'. Although Rawls does not list health care as a 'primary good' but as it is obvious that health is an essential requirement for equal participation in the society, it should be regarded so. The question remains though what level of health care services can be called as primary.

On the other hand it can also be considered how the 'difference principle' can be applied in the delivery of health care? An obvious interpretation of the 'difference principle' to the principles of health care delivery is that a health system should favour patients who are in the greatest need. A connecting problem is the difficulty of identifying patients in

the greatest need. The different interpretations of health need will be discussed later in this sections.

3.4 Egalitarian versus libertarian approaches to health care

Gillon (1994) gave a description about the application of different theories to health care. He distinguished *libertarianism* which emphasises natural rights and support the idea of minimal state, *utilitarianism* which tries to maximise the sum of individual utilities, *Marxism* which focuses on needs, and the principles of the *Rawlsian* justice.

Williams (1994) however finds it practical to make a distinction between libertarian and egalitarian approaches (viewpoints) only. *Libertarian* approach considers health care as part of the society's "reward system" with a clear precedence being given to freedom over equality wherever the two conflict (Williams, 1994). Emphasis on "entitlement" (Nozick, 1974) and provision of minimum standards is also associated with the libertarian viewpoint.

The egalitarian approach, by contrast, regards equality as an extension to the many of the freedom actually enjoyed by only the few (Williams, 1994). This viewpoint supports the idea of financing according to ability to pay and distribution of health care according to need. Table 3.2 gives a summary of different aspects of these viewpoints based on Williams (1997).

Table 3.2: Different aspects of the libertarian and egalitarian viewpoints on health care

ASPECTS	LIBERTARIAN	EGALITARIAN
Personal responsibility	Unearned rewards undermine moral well-being	Economic failure does not mean social worthlessness
Social concern	Social Darwinism dictates	Social mechanisms are preferable
Freedom	Freedom is supreme good in itself	Freedom might be sacrificed in one in order to achieve greater freedom in some others
Equality	Equality before the law	Equality of opportunity
Demand	Priorities are determined by own willingness and ability to pay	Priorities are determined by social judgements about need
Supply	Profit motivates the suppliers	Ethics is the appropriate motivation
Adjustment mechanism	Mechanism towards equilibrium	Pressure on the providers to cost-effective use of resources
Success criteria	Met demand from consumer side; profit from provider side	Improvement in health status of the population from the electorate side; cost-effectiveness from the provider side

3.5 Different concepts and definitions of equity

In the health economics literature, the principles and the measurement of *equity in health care*, in general, is discussed within the framework of the egalitarian approach, and include two main areas of the health care system:

- equity can be approached by examining how a health care system is *financed*, i.e. who are the people contributing more to it, and who are the ones contributing less;
- on the other hand, it can be also examined who benefits more than others from the *delivery* of health care (Wagstaff and Doorslaer 1993).

Equity itself also has two versions. By *horizontal* equity, it is usually meant that persons in equal situation should be treated the same. The *vertical* version of equity means that persons in unequal situation should be treated differently. A specific interpretation of the vertical version is the so called Aristotelian version. This principle suggests that people in unequal situation should be treated in proportion to the level of inequality. This Aristotelian definition, provides a useful tool for discussing health care inequalities in a resource limited environment.

The two versions of equity can be examined in both the finance and the delivery of health care:

Table 3.3 The versions of equity in the finance and delivery of health care services

	Finance	Delivery
Horizontal		Egalitarian approach
Vertical	Egalitarian approach	

In practice, health economics literature is looking at the extent to which a health care system is egalitarian in the following sense: to what extent vertical equity is present in the finance of health care services and to what extent horizontal equity is achieved in the delivery of health care services.

3.6 Equity in the finance of health care services

Vertical equity in the finance of health care services can be looked at through the progressivity of the different finance methods. This measurement is based on the ratio of the individuals' payments for health care and their salary. A finance system is regarded progressive if the average ratio of payments for health care is increasing with people' income. This measurement reflects the Aristotelian version of vertical equity and means that even if individuals with higher income pay more for the health care system than individuals with lower income the finance system still can be proportional or even regressive.

In practice, health care expenditures are raised from four main type of revenues:

- Out-of-pocket payments,
- Private insurance premiums,
- Social insurance contribution, and
- General taxation.

Out of pocket payments and private health premiums are thought to be the most regressive payment methods for health care as putting the relatively highest burden on low income individuals. Social insurance contributions are less regressive way of financing health care. The level of progressivity may even change with the level of people`s income: it may happen for example that the finance system is progressive at the lower income deciles (i.e. by exempting individuals with the lowest income from payments such as the pensioners) and regressive at the higher income deciles (by introducing a ceiling on payments after a certain level of income). General taxation is thought to be the most progressive way of raising revenues for the health care system though the actual value of progressivity depends of the structure and weight of different types of taxes: for example income and property taxes are usually progressive while excise and value added taxes are regarded as regressive payments.

3.7 Delivery of health care services

The literature, discussing equity in health care delivery, usually applies the notions of *utilization*, *needs* for, and *access* to health care. However, the interpretations of these definitions are far from self-evident, and the principles and implications derived from them are highly controversial. Culyer and Wagstaff (1992) have reviewed the literature on the different interpretations of these terms.

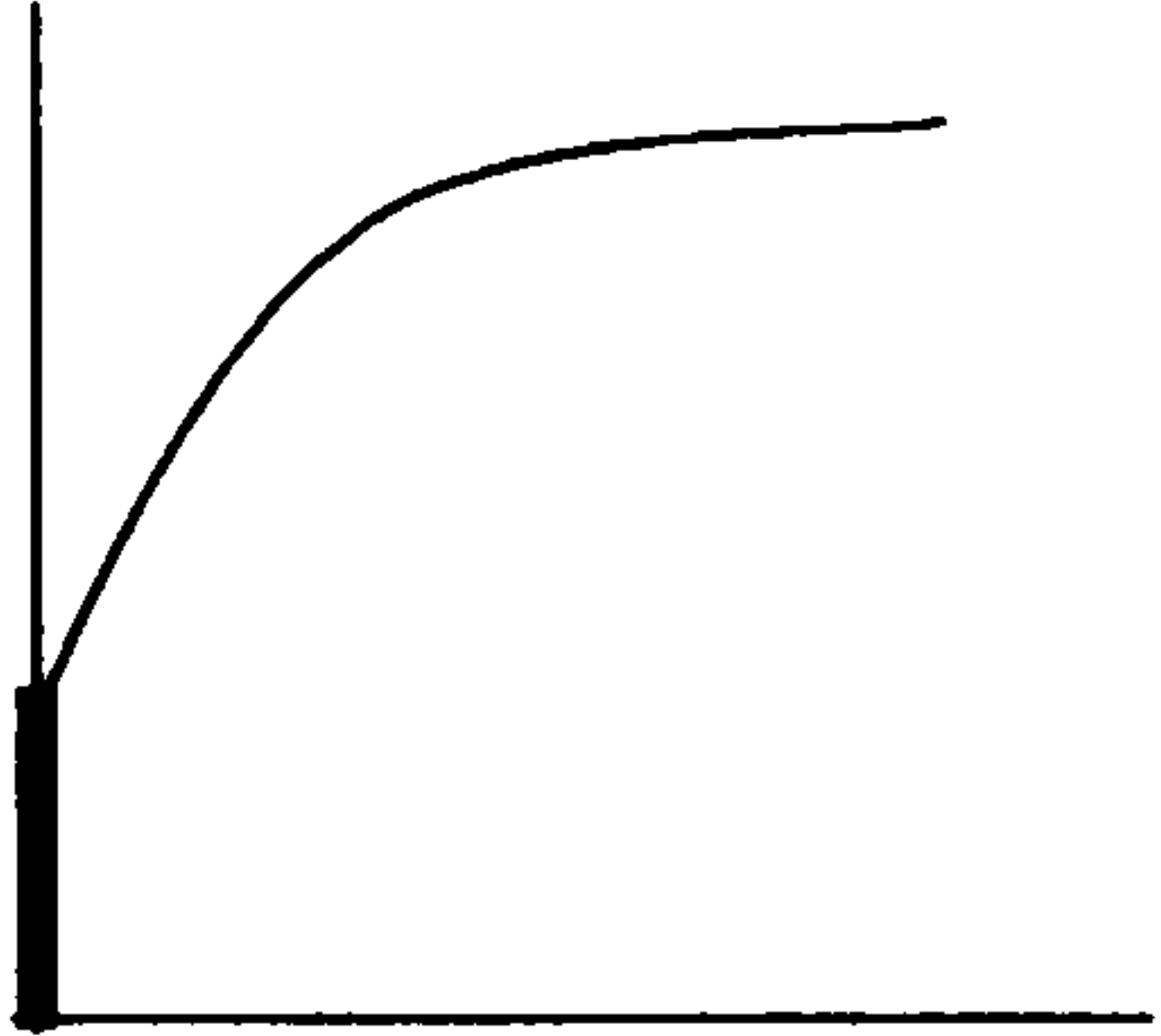
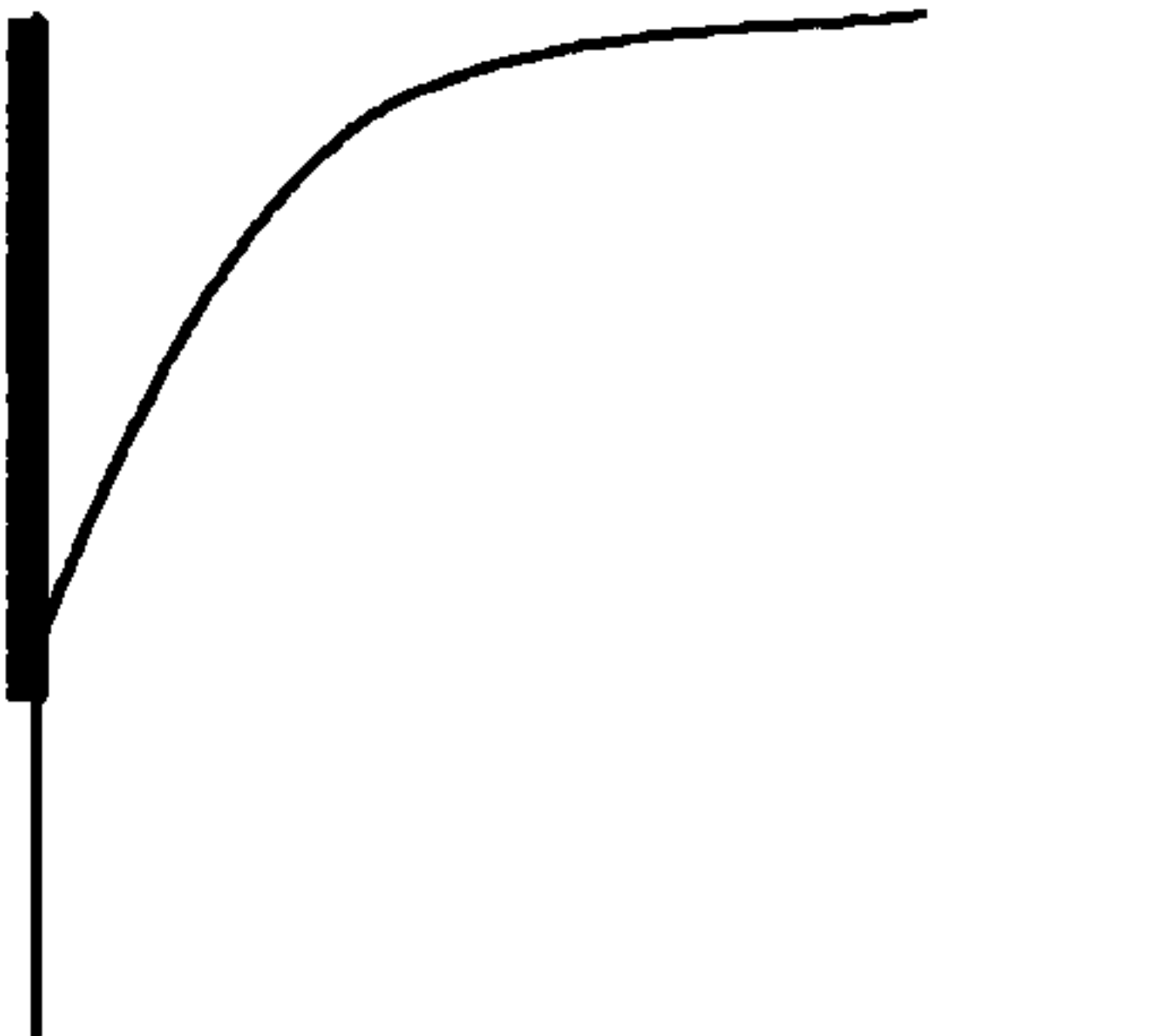
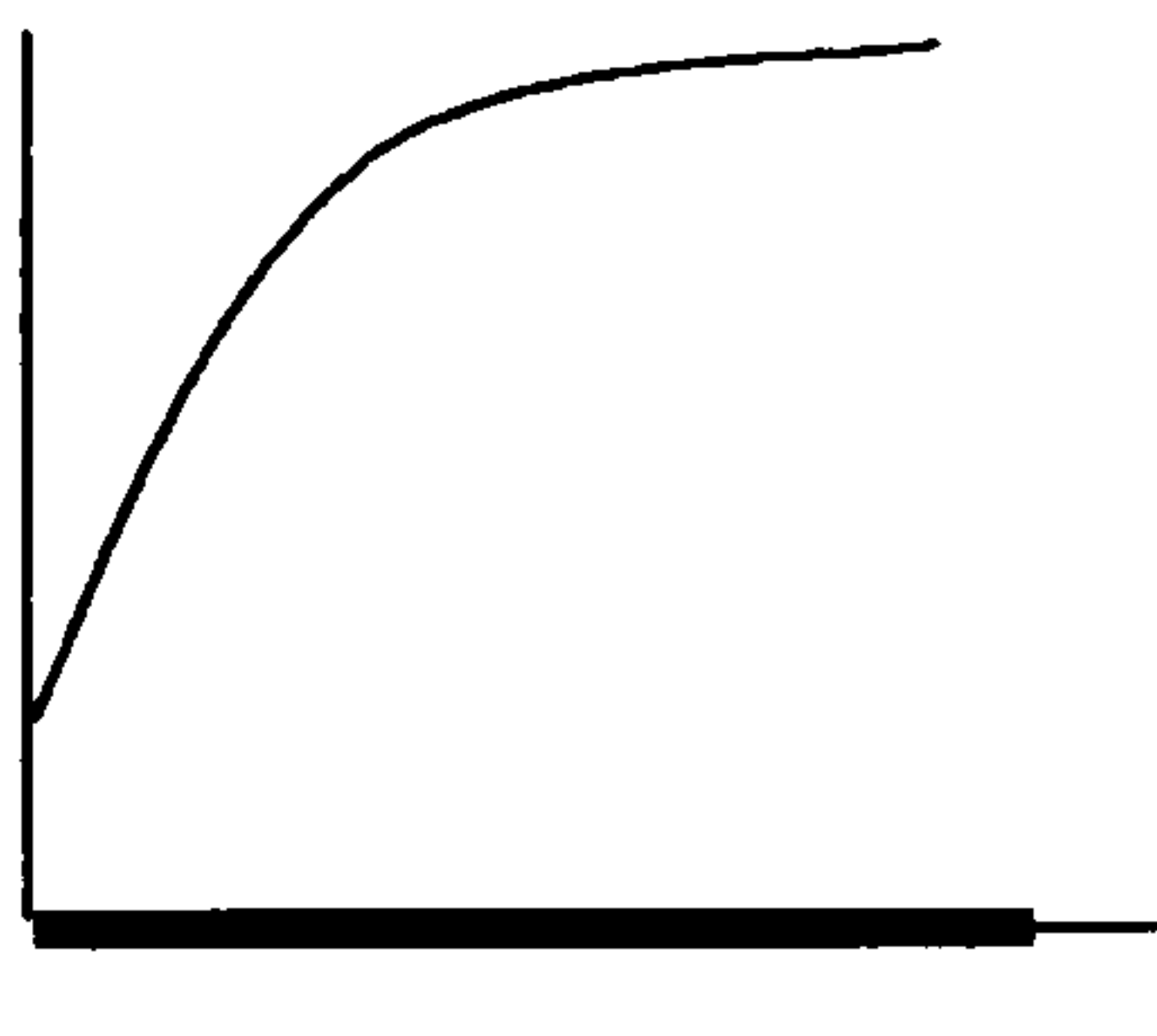
They argue that utilization of health care is often associated with access to health care which is inappropriate as all the further aspects of access to health care are not taken into account. First of all, there might be differences in the costs of access to health care which may occur when receiving the care. The costs of “entry” and the costs of treatment are clearly distinguished. Another interpretation of access can be the maximum attainable

consumption of health care services. Naturally, in the case of inequalities, the maximal feasible utilisation differs among individuals. The forgone utility interpretation of access is based on different valuations of income. This means that the poor values the utility from income much higher than the rich and therefore their costs of access to health care services are much higher. Hence their access will be less.

Culyer and Wagstaff also show that the different interpretations of access can easily conflict. An obvious example for this is if access costs are equal for individuals with different income levels then - according to the forgone utility interpretation - access to services will still remain unequal (in favour of the rich).

Culyer and Wagstaff also tried to identify all the possible definitions of health care needs and to show the relationships between the distributional consequences derived from the different possible definitions. Table 3.4 summarises the main definitions that were identified.

Table 3.4: Alternative definitions of health care needs and their illustration in the health production function

Definition	Explanation	Problems	Illustration
Need as initial health	Identified with ill health: persons who are more ill than others have greater need	Irrespective of the ability to improve health	
Need as capacity to benefit	Expected capacity to benefit from the consumption of health resources	Leaves unanswered the question how much health care a person needs	
Need as expenditures required to exhaust capacity to benefit	Expenditure required to effect the maximum possible health improvement (to reduce the individual's capacity to benefit to zero)	Superior definition	

Need as initial health

The first possible definition is identified with ill health, i.e. people who are more ill than others have greater need. In the health production function this can be illustrated as the initial health endowment. The main problem with this definition can be derived from the fact that there is no necessarily close relationship between the consumption of health care and the improvement in health status (for example in the case of a dread disease). People in greater need are not necessarily benefiting more from more consumption of health care. This definition therefore is irrespective of the ability to improve health.

Need as capacity to benefit

A more sophisticated definition is that defining need as the expected capacity to benefit from the consumption of health resources. This means that individuals who are more able to benefit from health care are considered as people with greater health needs. This

definition can be illustrated in the health production function as the difference between the maximum attainable health and the initial health. The main property of this interpretation of health care needs is that it takes into consideration the possible outcome of health care. However, it still leaves unanswered the crucial question how much health care a person needs.

Need as expenditures required to exhaust capacity to benefit

Another possible interpretation of the term 'need' can be the amount of expenditure required to effect the maximum possible health improvement, i.e. to reduce the individual's capacity to benefit to zero. The magnitude of the need here therefore can be illustrated in the health production function as the expenditure belonging to the maximum attainable health status. This definition of need is strongly connected with both (a) the individual's capacity to benefit from the consumption of health care, and the (b) expenditures required for that. These are the main reasons for that Culyer and Wagstaff regard this definition as the superior one.

It is easy to see that all the above-mentioned definitions, because they are not including any normative consideration, will lead to allocations that are not Pareto optimal. Individual's preferences about choices between the consumption of health care and the consumption of other goods are not taken into account. Neglecting the fact, that the valuation of the benefits from the consumption of health care relative to the benefits from the consumption of other goods differs from person to person, will necessarily lead to a distribution which is not optimal in the Pareto sense. The above theories of resource allocation according to need are, therefore, extra-welfarist approaches.

Need as expenditures a person ought to have

Culyer and Wagstaff identified another definition of need, which is based on normative grounds. According to this definition health care need is the amount of health care that a person ought to have. To some extent this interpretation take into consideration that health care need is generated in a situation where individuals have to make choices between consumption of many other goods, services, and activities. But as Culyer and Wagstaff proves this normative assessment of need may be, in practice, incompatible with the technical sense of need.

3.8 Concepts about inequalities in health status

Although there is a widespread agreement that inequalities in health are undesirable and health policy-makers have a responsibility to reduce them, there is still no clear agreement on how inequality in health should be defined. The WHO's influential World Health Report 2000, which measured health inequalities as variations in health between – ungrouped - individuals, provoked widespread criticisms from the health inequality research community. Wolfson and Rowe (2001) made a clear distinction between the “univariate” and “multivariate” type of definitions of inequalities in health. He associated the WHO's definition with the univariate approach, which is a concept that defines inequality as a property of a population. It assumes that each member of the population has an attribute (health) that is unidimensional and measurable on a cardinal scale. The multivariate approach, on the other hand, presents health as one among a number of relevant attributes of an individual. These dimensions can include income, gender, ethnicity, and education among others. Braveman et al. (2001) and Szwarcwald (2001) advocated the multidimensional approach to defining health inequalities. They argue that health inequalities correlated with social characteristics, such as wealth, education, occupation, racial or ethnic group, gender, rural or urban residence, and social conditions of places where people live and work are the morally important ones. Therefore, as Braveman et al (2001) argues, equity is the absence of systematic differences in health between social groups.

Chapter 4

Literature review on methodology

This chapter offers an overview of analytical tools used in the measurement of equity in health and health care. First, analytical tools for measuring vertical equity in the finance of health services will be introduced before discussing the tools for measuring horizontal equity in the delivery of health care.

The aim of this chapter is to give an explanation for the key characteristics of the measurement tool, mainly using graphical interpretation of the concentration method. To avoid repetitions within the thesis, the mathematical presentation of the method is provided only in chapter 6.

4.1 Measuring vertical equity in the finance of health care services

The most widely used methods of the measurement of inequality in the finance of health care are the progressivity indices which are derived from concentration curves. Here, the Gini, Kakwani and Suits indices of progressivity will be discussed.

In general, concentration curves and progressivity indices are used to measure the degree of certain types of inequalities. Inequalities can regard to several specific aspects, such as the inequality of health, the inequality of the provided health care, income level, or inequalities of taxes paid by people, etc.

In examining vertical equity in the finance of health care specifically, the distribution of payments to the health system among people with different income levels is analysed. The question to address is that whether people with higher incomes (i.e. with greater ability to pay) contributing more to the finance of health care, and if yes then how much more are they paying. The relationship between people's ability to pay and their actual payments can be:

- progressive (those with higher income are paying more in proportional terms),

- proportional (they are paying more in absolute terms, i.e. the same proportion of their income),
- regressive (they are paying less proportion of their income).

Based on the income and tax concentration curves, progressivity indices try to identify the degree of progressivity in the finance of a health system.

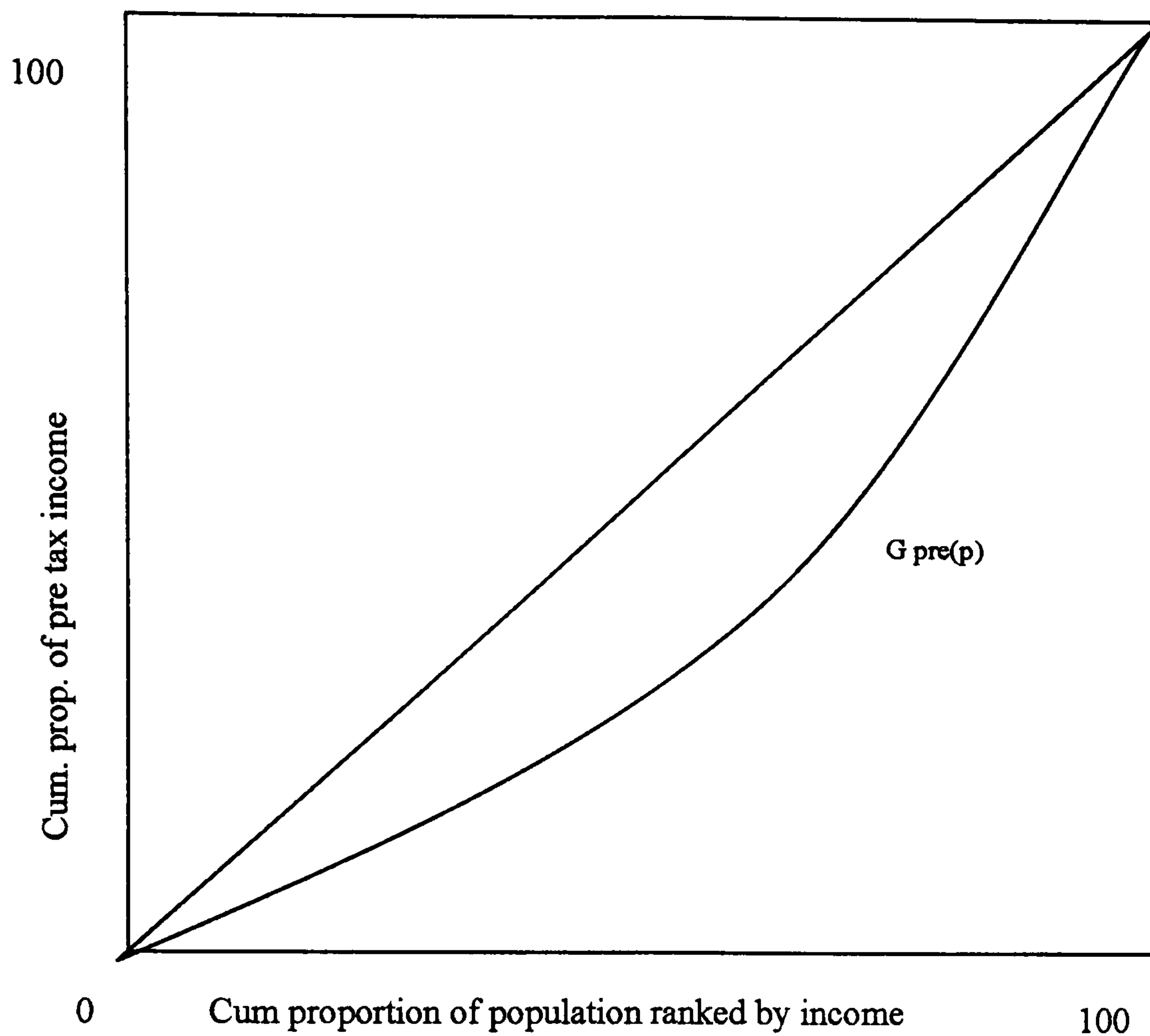
The main properties of them are that they are more sensitive to the distribution of income and taxes in the *whole* population than the tabulation methods are, and that they are more applicable in international comparisons.

In order to introduce the Kakwani and Suits indices of progressivity, first, the Lorenz curve and the Gini coefficient need to be explained. To calculate the Gini coefficient, the Lorenz curve is needed to be identified as tools of measuring income inequalities.

4.1.1 The Lorenz curve and the Gini coefficient

The Lorenz curve, $g_{pre}(p)$ is a function between the cumulative percentage of population and the cumulative percentage of the pre-tax income. Higher the inequalities in the income of the population, more convex the Lorenz curve is. The Lorenz curve can be illustrated in Figure 4.1.

Figure 4.1 The Lorenz curve and the Gini coefficient



Higher the level of inequality of income further is the Lorenz curve from the 45-degree line. More equal is the distribution of income in the population closer is the Lorenz curve to the 45-degree line. The area between the Lorenz curve and the 45-degree line therefore represents the level of inequality.

This area multiplied by two gives the value of the Gini coefficient:

$$G = 2 \times (\text{area between the 45-degree line and the Lorenz curve})$$

To sum up, while the Lorenz curve only illustrates the income inequality in the population the Gini coefficient is a concrete index giving the degree of inequality in income before taxes.

The value of the Gini coefficient can vary between 0 and 1, higher the value of the Gini greater the inequality in income is.

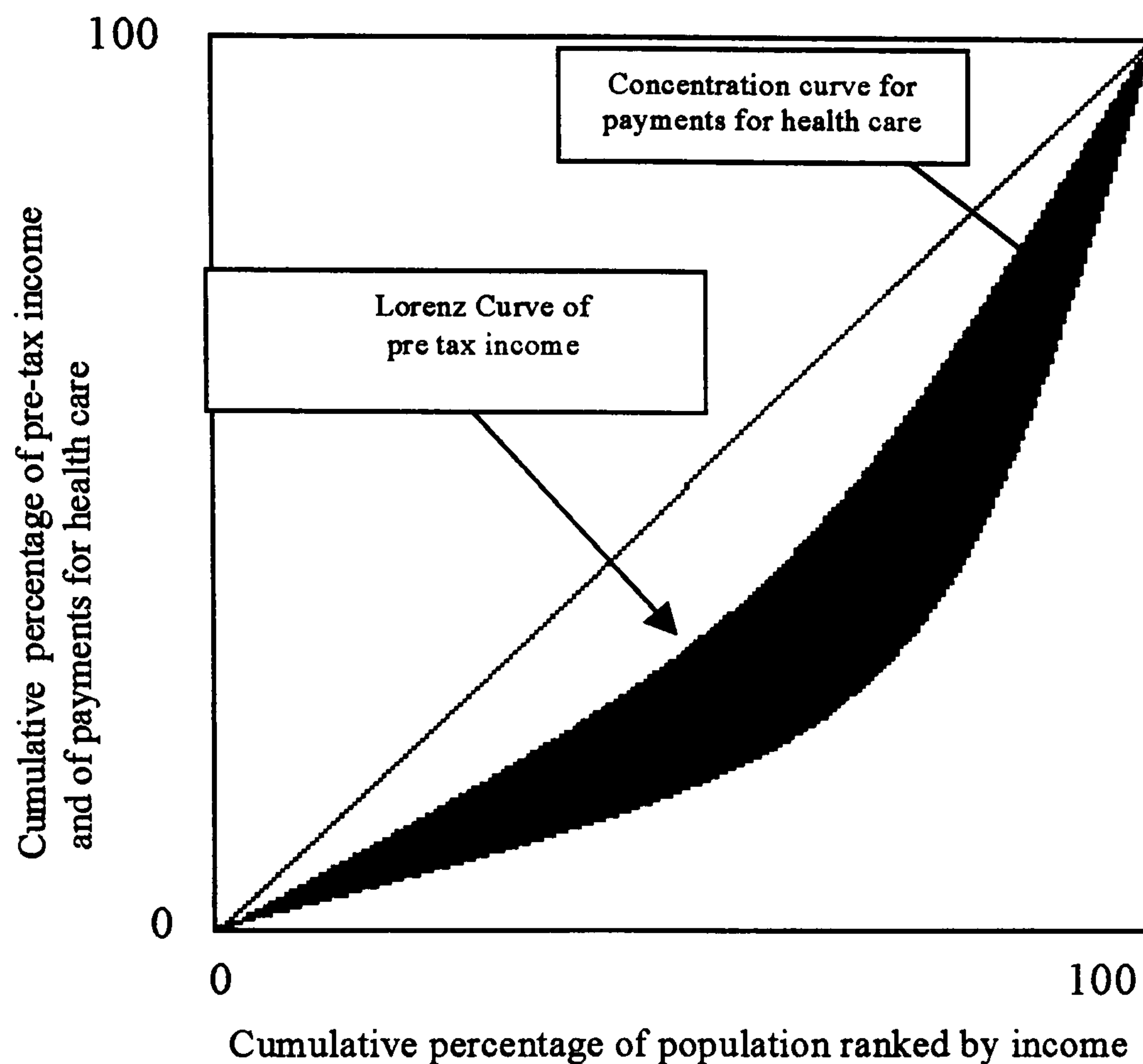
One of the extreme cases is when the value of the Gini coefficient = 1. This means that there is a complete inequality in the society (only one person earns all the income).

The other extreme case is when the value of the Gini = 0. This would mean that there is a complete equality, i.e. the income is equally distributed in the population.

4.1.2 Kakwani`s index of progressivity

The Kakwani index measures how much a tax system deviates from the proportionality. The deviation can go towards two direction: progressivity and regressivity. The Kakwani index can be derived from the comparison of the Lorenz curve for pre-tax income with the tax concentration curve ($g_{tax}(p)$). If the tax system is progressive (i.e. the average tax rate increases with income) then the tax concentration curve lies outside the Lorenz curve, and if the tax system is regressive (i.e. the average tax rate decreases as the income increases) then the tax concentration curve lies inside the Lorenz curve. Finally, if the system is proportional then the two curves coincide. The tax concentration curve and the Lorenz curve are illustrated in Figure 3.2.

Figure 3.2: The tax concentration curve and the Lorenz curve



The Kakwani index is based on the area between the two curves. The value of the Kakwani index is as follows:

$$\Pi_k = C_{\text{tax}} - G_{\text{pre}}$$

Where $C_{\text{tax}} = 2 \times$ (the area between the 45-degree line and $g_{\text{tax}}(p)$)

The value of the Kakwani index can vary between -2 and 1, higher the value of the index greater the progressivity of the tax system is. The positiveness or the negativeness of the value of the Kakwani index indicates that the system is progressive or regressive:

- $\Pi_k = 0$ indicates a proportional system
- $\Pi_k > 0$ indicates a progressive system
- $\Pi_k < 0$ indicates a regressive system

One of the extreme cases is when the value of the Kakwani index = 1. This is the case when the distribution of income is completely equal and only one person (i.e. the richest) pays all the taxes.

The other extreme case is when the value of the Kakwani index = -2. This would mean that there is a complete inequality in the distribution of income (only one person has income), and at the same time only one person (the poorest) pays all the taxes.

4.1.3 Suits index of progressivity

While the Kakwani index is based on standard Lorenz and tax concentration curves the Suits index, by contrast, is based on 'relative concentration curves'. The relative concentration curve for pre-tax income [$h_{pre}(y)$] shows the cumulative proportion of pre-tax income against the cumulative proportion of pre-tax income. Thus coincides the 45-degree line (i.e. the Lorenz curve becomes the 45-degree line). The relative concentration curve for tax payments [$h_{tax}(y)$] shows the cumulative proportion of pre-tax income against the cumulative proportion of tax payments.

The Suits index can be derived from the comparison of the relative concentration curve for pre-tax income with the relative concentration curve for tax payments. If the tax system is progressive then the relative concentration curve for tax payments lies below the relative concentration curve for pre-tax income (i.e. the diagonal), and if the tax system is regressive then the relative concentration curve for tax payments lies above the relative concentration curve for pre-tax income (i.e. the diagonal). Finally, if the system is proportional then the two curves coincide. The Suits index which is based on the area between the two curves, measures how much a tax system deviates from the proportionality. The value of the Suits index can be calculated as follows:

$$\Pi_s = 2 \times (\text{the area between the 45-degree line and the } h_{tax}(y) \text{ curve})$$

Where $h_{tax}(y)$ is the tax concentration curve.

The value of the Suits index can vary between -1 and 1, higher the value of the index greater the progressivity of the tax system is. The positive or the negative value of the Kakwani index indicates that the system is progressive or regressive:

$\Pi_s = 0$ indicates a proportional system

$\Pi_s > 0$ indicates a progressive system

$\Pi_s < 0$ indicates a regressive system

One of the extreme cases is when the value of the Suits index = 1. This is the case when the distribution of income is completely equal and only one person (i.e. the richest) pays all the taxes.

The other extreme case is when the value of the Suits index = -1. This would mean that there is a complete inequality in the distribution of income (only one person has income), and at the same time only one person (the poorest) pays all the taxes.

Although the Kakwani and the Suits indices are very similar in many respect there are some differences between them. While the Kakwani index is based on standard concentration curves the Suits index is based on 'relative' concentration curves. The possible values of the two indices are also slightly different. While the Kakwani index can take the lowest value of -2, the lowest possible value of the Suits index is -1.

The interpretation of the values are very similar, however in certain cases the Kakwani and the Suits can give the opposite result. It is possible that in a system the level of progressivity change drastically with income. For example in systems where pensioners (usually with low income level) exempt from social insurance contributions. On the other hand, it is also possible that people whose income is above a ceiling also exempt from further contributions. This would modify a basically proportional tax system in two ways: the system becomes progressive in the low income tail, and becomes regressive in the upper income tail.

Another difference of the two index of progressivity that the Suits index gives smaller values to those with lower income than the Kakwani index does. Because the two indices give different weights to groups of people with different income level, in cases when the concentration curves intersect the Kakwani and the Suits indices will show opposite implication about the regressivity of a tax/social insurance contribution system.

In conclusion, progressivity indices can be based on 'absolute' and 'relative' terms of concentration, giving basically the same implications. However, the choice between the use of the Suits or the Kakwani index might be crucial, as in certain cases they might give the opposite result. The choice about the applied index should depend on the aim of the research, i.e. if the purposes of the research require weighing the poor (lower income groups) more then the Kakwani index is suggested, or on the other hand if a research tries to give more weight to those with higher income then the Suits index suits better.

Finally, in an analysis, it can be useful to include not only the progressivity indexes but also the tabulations of payments by income (or socio economic) groups. Although this tabulation method does not give a single measurement for inequalities, it can provide additional information about the pattern of inequality.

4.2 Measuring horizontal inequity in the delivery of health care services

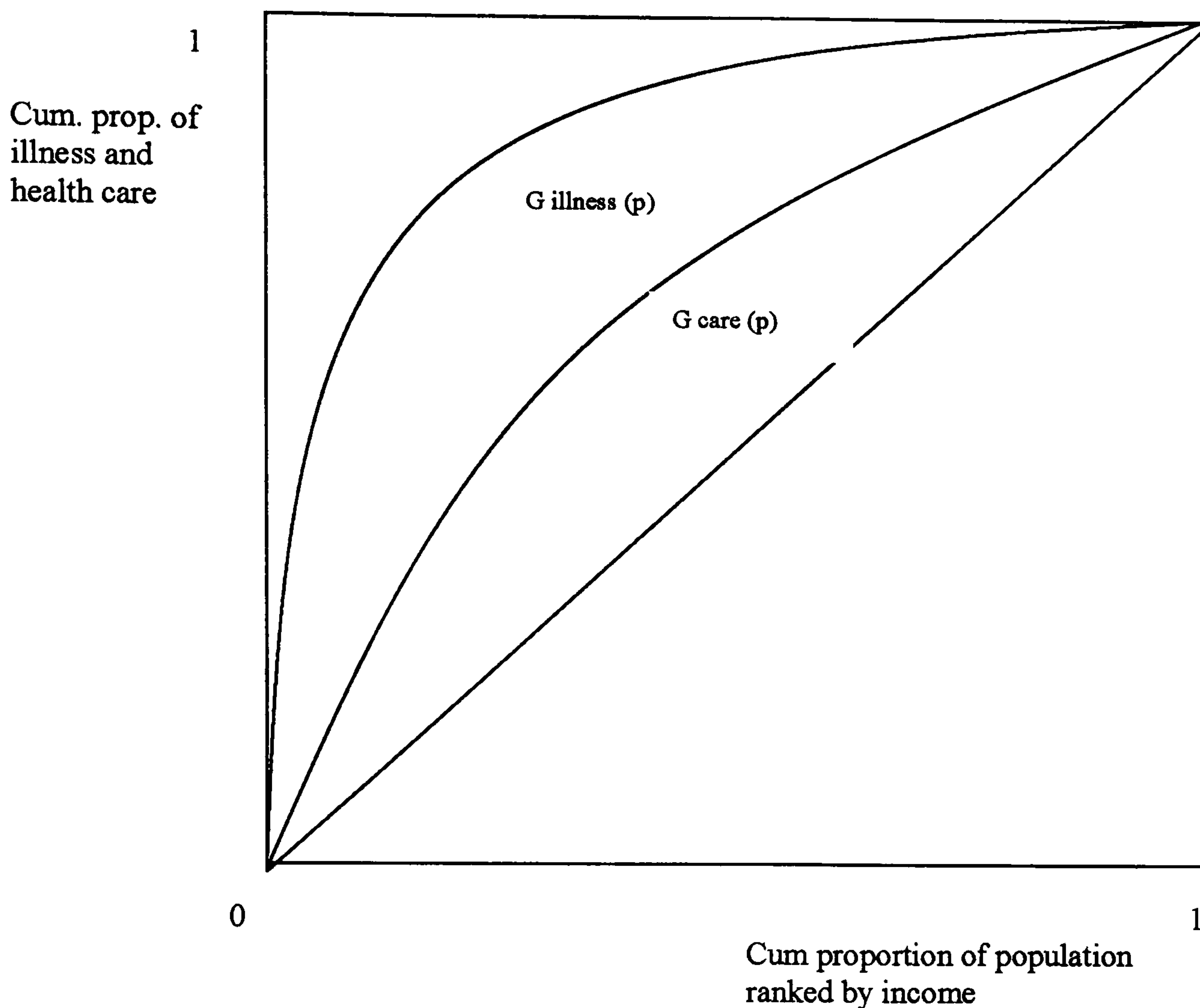
This section discusses those methods that are suitable for measuring inequity in the delivery of health care. The literature discusses three main methods of measuring horizontal inequity in the delivery of health care services:

- Le Grand approach,
- using statistical tools to test for any inequity,
- using need-standardized health expenditure (or health care utilization) curves and concentration indices.

4.2.1 Le Grand approach

According to the Le Grand approach, the level of medical care received by an income group (or SEG, socio-economic group) should be compared to the share of health care needs of that particular income group (Wagstaff and Van Doorslaer 1993). This method reflects the Aristotalian approach to equity. Based on this idea, the illness concentration curve and the level of receipt of health care services (i.e. expenditure on those services) can be considered. Figure 3.3 illustrates a possible illness concentration and expenditure concentration curves.

Figure 3.3: Illness and expenditure concentration curves



Where $G_{\text{illness}}(p)$ is the illness concentration curve and $G_{\text{care}}(p)$ is the concentration curve of health care utilization.

The figure can be interpreted in the following way. The above figure illustrates a case when there is inequality in the distribution of illnesses (favouring the rich) and inequality in the delivery of health care (favouring the poor). The level of inequalities is, however, different in the illustrated case as health care is not delivered in proportion of illness.

The Le Grand index quantifies the relationship between illness concentration and the concentration of the delivery of health care:

$$HI_{lg} = C_{\text{exp}} - C_{\text{ill}}$$

Where C_{exp} is the concentration index for health care utilization expressed as expenditures on health care, and C_{ill} is the concentration index for ill health.

Any positive values indicate a system favouring the rich and any negative values indicates a system favouring the poor. The theoretical maximum value of the index is 2 (the poorest person suffers from all the illnesses and the richest gets all health care) The theoretical minimum value is -2 (the richest person suffers from all the illnesses and the poorest gets all health care).

The Le Grand index has a lot of merits as a single and comparable index of inequalities but the following problems are also associated with it. It can be shown that this index contains an inbuilt bias towards the detection of inequity favouring the rich, as a result of its implicit assumption that non-sick people do not receive care. This is a more serious problem if a health system is such that non-sick people still receive a lot of health care services. The other problem might be that the rich and the poor have different demographic characteristics which are reflected by the allocation of health care. Le Grand tried to get around this problem with using standardised values but Wagstaff et al (1993) found these attempts unreliable.

4.2.2 Testing for inequalities

Another approach is testing for inequalities (Wagstaff and Doorslaer 1993). This approach has the advantage that it uses simple regression analysis to test for inequalities and that the analysis can capture confounding variables (such as demographic characteristics). The disadvantage of this method is that it does not quantify the level of inequalities.

A simple way of this method is looking at if the level of medical care received (dependent variable) is only determined by health status (and age) or also influenced by the income level.

A regression equation for this could be formed as follows:

$$M = \beta_0 + \beta_1 Y + \beta_2 H + \beta_3 X + \varepsilon$$

where M: medical care received, Y: income, H: health status, X: age, and ε : error term. In this case the zero value of β_1 indicates the lack of inequality with regards to income.

This testing method can be further elaborated. For example, the interaction between age and income might be involved. A regression equation for this case could be formed, for example:

$$M = \beta_0 + \beta_1 Y + \beta_2 H + \beta_3 X + \beta_4 YX + \varepsilon$$

Where where M: medical care received, Y: income, H: health status, X: age, YX stands for the interaction term between age and income, and ε :error term. In this case the zero value of β_1 and β_4 would indicate the lack of income-related inequality.

Another method is to set up the above equations for different income categories (such as rich and poor or income quintiles by using dummy variables for them) and test whether the intercept terms (expected medical care of a non-sick) and the slope parameters differ across income groups.

4.2.3 Need-predicted standardized health care utilization curves

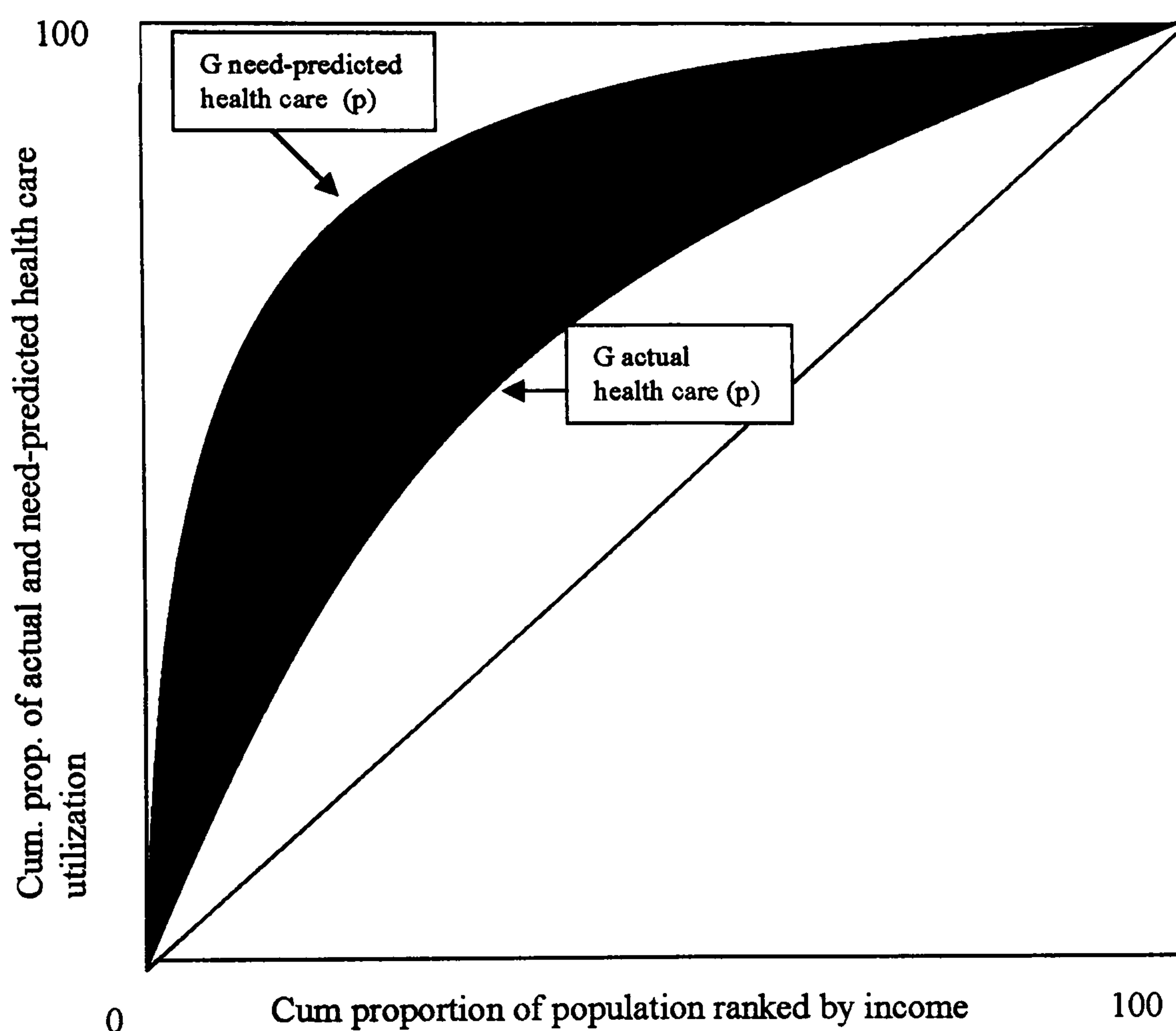
A kind of combination of the Le Grand method and the regression method is the calculation of standardized expenditure curves. This method calculates the health care utilization (as expressed in natural units or as health care expenditures) each income group would receive if they had the same demographic (age) and morbidity characteristics as the population as a whole.

A concentration index can be calculated for this standardized concentration curve. The value of the index is positive when a system favours the rich (the curve lies below the diagonal) and negative when favouring the poor (the curve lies above the diagonal).

Wagstaff and Doorslaer suggested calculating the health inequity index (HI_{wv}) by comparing the need-predicted health care utilization level to the actual health care utilization level. Figure 4.4 presents a situation in which lower income individuals are in fact using more health care than higher income individuals with better health. However, the concentration of the actual utilization of health care services among lower income individuals is still lower than it should be if health care would be delivered in proportion to need. The HI_{wv} inequity index can be calculated as twice the area between the actual

and the need-predicted health care utilization curve. Its negative values indicate a health care delivery system that favours the poor; while positive values indicate a system that favours the rich.

Figure 3.4: Actual versus need-predicted health care utilization



This method overcomes the limitation of the Le Grand method because it can account for demographic differences across income groups and it also can account for expenditures on medical care received by the non-sick. This method, which is used in the analysis of equity in the delivery of care in Hungary, is described in more details in chapter 6.

4.3 Measuring income-related inequity in health care status

Despite the increasing need for information on inequalities in health status, there is a lack of consensus on how health inequalities should be best measured.

Traditionally, simple indicators, such as the difference between (or proportion of) the health status of population sub-groups have been widely used. However, recently, there has been an increasing interest in indicators that capture inequalities of the overall population in a single index. Such health inequality indices can be especially convenient for use in comparative multi-country studies.

Some researchers have argued that overall health inequality in itself is an important concern as it highlights the magnitude of differences in health status between individuals with different demographic, morbidity, social, and economic characteristics (for example, Murray et al. 1999, Gakidou et al 2000, Murray et al. 2000). Others believe that only those inequalities are important that are inequitable, i.e. those that are related to the social or economic status of the individual (for example, Kunst and Mackenbach 1993, Braveman et al. 2001). For health economists, a particular concern is the analysis of income-related inequalities in health status.

The health concentration index method have become an increasingly popular approach, as it has been shown to be a valid measure of health inequalities, with additional possibility to decompose the overall index into components related to the social, and economic status of members of the population (Le Grand 1989, Wagstaff et al 1991, Wagstaff and Doorslaer 2002, Doorslaer and Jones 2003).

The income-related health concentration index can be calculated in the same way as the concentration index for payments or health care utilization (Wagstaff et al 1991). Decomposition analysis can be performed to identify the extent to which different socio-economic factors contribute to income-related overall inequalities in health status (Wagstaff and Doorslaer 2002). The detailed methodology is presented in Chapter 6.

Chapter 5

Literature review on empirical evidence

This chapter reviews the empirical evidence on income-related inequalities in health and equity in the finance and delivery of health care. Data presented in previous international studies can be relevant for the interpretation and comparison of the Hungarian results.

5.1 Empirical evidence on equity in the finance of the health care

The first comprehensive empirical study on equity in the finance and delivery of health care services was done by Doorslaer et al. (1993). This study covered ten OECD countries in the analysis. As discussed above, vertical equity in the finance of health care services can be looked at through the progressivity of the different finance methods.

In all health care system, expenditures are raised from four main type of revenues:

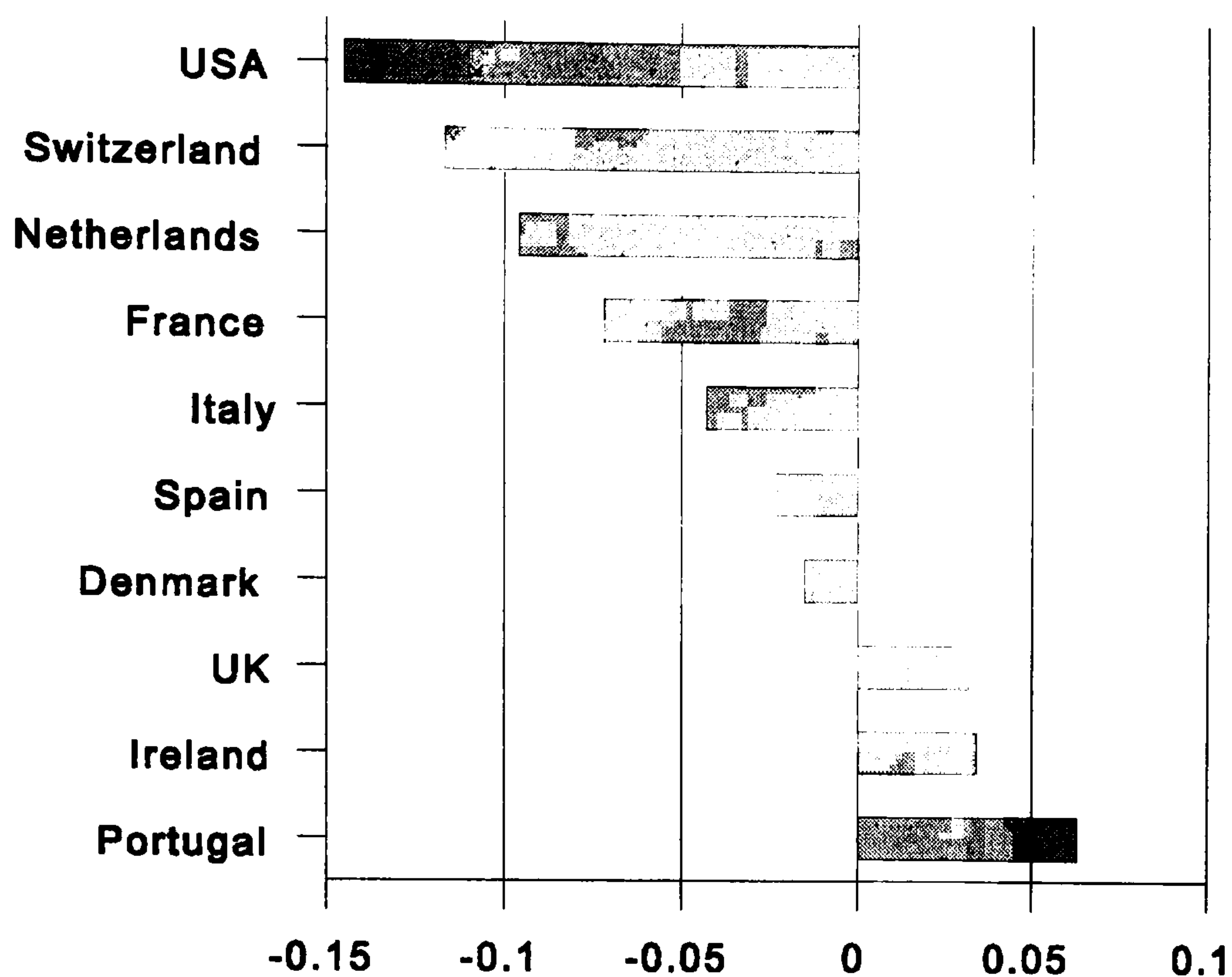
- Out-of-pocket payments,
- Private insurance premiums,
- Social insurance contribution, and
- General taxation.

According to the way of raising the bulk of their expenditures, Doorslaer et al. (1993) distinguished 3 groups of countries in their study:

- tax financed systems include Denmark, Ireland, Portugal, and the UK ;
- social insurance systems include France, the Netherlands and Spain;
- private systems, where private insurance premiums and out-of-pocket payments exceed 50 percent, are the USA and Switzerland.
- Italy is a country of mixed finance of taxes and social insurance.

Doorslaer et al. reported Kakwani and Suits indices with consistent results but here only the Kakwani indices are summarised below.

Figure 5.1 summarizes the Kakwani indices in the 10 OECD countries



As Figure 5.1 shows, clear evidence has been found on the relationship between the way of raising revenues and the level of inequity in the finance of health care.

Health care system based on out of pocket payments and private health premiums are the most regressive payment systems, putting relatively high burden on low income individuals.

Countries with social insurance contributions have less regressive way of financing health care. While general taxation is the most progressive way of raising revenues.

The final conclusion of Doorslaer et al. is that surprisingly few countries have progressive finance system, and even social insurance finance systems are regressive in terms of raising revenues. Detailed results from a series of further studies from using refined methodology have been reported extensively (1993, 1997, 1998, 1999) and are summarised in Table 5.1.

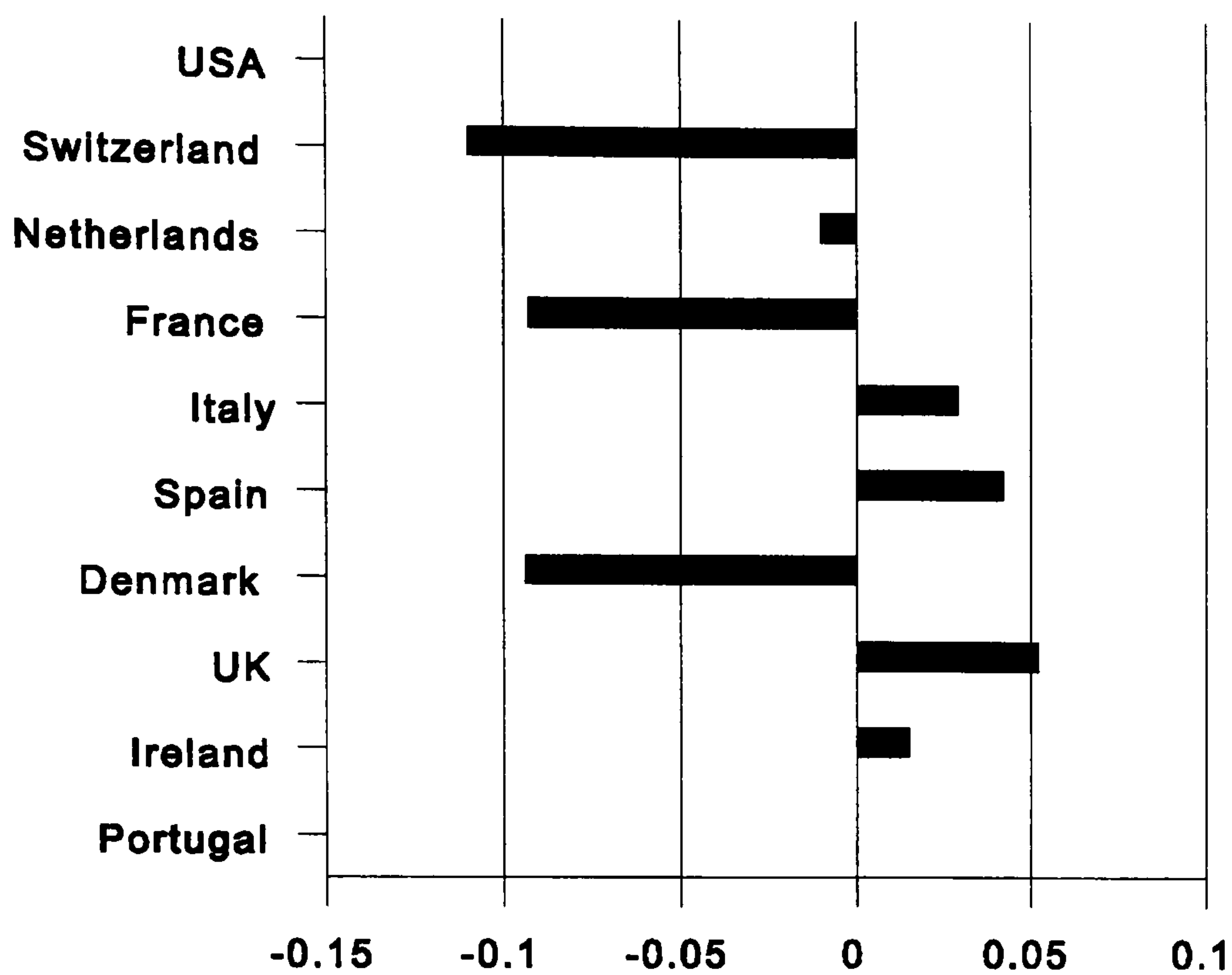
Table 5.1 International comparison of progressivity indices of payment methods

	Direct taxes	Indirect taxes	Social insurance	Private payments	Overall
Denmark	0.0624	-0.1126	N/A	-0.2654	-0.0047
Finland	0.1272	-0.0969	0.0937	-0.2419	0.0181
France	N/A	N/A	0.1112	-0.3396	0.0012
Germany	0.2488	-0.0922	-0.0977	-0.0963	-0.0452
Ireland	0.2666	N/A	0.1263	-0.1472	N/A
Italy	0.1554	-0.1135	0.1072	-0.0807	0.0413
Netherlands	0.2003	-0.0885	-0.1286	-0.0377	-0.0703
Portugal	0.218	-0.0347	0.1845	-0.2424	-0.0445
Spain	0.2125	-0.1533	0.0615	-0.1801	0.0004
Sweden	0.0529	-0.0827	0.01	-0.2402	-0.0158
Switzerland	0.2055	-0.0722	0.0551	-0.3619	-0.1402
UK	0.2843	-0.1522	0.1867	-0.2229	0.051
USA	0.2104	-0.0674	0.0181	-0.3874	-0.1303

5.2 Empirical evidence on equity in the delivery of health care

Doorslaer et al. were more inconclusive about the level of equity in the delivery of health care as the results were much more sensitive to the choice of the measurement method. Therefore, no clear conclusions could be drawn which health care delivery systems are more equitable. Here the country specific Le Grand indices are reported.

Figure 5.2 shows the Le Grand inequity indices in different countries



The sensitivity of the inequity measurement results to the type of the indicator suggests that more research is needed to understand inequity in the delivery of health care. A more comprehensive measurement of health status or utilisation of health care, for example, might be helpful.

Instead of drawing a valid conclusion about equity in the delivery of health care in the ten OECD countries, Doorslaer at al. made an attempt to summarize what are those incentives which contribute to the presence of inequity in a health care system. The impact of these anti-equity provider incentives were not, however quantified empirically.

Table 5.2: Anti-equity provider incentives in 10 OECD countries

	AMBULATORY CARE	INPATIENT CARE
Denmark	none	none
France	GPs and specialists are allowed to over-bill	Mixture of private and public services in hospitals
Ireland	Higher fees for private patients	Fee-for-service payment for the privately insured
Italy	Fee-for-service for private patients	Higher fees for private patients
Netherlands	Fee-for-service for private patients	Higher fees for private patients
Portugal	Fee-for-service for private patients	Fee-for-service for private patients
Spain	Fee-for-service for private patients	Retrospective fee-for-service for private patients
Switzerland	Higher charges for 1 st and 2 nd class insurance cover	none
UK	Simultaneous employment of physicians at public and private providers	Simultaneous employment of physicians at public and private providers; Fee-for-service for private patients
USA	Less reimbursement for Medicaid patients	Less reimbursement for Medicaid patients

To sum up, it can be said that regressive payment methods such as out-of-pocket payments, private insurance or social insurance system are responsible for inequity in the finance of health care services. In the provision of health care services, on the other hand, inequity can be derived from those incentives that are encouraging providers to differentiate between better-off and worse-off patients. These are most importantly the higher fees or higher reimbursement for private patients, fee-for-service payments for the

privately insured patients, mixture of private and public services in hospitals, and the possibility of over-billing by doctors.

O'Donnell et al. (1991) measured the level of equity in the finance and delivery of health care in Britain based on the 1985 General Household Survey. The main methods and main findings of this study are summarized here.

For measuring equity in the *delivery* of health care services the following data were used from the survey:

- health care utilisation: GP, outpatient, accident, emergency, and inpatient care;
- morbidity: restricted usual activities, chronic illness, subjective valuation of health status;
- adjusted gross family income (i.e. equivalent income).

The distribution of standardized expenditure on health care was analysed and concentration indices were reported. The key finding was that the distribution of standardized expenditure on NHS care was pro-poor. This was reflected by the negative value of the concentration index (-0.089 and -0.031). The concentration index regarding total health care (i.e. NHS and private) varied between -0.048 and 0.013 reflecting a more pro-rich pattern. The most recently published evidence on equity in health care delivery is summarised in Table 5.3.

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	GP care		Outpatient specialist		Dental care		Inpatient care		Total care	
	C _M	HI _{wv}	C _M	HI _{wv}	C _M	HI _{wv}	C _M	HI _{wv}	C _M	HI _{wv}
Austria	-0.050*	0.018*	0.036*	0.081*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Belgium	-0.102*	-0.020*	-0.030*	0.036*	0.057***	n.a.	-0.324**	-0.140**	-0.279**	-0.119**
Canada	-0.079*	-0.006*	0.001*	0.063*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Denmark	-0.079*	-0.004*	0.020*	0.072*	0.056***	n.a.	-0.341**	-0.130**	-0.259**	-0.110**
Finland	-0.063**	0.004**	-0.036**	0.007**	0.091***	n.a.	-0.282**	-0.134**	-0.187**	-0.083**
East Germany	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.156**	n.a.	-0.129**	n.a.
West Germany	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.168**	n.a.	-0.146**	n.a.
Germany	-0.063*	-0.019*	0.015*	0.059*	0.016***	n.a.	n.a.	n.a.	n.a.	n.a.
Greece	-0.126*	-0.011*	-0.036*	0.077*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ireland	-0.128*	-0.43*	0.070*	0.150*	0.205***	n.a.	-0.137**	-0.050**	-0.140**	-0.056**
Italy	-0.064*	-0.028*	0.020*	0.062*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Luxembourg	-0.088*	-0.032*	-0.066*	-0.004*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Netherlands	-0.047*	-0.003*	-0.021*	0.037*	0.056***	n.a.	-0.207**	-0.127	-0.159**	-0.088**
Portugal	-0.070*	0.015*	0.096*	0.190	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	-0.091*	-0.044*	0.025*	0.076*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sweden	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.028**	-0.075**	-0.019**	-0.054**
Switzerland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.158**	-0.035**	-0.144**	-0.040**
UK	-0.115*	-0.014*	-0.024*	0.083*	0.072	n.a.	-0.171**	-0.107**	-0.117**	-0.050**
US	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.195**	-0.101**	-0.145**	-0.066**

* van Doorslaer et al. 2002

** van Doorslaer et al. 2000

*** van Doorslaer and Koolman 2002

5.3 Studies on income-related health inequalities measured by the concentration index method

This section will introduce those empirical studies which looked at income related health inequalities and measured the level of inequalities with concentration curves and concentration indices. These results do not show directly the level of equity in the delivery of health care but they are important part of the measurement of equity and they have methodological implications as well.

Doorslaer et al. (1997) published a study on the income related inequalities in health in nine countries. This study was based on the measurement of health by categorical variables. The applied methodology was, however, new in the sense that the analysis assumed that underlying the categorical health variable the variable of health has a standard lognormal distribution. The results showed that inequalities in health favour the rich in all countries (Table 5.4).

Table 5.4: Empirical evidence on income-related health inequalities in 9 OECD countries

	Health concentration index
Finland	-0.0566
East Germany	-0.0436
West Germany	-0.0571
The Netherlands	-0.0660
Spain	-0.0732
Sweden	-0.0347
Switzerland	-0.0696
UK	-0.1148
USA	-0.1360

Gerdtham et al. (1999) reflected on the results of the above study but on the methodology that it used. Gerdtham et al. argued that it had not been empirically proved

that the level of health status with respect to income had a standard lognormal distribution. The validation of the Doorslaer et al. (1997) study was therefore needed. Gerdtham et al. validated the Doorslaer et al. study by using continuous and categorical health measures and by comparing the results of the different methods. Data were collected from a representative sample of 8000 people living in Uppsala County in Sweden. Health status was measured by three different tools: a self-assessed categorical measurement, which was one of the questions of the SF-36 generic quality of life questionnaire (and the authors refer to it as the Wagstaff-Doorslaer, WvD's method), rating scale method, which was a visual analog scale with anchors of death at 0 and full health at 100, (continuous variable), and a TTO question asking about the length of time in full health which would be equivalent to 20 years in actual current health state (continuous variable).

By using these measurement tools, the health concentration indices were calculated to be -0.1166, -0.0987, and -0.1285 respectively. The hypothesis of no difference between the concentration indices based on continuous and the categorical health measurements could not be rejected on 90% confidence level and therefore the Doorslaer et al. study results have been validated.

Gerdtham and Johannesson (2000) calculated income-related health concentration indices for Quality Adjusted Life Years (QALYs). The concentration index values for QALYs were significantly lower than those reported for continuous measures of health by Gerdtham (1999).

Wagstaff (1999) recently conducted another World Bank study on the inequalities in health in nine developing countries. Infant and under-5 mortality was examined with respect to the economic status of the family. Data were taken from the Living Standards and Measurement Study and the Cebu Longitudinal Health and Nutrition Survey. The economic status of the family was measured by the consumption of the family. Data on consumption included consumption of food, housing, non-food items, and the rental value of the household's home and other durables. Concentration indices of mortality resulted in negative values in all countries showing inequalities across socioeconomic groups of the society. The inequality was larger in the case of under-5 mortality than in the case of infant mortality. The author also tried to find the *causes* of inequalities in

mortality with the example of the Philippines. The results showed that consumption was the largest contributory factor to mortality inequalities but inequalities in mother's education and inequalities in sanitation were also important. On the other hand, inequalities in water and access to medical care contributed only to a very small part to the overall inequality in mortality.

From methodological aspect, this study by Wagstaff went beyond the simple application of concentration curves and concentration indices. It used concentration curve deviations diagrams and Hasse diagrams to illustrate the differences in inequalities in mortality between countries. It applied Weibull model to specify the causes of inequalities in mortality. Finally, it emphasised the importance of statistical significance of differences between concentration curves and indices.

5.4 An empirical study on the progressivity of income taxes in Hungary

To calculate equity in the finance of health care, the progressivity of payments for health care should be calculated. In Hungary, health care is mainly financed by social insurance contributions. However, a proportion of funds are raised from general taxation. To get a full picture of the overall progressivity of the finance of health care, therefore, the progressivity of all tax types should be known, such as income taxes, indirect taxes etc. In Hungary, there is no empirical study available on the progressivity of the overall tax system. A study by Toth (1997), however, examined the progressivity of the income taxation.

The study used the data of the Hungarian Tax Authority. The overall tax rate is based on three components:

- income including salary, transfers, and other type of incomes,
- separately taxable incomes (such as income from capital),
- tax allowances.

Based on these data, the distribution of tax burden in the society and the tax concentration index was calculated. The results showed that the Hungarian tax system is regressive at the very low income level and progressive in the rest of income levels. The initial regressive pattern is due to the use of two separate tax tables (one is for people with only salary and the other is for people with salary and other incomes). As Toth argues people with the lowest incomes are facing a very high effective tax rate because the proportion of people among them who has non-salary income is high.

The overall tax concentration index in 1996 was calculated to be 0.7072. This value was slightly larger than the tax concentration index in 1994 with a value of 0.6772. Toth also reported the level of the concentration of pre tax incomes. The Gini-coefficient was 0.53 in 1996 and 0.49 in 1994.

Toth did not report the Kakwani index of tax progressivity but it can be easily calculated given the tax concentration indices and the Gini-coefficients. Subtracting the two from each other, the Kakwani index gets a value of 0.1772 for the year 1996 and 0.1872 for 1994. These positive values reflect a progressive income tax system, the progressivity of which has slightly decreased between 1994 and 1996.

PART III. EMPIRICAL RESULTS FOR HUNGARY

Chapter 6

Surveys, data, instruments, and analysis

The aim of this chapter is to introduce the detailed methods and data used in this research. Information of the surveys, including survey characteristics, information on variables, instruments, and analytical tools are presented in detail.

6.1 Surveys used in the analysis

As Chapter 1 discussed, the objective of this research was to comprehensively analyse equity in three major aspects of health and health care in Hungary: income-related inequalities in health status and equity in the finance and delivery of health care. To address all these three areas, there was no single data source available that could have been suitable for analysis multiple data sources had to be used.

Five surveys were used in this study. Two of these surveys, the Hungarian Household Budget Panel and the National Health Monitoring OLEF2000 Survey, formed the core basis of the analysis, while the others played a supplementary role. These surveys and their role in addressing the various research questions are summarised in table 6.1. It has to be noted that several additional data sources were also used in the estimation of results. Additional data sources included surveys, macro finance data, data in published literature, and other types of information sources.

Table 6.1: Summary of main surveys used in the analyses

	Name	Research area	Subjects	Year
Survey 1	Hungarian Household Budget Panel	Equity in finance	9640 households	1998
Survey 2	Informal Payments Survey (TÁRKI 1999/2 Omnibusz)	Equity in finance	1392 adults and their household from the non-institutionalised population	1999
Survey 3	National Health Monitoring OLEF2000 Survey	Inequalities in health status, Equity in delivery of health care	5503 adults from the non-institutionalised population	2000
Survey 4	Inequality aversion survey – decision-makers	Professionals’ preferences concerning health inequalities	43 health care decision-makers	2001
Survey 5	Inequality aversion survey - physicians	Professionals’ preferences concerning health inequalities	72 young physicians (equivalent to senior house officer level)	2001

The Hungarian Household Budget Panel database (Survey 1) is produced by the Hungarian Central Statistical Office. The Informal Payment Survey (Survey 2) has been conducted by the TARKI institute. The National Health Monitoring OLEF 2000 Survey (Survey 3) was organised by the Ministry of Health of Hungary. I had an agreement with the Ministry of Health that I contribute to the planning and analysis of health-related quality of life and economic aspects of the survey as part of the thesis work. Survey 4 and 5 were organised by myself. The questionnaire used was a modified version of an inequality aversion instrument developed by Shaw et al (1999).

6.2 Description of data and instruments

Data sources used in the three main parts of the analysis are described in detail in this section. The description of data sources is structured into three sections. The first section describes data sources related to the analysis of equity in the finance of health care, including the Hungarian Household Budget Panel and the Informal Payments surveys. The second section describes the National Health Monitoring survey, which was used for the analysis of inequalities in health status and equity in the delivery of health care. The final section introduces the inequality aversions surveys.

6.2.1 Equity in the finance of health care

Data for the analysis of equity in the finance of health care came from two major types of sources:

- *Concentration of payments* was calculated by using the Hungarian Household Budget Survey (Survey 1) and the Informal Payments Survey (Survey 2);
- While *revenue shares* of different finance methods were identified by using macro finance data with the exception of informal payments, which were estimated from survey data.

Micro data to identify concentration of payments

The calculation of progressivity indices was based on the Hungarian Household Budget Panel (Survey 1) and the Informal Payments Survey (Survey 2). This section describes both databases and the relevant variables.

The Hungarian Household Budget Panel

The history of the *Hungarian Household Budget Survey* goes back to as early as 1949 when the Central Statistical Office organised the first survey to gain information about the consumption characteristics of the population. The survey has been run in every second year and on an annual basis from 1993. The Central Statistical Office has published a detailed description of methods used (KSH, 1997).

The Hungarian Household Budget Survey involves 9640 households with over 26000 individuals living at 260 locations (towns or villages) covering 1608 census districts. The sample is selected from the census register. The basis of sampling is the address of flat/house, while the basis of observation is the household. The house and the household are almost identical because, normally, one household lives under an address in Hungary.

The sample is layered for the type of residence in terms of number of inhabitants. The sampling procedure consists of the following steps. In the case of towns or villages with

over 15,000 inhabitants, the basis for primary selection is the census district and the basis for secondary selection is the flat/house. In the case of towns or villages with between 10,000 to 15,000 inhabitants, the basis for primary selection is the town/village, the basis for secondary selection is the census district and the basis for tertiary selection is the flat/house. In the case of towns or villages with less than 10,000 inhabitants, the basis for primary selection is the town/village and the basis for secondary selection is the flat/house. The selection rates for the various types of residences are inversely proportional to the size of the location. In the capital (Budapest), the selection rate is 0.5 times of the selection rate applied in small locations with less than 10,000 inhabitants. This ratio is 0.6 and 0.8 in the case of locations with more than 50,000 and 10,000 inhabitants, respectively. Six addresses are selected from each census district. This sampling procedure ensures that the probability of that a household is selected into the sample is equal across locations with different number of inhabitants. An annual rate of 1/3 is used for sample rotation to decrease burden on households in the sample and to avoid loss in follow-up.

Weighting based on residence type and demographic characteristics is used to provide representative sample for the total population. Weighting does not include correction for income characteristics, and the Central Statistical Office argues that higher income households are under-represented in the sample. The reason for not weighting for income characteristics is that the Central Statistical Office has not developed a method to perform the corrections (Central Statistical Office, 1997).

Income and expenditure data are collected on a mixture of personal and household level basis and data collection is based on both the monthly diary and the annual interview.

Income variable

In the Household Budget Panel Survey, the collection of information on income is based on enquiries from each person living in the household. Questions on income cover 34 types of income categories. These include gross salary; benefits provided by the employer (such as pension insurance; holiday benefits, company car, etc.); income from properties;

transfers; among other types of income sources. Table 6.2 summarises the complete list of income sources that are included in the Household Budget Panel Survey.

Table 6.2: Income sources included in the Household Budget Panel Survey

Type of income source	
1.	GROSS INCOME FROM FULL TIME EMPLOYMENT
2.	COMPENSATION AT TERMINATION OF EMPLOYMENT
3.	LIFE AND PENSION INSURANCE PREMIUM PAID BY THE EMPLOYER
4.	INCOME FROM PART-TIME JOB
5.	INCOME FROM SELF-ENTERPRISE ACTIVITY
	INCOME FROM CORPORATE ACTIVITIES:
6.	- CORPORATE LEGAL ENTITY - SALARY
7.	- CORPORATE LEGAL ENTITY - DIVISION
8.	- CORPORATE BUT NOT LEGAL ENTITY - SALARY
9.	- CORPORATE BUT NOT LEGAL ENTITY - DIVISION
	REIMBURSED EXPENSES
10.	- FOOD
11.	- CLOTHES
12.	- CAR
13.	- HOLIDAYS
14.	- ACCOMMODATION
15.	- PERSONAL COSTS
16.	- TUITION FEES
17.	- OTHER
18.	INCOME FROM INTELLECTUAL PROPERTIES
19.	TIPS, INFORMAL PAYMENTS
20.	INCOME FROM OCCASIONAL EMPLOYMENT
21.	INCOME FROM PRIVATE PROPERTIES
22.	INCOME FROM OTHER SOURCES
23.	PENSION
24.	REGULAR SOCIAL BENEFIT
25.	NON-REGULAR SOCIAL BENEFIT
26.	MATERNITY BENEFIT
27.	SCHOLARSHIP
28.	UNEMPLOYMENT BENEFIT
29.	CARE-GIVER/NURSING BENEFIT
30.	HISTORICAL COMPENSATION-RELATED BENEFIT
31.	UNEMPLOYMENT BENEFIT
	INCOME FROM ABROAD
32.	- SALARY
33.	- SOCIAL BENEFIT
34.	- OTHER

For the purpose of the calculation of concentration indices, employment-related income was calculated as gross-gross income. Social insurance contributions (both those paid by the employer and the employee) were added to the income based on official payment rules in 1999. This calculation method – in accordance with the methodology of the ECuity project - is based on the assumption that the burden of all insurance contributions falls on the employee, independently whether the employer or the employee pays it. The payment rules for health insurance contributions are summarised in Table 6.3

Table 6.3: Payment rules for health insurance contributions in 1999

Component of contribution	Payment rule
Income-related contribution paid by the employer	11% of gross salary
Income-related contribution paid by the employee	3% of gross salary; ceiling ⁶ for salaries above annual 1.9 million HUF ⁷
Fix component (EHO) paid by the employer	3600 HUF per month

In addition to health insurance, there are social insurance contributions to pension and unemployment funds. These were also added when calculating the gross-gross income.

In the ranking of the population according to income as well as for the calculation of concentration indices, *equivalent* income was calculated. In *base-case*, the analysis used the latest formula recommended by the OECD, which was also used in the ECuity project. This formula uses 0.5 as weight for additional household members. The calculation of the equivalent income was based on the following formula:

$$\text{EQUIVALENT INCOME} = \text{INCOME OF HOUSEHOLD} / \text{NUMBER OF MEMBERS}^{0.5}$$

In addition to base case analysis, results were calculated for the scenarios when the equivalence weight was defined as 0.73 and 1. The objective of the sensitivity analysis on income equivalence weight was to test how the value of the concentration index changes when different equivalence weights are used. This analysis enables the comparison of results with those studies that used different equivalence weights.

Payments for health care

This section describes the calculation of payments for health care made by the households. Payments include direct as well as indirect payments for health care, such as:

- Income tax
- Health insurance contributions
- Indirect taxes
- Out-of-pocket payments

⁶ This ceiling has been removed after year 2000.

⁷ GBP 1 is equal to around HUF 400.

Income taxation

Income taxes were imputed by using the official personal income tax rules for all components of income earned by household members. As there is no family taxation in Hungary, personal income taxes were calculated for each member of the family and were then added up to gain total income tax paid by the household. It was assumed that each individual fully followed the taxation rules. For example, if someone was eligible for a particular tax allowance based on family or economic status (such as tax allowance after children) then the tax allowance was incorporated into the calculation of the income tax.

Health insurance contributions

Health insurance contributions have been calculated for each member of the household. Different rules for paying contributions after different types of incomes (by people of different status) have been taken into account. Again, the calculation assumed that employers *correctly* paid relevant health insurance contributions according to the official regulations.

Indirect taxes

Indirect taxes paid by households have been calculated by using data on household consumption. There were 384 goods and services used in the analysis that are recorded in the Hungarian Household Budget Panel survey. Value-added taxes and excise taxes were calculated for each good and service purchased by the household in order to quantify the indirect taxes paid by the household. Value-added taxes and excise taxes paid were calculated by multiplying the relevant tax rates with the relevant consumption variables. Value added tax and excise tax rates differ depending on the nature of the goods and services consumed. The relevant tax rate was identified for all goods and services.

Out-of-pocket payments

Out-of-pocket payments for health care were also recorded in the household expenditure diary. These fell into three categories:

- Drugs
- Medical devices
- Private health care services

As there are no value-added taxes on medications in Hungary, there was no problem of double counting out-of-pocket payments both among indirect taxes and direct payments. Payments for private health insurance has been excluded from the analysis, due to their almost non-existence in Hungary.

Although the Household Budget Panel Survey includes a question about the informal payments made when using public health care services, this variable was not used in the final analysis. The reason for this is that the estimation of informal payments needs a special research approach. The Household Budget Panel Survey underestimates the level of informal payments due to its simplistic questioning approach on the complex issue of informal payments. For this reason, data on informal payments were used based on another survey, called the Informal Payments Survey (Survey 2).

The Informal Payments Survey

The *Informal Payments Survey* has been performed along the Omnibusz 1999 (no 2) Survey conducted by the Social Research Informatics Center. This survey is known to be the first large-scale survey on informal payments in Hungary.

The Household Budget Panel Survey also includes a question on the amount of informal payments that the household make. This question directly asks about the total amount of informal payments. In contrast, the Informal Payments Survey contains detailed questions to identify cash and in-kind informal payments at GP, outpatient and inpatient services made both to physicians and to other staff.

The Informal Payments Survey is based on a representative sample of 1392 non-institutionalised adults. The sample was taken in two steps: first a sample of cities/villages was taken and then addresses were selected. The database was weighted for

age, gender, and education level. Although the basis for the sample was that of the individual, questions included items on income and informal payments made by the rest of the members of the household.

Income variable

There were two questions about income in the Informal Payments Survey. The first question asked about the net monthly income of the respondent. The second question directly asked about the monthly, total, net income of the household.

The total monthly net household income was the basis for ranking the population by income level. Net income means the income after income taxation and after receipt of any transfers. Similarly to the case of the Household Budget Panel survey, equivalent income was calculated with equivalence weight of 0.5 in base-case analysis.

Informal payments

Respondents were asked to identify their actual informal payments that they paid when they visited their GP, an outpatient physician, or received a treatment at a hospital. Different components of informal payments, such as money or in-kind payments to the physicians and payments to the nurses were separately asked and then added up. The structure of the questions on informal payments is illustrated in Table 6.4.

Table 6.4: Summary of questions on informal payments used in the Informal Payments Survey

Health care service level		
General practitioner	Outpatient specialist	Inpatient care
Did you give informal payment to your GP? And if so then how much money did you give?	Did you give informal payment to your physician? And if so then how much money did you give?	Did you give informal payment to your physician? And if so then how much money did you give?
Did you give a present or did you offer other type of support to your GP? And if so then what was the value of the present/other support in monetary terms?	Did you give a present or did you offer other type of support to your physician? And if so then what was the value of the present/other support in monetary terms?	Did you give a present or did you offer other type of support to your physician? And if so then what was the value of the present/other support in monetary terms?
Did you give informal payment to your nurse? And if so then how much money did you give?	Did you give informal payment to medical staff other than your physicians? And if so then how much money did you give?	Did you give informal payment to physicians at other departments than the one where you stayed? And if so then how much money did you give?
Did you give a present or did you offer other type of support to your nurse? And if so then what was the value of the present/other support in monetary terms?	Did you give a present or did you offer other type of support to medical staff other than your physicians? And if so then what was the value of the present/other support in monetary terms?	Did you give a present or did you offer other type of support to your physicians at other departments than the one where you stayed? And if so then what was the value of the present/other support in monetary terms?
		Did you give informal payment to your nurse? And if so then how much money did you give?
		Did you give a present or did you offer other type of support to your nurse? And if so then what was the value of the present/other support in monetary terms?

The survey asked the same questions from a second household member if there was anyone else in the household who visited a physician in the past year. If there were more than one household members who needed medical help then the respondent had to describe only that member about whom he or she had more information. There was no possibility in the survey to include more than one additional household member. The survey, therefore, underestimated the total informal payments made by the household in those cases when there were more than two people seeking medical care between January 1998 and January 1999.

Macro finance data to identify revenue shares

Although the Hungarian health care system is operated mainly on the basis of a compulsory social health insurance system, funding for health care is raised from more

than one source. In addition to the national health insurance system, an important proportion of funding comes from general tax revenues. Supplementary out-of-pocket payments consist of patient co-payments for pharmaceuticals, informal payments, and payments for private medical care.

Multiple data sources were used to identify the relative share of each type of source in total health care revenues. Macro finance data sources were used to calculate the revenue shares. The only exceptions were informal payments and payments for private medical care. These were estimated from survey data.

Sources of macro finance data and calculation methods are summarised in Table 5.5. As shown in the table, revenues raised through different sources are highlighted along three main groups: those raised through general taxation; those raised through the compulsory health insurance system; and those that are out-of-pocket payments. All macro finance data relate to the year of 1999.

Research assumptions and limitations in data

Although the analysis of equity in the finance of health care in Hungary intended to be as comprehensive as possible, there were some limitations in data. The following section describes those areas where assumptions and research decision had to be made due to imperfect data.

Year of data

The analysis of equity in the finance of health care related to the year of 1999. A particular difficulty for the analysis was that the Household Budget Panel survey (Survey 1) database involved data from year 1998 while the Informal Payments Survey (Survey 2) involved data from 1999. The reason for this problem was that at the time of the analysis the Household Budget Panel survey, the new database for 1999 had not had come out yet.

It was important to perform the analysis for the year 1999 because relevant changes were introduced in the social health insurance payment rules. The fix component of the health insurance contribution has increased substantially. This development was believed to contribute to a shift towards a more regressive finance system.

As a solution, both income and payments have been transformed from 1998 values to 1999 values by using consumer price indices as reported by the Central Statistical Office in Hungary (KSH 2000). Health care specific price indices have been used to calculate 1999 values for health care expenditures.

Although this procedure could lead to some distortions in data, there is no reason to believe that it had a major impact on the validity of results. The inflation rates were generally low for year 1998/99.

Finally, the objectives of this dissertation did not include the analysis of changes in equity in finance of health care over a time period. The key objective was to perform a cross-sectional analysis in order to set up base-line data for Hungary. Therefore, results were calculated for year 1999 only.

Measurement of income

The questions on income differed between Survey 1 and Survey 2. While the Household Budget Survey included separate questions on a large number of potential income sources, the Informal Payments directly asked about the total income. In addition, in the Household Budget Survey gross-gross income was used while in the Informal Payments Survey used net income.

Although, individual households might be ranked differently when using the two survey methods, there is no reason to believe that differences in ranking would be systematic in nature. This is supported by the findings that the Gini-coefficients were exactly the same (i.e. 0.36) for both databases in base-case analysis (see Chapter 6).

The under-representation of high income households

A more important limitation of the analysis is that high-income households are likely to be underestimated in the surveys. While it is believed that the willingness to participate in surveys are substantially lower for high-income households, there is no evidence on the exact pattern of refusal rate and there is no formula developed to correct the sample by weighting. Due to their absence from the sample, the characteristics of refusing households are not well known.

The choice of income equivalence weight

Theoretically, income equivalence weights should be carefully selected based on the consumption pattern of the households in a country of question. In practice, there is no empirical evidence on the equivalence weight that would best reflect the household consumption pattern in Hungary. For practical reasons, the equivalence weight of 0.5 was chosen for base-case analysis to allow for direct comparison with the results of the ECquity project. However, “sensitivity analyses” were performed on other equivalence weights to test the impact of the choice on final results.

In the case of the analysis of equity in the finance of health care, similarly to the calculation of equivalent income, *equivalent payments* have been calculated by using the same equivalence weights.

“Allocation” of burden of payments for health care

According to the methodology of the ECuity project by Doorslaer and Wagstaff (1997), it was assumed that the burden of all direct payments, direct and indirect taxes, and all health insurance contributions paid by either the employer or the employee fall on the household.

Although Doorslaer and Wagstaff recommended calculating the burden of corporate income taxes as those falling on the owners of companies, this item was excluded from this research. The Hungarian Household Budget Panel database did not allow for identifying owners of companies and corporate taxes paid by them. This was due to the

complex ownership situation, large involvement of foreign owners, and lack of relevant data. Corporate income taxes account for about 18% of total central budget revenues, which corresponds to a 4.2% share in the finance of health care. Base-case analysis assumed that central revenues came only from personal income taxation (29.2%), VAT (47.6%), and excise taxes (23.2%). Corporate income taxes and some smaller revenue items were excluded from detailed analyses. This method implicitly assumed that their burden was distributed among the population as those of the included main taxes. As corporate income taxes are believed to be one of the most progressive taxes, their omission from the analysis underestimates the actual level of progressivity of total payments for health care.

Assumption on perfect tax paying scenario

The data analysis method explicitly assumed that all individuals in the sample as well as their employers did follow the official tax regulations. In the real world, however, official tax regulations are not always fully followed. There is a decreasing but still relevant black or grey economy in Hungary. It is known that unofficial economy involves high income as well as low-income individuals. However, there is no evidence on whether there is a systematic relationship between the level of income and the probability of being involved in unofficial economy. Therefore, it cannot be estimated how the presence of unofficial economy influence the validity of the study findings.

6.3.2 Inequalities in health status and equity in the delivery of health care: the National Health Monitoring OLEF2000 Survey

The objective of the National Health Monitoring OLEF2000 Survey (Survey 3) was to increase the understanding of the current health status of the Hungarian adult population. The survey was conducted in the last quarter of year 2000. As compared to the traditional way of generating health or morbidity data, the key novelty of this survey was that it included a number of new self-assessed health status questions, as well as questions on demographic and socio-economic background information. This section describes the

main characteristics of the survey, before introducing the details of variables used to measure income, health status, and utilisation of health care.

Main characteristics of the survey

The sample was based on 7000 randomly selected adults from the electoral registry of Hungary. Sample size was identified on the basis of a sample size calculation to determine a sample size that allows the detection of diseases with prevalence level of minimum 5%. Sampling included the selection of 440 locations (including towns and villages) before the selection of 7000 individuals. The sample was representative with respect to the type of living area. All counties of Hungary were represented in the sample.

12.5% of selected people could not be found at the given address. No substitution was made for these individuals. 1.4% was not able to respond. 7.5 % refused to take part in the survey. Therefore, the overall participation rate was 78.6% with a total number of 5533 respondents. An additional 30 individuals refused to sign a form that contained their agreement of allowing to use their data for public health purposes. The final database included data from 5503 individuals.

55.2% of the sample population was female. 38% belonged to age group 18-39 (51% female), 36% belonged to age group 40-59 (54% female), and 26% belonged to age group over 60 (62% female).

The final sample well represented the Hungarian population with respect to demographic, gender, and living area characteristics. To correct the slight deviations from the population characteristics, the sample was weighted for age, gender, and living area characteristics.

The response rate to individual questions was generally high. The response rate to the key health status variable, i.e. health-related quality of life measured by the EQ-5D instrument was close to 100%. The response rate to the five dimension questions varied between 96 and 98%. The response rate to the visual analogue scale question was 97%. The response rate to the income question was 88%. The educational and occupational

characteristics of those individuals who refused to answer the income question differed from those who answered the questions. Differences of characteristics favoured the non-respondent group. The sample was not corrected for income response rate, as there was no sufficient information available on the income characteristics of non-respondents to develop a weighting formula. Therefore, higher income individuals were more than likely to be underrepresented in the final sample.

In the analysis of concentration indices was performed on a sub-sample of 4464 individuals with complete income and EQ-5D data.

The survey included two main parts with respect to the questionnaire administration method:

- There was a personal interview that covered most of the health and socio-economic background questions.
- The interview was supplemented with an additional questionnaire that was self-administered but interviewer attended. The interviewers asked the respondents to fill in a short questionnaire during their presence by allowing for break of the interview. The self-administered questionnaire involved some specific health status questions including the EQ-5D instrument followed by questions with psychiatric, sexual, and suicidal content.

Income variable

One direct question was asked about the net monthly household income:

“Please estimate what is the total monthly net income of individuals living in your household, i.e. how much is the money that is available for the household in a month?”

This question was included in the interviewer-administered part of the survey. The net monthly income was transformed to equivalent income by using 0.5 as equivalence weight in base case analysis. Similarly to the analysis of equity in the finance of health care, 0.5 was used as equivalence weight in base-case analysis⁸. Sensitivity analysis was

⁸ Equivalent income = Household income / $N^{0.5}$, where N is the number of household members.

performed on equivalence weights of 0.73 and 1 to test impact on final concentration indices.

Health status measurement

As the objective of the National Health Monitoring OLEF2000 Survey was to understand the health status of the Hungarian population, an extensive list of questions on health status were included in the survey. Questions covered all major disease areas (except for cancer) as well as health-related behaviour.

In addition to the disease-related questions, more generic or summary measures of health status were also included in the survey. The analysis of inequalities in health status and equity in delivery of care was based on using continuous and categorical generic measures of health status. These variables included the followings:

- The EQ-5D instrument
- Functionality
- Chronic illness
- Wagstaff and van Doorslaer (WvD) continuous measure based on self-assessed categorical health.

For the base-case analysis, the EQ-5D instrument was used as the measure of health status. The rest of this section describes these data used to measure health status.

The EQ-5D instrument

The EQ-5D questionnaire is a generic, utility-based HRQL instrument developed by an international, multidisciplinary group of researchers in order to provide a simple, generic measure of health for clinical and economic appraisal (EuroQol Group, 1990).

The EQ-5D questionnaire has five domains including mobility, self-care, usual activities, pain/discomfort and anxiety/depression. Each domain has three levels: no problem, some problem, severe problem. Therefore, altogether there are 243 health states defined.

A utility weight is assigned to each health state. Utility weights are elicited from general population surveys that used one of the available direct utility assessment methods. The most frequently applied value set, the “York formula” is based on a large UK study that used the time trade-off (TTO) utility assessment method (MVH Group, 1995). A more recent formula was estimated based on the analysis of pooled data from preference elicitation surveys in general populations of various European countries (Weijnen et al. 1999). The advantage of this alternative formula is that it is based on preferences of general population of several European countries as compared to the MVH formula, which is based on UK population preferences. The disadvantage of the European value set is that it is based on the visual analogue scale (VAS) method, which is the least accepted way of eliciting utilities.

In summary, health status can be measured in three different ways by using the EQ-5D instrument:

- A single utility index based on general population preference values (EQ-5Dindex);
- Self-rated health based on the visual analogue scale question from zero, i.e. worst imaginable health state and 100, i.e. best imaginable health state (EQ-5Dvas);
- As profile along the five dimension questions (EQ-5Dmobility, EQ-5Dself-care, EQ-5Dusual activity, EQ-5Dpain/discomfort, EQ-5Danxiety/depression).

Figure 6.1: The EQ-5D instrument

By placing a tick in one box in each group below, please indicate which statements best describe your own health state today.

Mobility

- I have no problems in walking about
- I have some problems in walking about
- I am confined to bed

Self-Care

- I have no problems with self-care
- I have some problems washing or dressing myself
- I am unable to wash or dress myself

Usual Activities (e.g. work, study, housework, family or leisure activities)

- I have no problems with performing my usual activities
- I have some problems with performing my usual activities
- I am unable to perform my usual activities

Pain/Discomfort

- I have no pain or discomfort
- I have moderate pain or discomfort
- I have extreme pain or discomfort

Anxiety/Depression

- I am not anxious or depressed
- I am moderately anxious or depressed
- I am extremely anxious or depressed

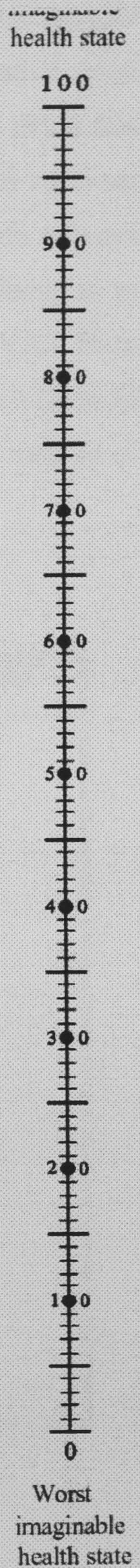
Compared with my general level of health over the past 12 months, my health state today is:

- Better PLEASE TICK
- Much the same ONE
- Worse BOX

To help people say how good or bad a health state is, we have drawn a scale (rather like a thermometer) on which the best state you can imagine is marked 100 and the worst state you can imagine is marked 0.

We would like you to indicate on this scale how good or bad your own health is today, in your opinion. Please do this by drawing a line from the box below to whichever point on the scale indicates how good or bad your health state is today.

**Your own
health state
today**



Regarding the calculation of the EQ-5Dindex, as there were no available utility weights elicited from the Hungarian general population, the analysis used two alternative value sets. Utility index was calculated by using the so called York formula (MVH, 1995) that is based on a UK population survey with TTO method, and the European VAS value set (Weijnen et al, 1999) which is based on a combination of general population surveys conducted across European countries by using the RS method. The first is referred to as EQ-5DindexTTO while the second variable is referred to as EQ-5DeuropeanVAS. Both variables are continuous measures and include the state of death. Negative values of health states indicate health states that are worse than death. The calculation method of the utility index is illustrated in Table 5.19.

Table 5.6: Coefficients for the estimation of the EQ-5Dindex values:

	European VAS value set	York TTO value set
Constant	0.996	1
At least one 2 or 3	-0.204	-0.081
At least one 3	-0.191	-0.269
Mobility=2	-0.055	-0.069
Mobility=3	-0.180	-0.314
Self care=2	-0.103	-0.104
Self care=3	-0.143	-0.214
Usual activities=2	-0.024	-0.036
Usual activities=3	-0.071	-0.094
Pain/discomfort=2	-0.084	-0.123
Pain/discomfort =3	-0.139	-0.386
Anxiety/depression=2	-0.072	-0.071
Anxiety/depression=3	-0.111	-0.236

To measure ill-health rather than health, variables $(1 - \text{EQ-5Dindex})$ were used in the measurement in inequalities. Similarly, self-rated ill-health was measured as $1 - \text{EQ-5Dvas}$.

Variables of the five dimension questions were dichotomised by defining ill-health as 1 if someone has *some* or *severe* (level 2 or level 3) problems, and zero if someone does not have any problems (level 1). These variables were used in the analysis of the income-related inequalities along the five different problems.

Chronic illness

Chronic illness variable was also a dummy variable constructed from ten questions about major chronic diseases. Ten questions were asked about chronic diseases, including hypertension, myocardial infarction in the past, other heart diseases, stroke, hypercholesteremia, diabetes, asthma, other allergy, long-standing liver problems, chronic pain (due to musculoskeletal problems). If the respondent indicated at least one of these chronic problems then the value of the “Chronic illness” ill-health variable was 1, otherwise it was zero.

Functionality

The variable of functionality is also a dichotomised variable constructed from different questions about limited functioning. This variable was constructed within the framework of the health monitoring survey program. The value of zero indicates no problem while the value 1 indicates problem with functionality.

WvD's measure of health

WvD' measure of health was constructed in the same as described by Wagstaff and van Doorslaer (1994) and as was applied by Gerdtham et al. (1999). The objective of the calculation of the WvD' measure of health was the generation of data for comparative analysis. Several previously conducted international analyses in this field used categorical variables on health status. The calculation of the concentration indices with the WvD' measure makes it possible to compare the Hungarian results with those international results that are using the same approach.

The WvD's method of constructing continuous measure of health status based on self-assessed categorical variable had the following steps:

The commonly used five-point self-assessed categorical health variable (H) has the values between 1 (i.e. very bad health) and 5 (i.e. very good or excellent health). It is assumed that there is an underlying latent health variable (H^*) that has a standard lognormal distribution. The categorical variable is related to the latent variable in the following way:

1. $H = 1$ if $-\infty < H^* = \alpha_1$
2. $H = 2$ if $\alpha_1 < H^* = \alpha_2$
3. $H = 3$ if $\alpha_2 < H^* = \alpha_3$
4. $H = 4$ if $\alpha_3 < H^* = \alpha_4$
5. $H = 5$ if $\alpha_4 < H^* < \infty$

Where α_i are threshold values. If the assumption was that H^* had a standard normal distribution then threshold values could be calculated with the following equation:

$$(1) \quad \hat{\alpha}_j = \Phi^{-1} \left(\sum_{i=1}^j \frac{n_i}{N} \right), j = 1, 2, \dots, j-1$$

Where Φ^{-1} is the inverse standard normal cumulative density function, n_j is the number of respondents in category j , and N is the total number of respondents. The mean values of the five intervals can be estimated as normal scores (Z_j):

$$(2) \quad \hat{Z}_j = \left(\frac{N}{n_j} \right) \left[\phi(\hat{\alpha}_{j-1}) - \phi(\hat{\alpha}_j) \right]$$

Where Φ is the standard normal density function.

But assuming that the latent health variable (i.e. H^*) has a lognormal rather than a normal distribution, then:

$$(3) \quad \hat{Z}_j = -\ln H^*,$$

Therefore, final values on the continuous health variable can be obtained as follows:

$$(4) \quad H^* = \exp(-\hat{Z})$$

This variable was used as the continuous alternative of the five-point self-assessed categorical health variable.

Health care utilisation variables

In Hungary, health care is provided at three main service level, involving primary care (GP), specialist care at outpatient clinics or outpatient departments of hospitals, and in-patient care at hospitals. Dental care traditionally belongs to primary care level services. However, due to that dental care is organised separately from GP practices an additional question was included in the analysis.

Health care utilisation was, therefore, measured along four main types of health care services. These included:

- General practitioner visits
- Outpatient specialist visits
- Days spent in hospital
- Visits to dentists

There was a direct question asked about the number of visits the respondent had in the past 12 months. In the case of hospital treatment, the respondent had to define the number of days spent in hospital in the past 12 months.

The calculation of the concentration indices related to health care utilisation was based on natural units (i.e. number of visits, days spent in hospital) rather than using a monetary value of the services used. The concentration index would give the same result independently from whether service units or the monetary value units are used, given that each service unit costs the same⁹.

⁹ This is due to that the value of the concentration index is the same if there is a proportional relationship between the two variables.

In addition to four types of health care service utilisation data, total health care utilisation was also measured by applying the imputed expenditures computation method. The imputed expenditure of total health care services used by the individuals was estimated by multiplying the number of services with their estimated costs.

Unit costs of health care services was provided by the GYOGYINFOK Institute, which is an organisation devoted to the collection and analysis of health care cost data. The GYOGYINFOK is responsible for determining health care finance fees that are paid to health care providers.

The average unit costs presented in Table 6.7. are representing the average fees that providers received for a visit during year 2000.

Table 5.7 Average costs of each type of health care services

Health care service	Unit cost in HUF
General practitioner visits	624
Outpatient specialist visits	782
One day spent in hospital	10474
Visits to dentists	1713

An important data limitation in the analysis of equity in the delivery of health care was the omission of the utilisation of medications. Although there have been data collected about the use of medications, these were not expressed in monetary terms or other comparable units.

6.3.3 Inequality aversion survey

A particular problem related to the use of concentration indices in the measurement of equity in health and health care is the lack of understanding how concentration indices can be interpreted. The objective of collecting data on inequality aversion was to evaluate how these data can be integrated into a health-related social welfare function. Revealing public preferences for health inequality aversion is in itself an interesting information as it can support decisions which involve the consideration of trade-offs between equity and efficiency objectives in health care.

To elicit preferences for inequality aversion, two experiments were conducted among decision-makers in the health care administration and among young practicing physicians. Data collection among these subgroups of health care professionals is interesting as the former group represent those making policies and running the health care system, while the latter represent those who directly provide medical care to the patients. The questionnaire used to measure preferences for inequality aversion was the modified version of the questionnaire developed by Shaw et al (2001) at the University of York. The rest of this section first describes the survey samples and the details of the instrument.

Survey sample

Data were collected by using the inequality aversion questionnaire with two groups of health care professionals. Survey 4 involved 44 health care decision-makers while Survey 5 included 72 young physicians (equivalent to senior house officer level). Both surveys were conducted in Spring of 2001.

Both surveys took place at training/conference programs for health care professionals. The survey with health care decision-makers had two sites: one was a workshop for higher level civil servants of the National Health Insurance Fund, while the other was a workshop for a mixed audience of health care decision-makers of public health officers

from different parts of the country. Although the survey covered decision-makers from a national level health care finance institute as well as decision-makers from the various counties of Hungary, the sample did not fully represent all health care decision-makers of Hungary. For example, civil servants of the ministry of health were not included in the sample.

Survey 5 was performed at a health economics training class for senior house officer level physicians in the university city of Debrecen. The audience was informed about the objectives of the research and was asked to fill in the questionnaire. This survey included a sample from one of the four medical universities of Hungary and therefore the sample can not be called representative for young physicians of the country.

There was 1 respondent in the health care decision-makers group who indicated difficulty of understanding the questionnaire from its second question. This questionnaire was excluded from the analysis.

There was no data collected from the general population of Hungary. The objectives of Survey 4 and Survey 5 was experimental with the aim to gain understanding of connecting data on public preferences for health inequalities with the actual inequalities measured by the concentration index.

Inequality aversion questionnaire

The inequality aversion questionnaire was adopted from the questionnaire developed by Shaw et al (2001). The adaptation included two main components.

Firstly, the questionnaire was modified to reflect realistic data on the current level of inequalities in Hungary. Data were taken from the Health Monitoring OLEF2000 Survey (Survey 3). Non-standardised values of the $EQ-5D_{indexTTO}$ were used to construct baseline data for the morbidity question. According to the survey results, the richest quintile of the population had a value of 0.90 while the poorest quintile had a mean value of 0.75.

Secondly, more text-based explanation was given to each graphical question. This was done in order to increase the probability that respondents understand the full meaning of

the questions. No test of comprehension or any validation of this instrument was performed. Figure 6.2 illustrates the key content of the questionnaire.

Procedures

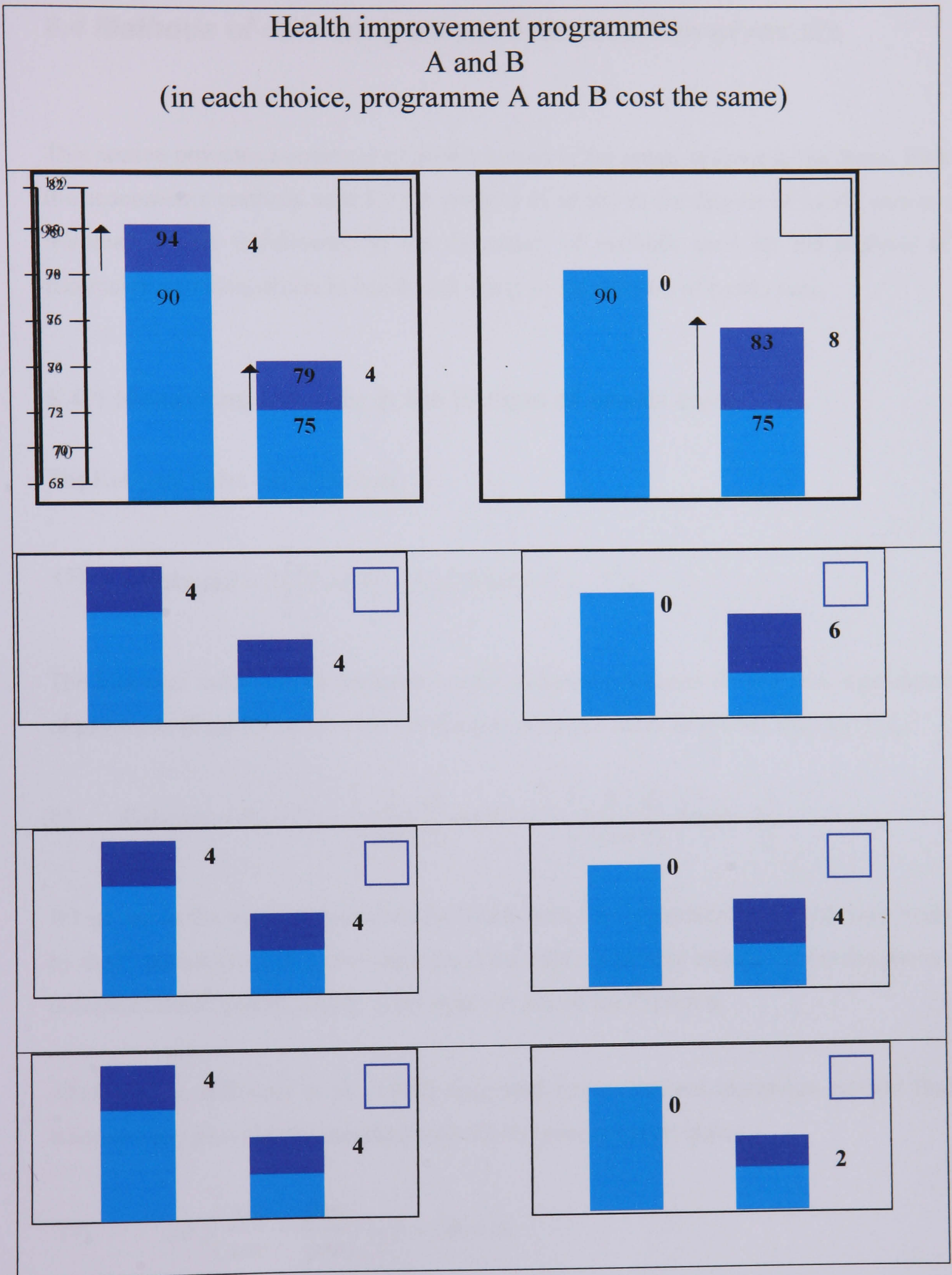
The inequality aversion questionnaire first explained a hypothetical scenario in which preferences can be expressed about two health care programmes (programme A and programme B). Each programme covers two population sub-groups: a group with high income level and better current health status and a group with low income level and worse current health status.

Programme A always offers a choice when both the better off and the worse off population sub-group can achieve the same amount of improvement of health during the programme. Programme B on the other hand offers a choice when the worse off population sub group achieves a higher improvement in health than the better off sub-group. Both programmes cost the same.

The first question presents a scenario when the total amount of health gain is equal between programme A and B. The remaining 3 questions present scenarios when the total amount of health gain is smaller for programme B than for programme A reflecting an equity-efficiency trade-off. The questionnaire explains to the respondents that in these cases programme B that targets the worse-off population group leads to less overall health gain as it is more expensive to implement programmes for the low income individuals (e.g., health prevention programmes that target the poor).

Each scenario reflects different level of loss in overall health that can be traded for greater equity. The level of inequality aversion is reflected by how far respondents are willing to go in sacrificing efficiency for equity. In fact, the last scenario offers an extreme scenario for those preferring reducing equity even at the expense of ensuring smaller health for both the rich and the poor.

Figure 6.2: Summary illustration of the inequality aversion questionnaire



6.4 Methods of data analysis and interpretation of results

This section provides a summary of methods used in the actual analysis in the thesis. First the econometric methods used for the analysis of equity in the finance of health care are introduced. This is followed by the discussion of methods used for the analysis of income-related inequalities in health and equity in the delivery of health care.

6.4.1 Measuring inequity in the finance of health care:

The Kakwani index can be written:

$$(5) \quad Kakwani = 2 \int_0^1 [L_{tax}(R) - L_{pre}(R)] dR = C_{tax} - C_{pre}$$

The Kakwani index can be computed as the difference between the concentration index of payments (C_{tax}) for health care and the concentration index of pre-tax income (C_{pre}):

$$(6) \quad Kakwani = C_{tax} - C_{pre} = \left[\frac{2}{N_{tax}} \sum_{i=1}^N tax_i R_i - 1 \right] - \left[\frac{2}{N_{pre}} \sum_{i=1}^N pre_i R_i - 1 \right]$$

Where tax is the mean of payments for health care, tax_i is payment for health care made by the i^{th} person (ranked by income), pre is the mean of pre-tax income, pre_i is the pre-tax income of the i^{th} person, and R_i is the relative rank of the i^{th} person.

Alternatively, Kakwani et al. (1997) suggested the convenient regression method that automatically provides the standard error for the concentration index:

$$(7) \quad 2\sigma_R^2 \left(\frac{tax_i}{tax} - \frac{pre_i}{pre} \right) = \gamma + \delta R_i + u_i$$

where σ^2 is the variance of the relative rank.

All analyses have been run by both methods and resulted in identical Kakwani index values without exception.

6.4.2 Measuring income-related inequalities in health

The ill-health concentration index can be quantified as 1 minus the area below the ill-health concentration curve, which is equivalent to twice the area between the ill-health concentration curve and the diagonal. This can be mathematically expressed as:

$$(8) \quad C_H = 1 - \int_0^1 L_H(R) dR$$

where, L_H indicates the ill-health function that gives the cumulative percentage of ill-health by the cumulative percentage of the population ranked (R) by income.

The ill-health concentration index can be best computed by using the following formula:

$$(9) \quad C_H = \frac{2}{h} \sum_{i=1}^N w_i h_i R_i - 1$$

where, h indicates weighted mean ill-health, h_i indicates ill-health of individual i , and R_i indicates the relative rank of individual i defined as:

$$(10) \quad R_i = \frac{1}{N} \sum_{j=1}^{i-1} w_j + \frac{1}{2} w_i \quad \text{where } w_0 = 0$$

Alternatively, Kakwani et al. (1997) suggested the convenient regression approach that makes the computation of the standard error of the concentration index simpler:

$$(11) \quad 2\sigma_R^2 \left(\frac{h_i}{h} \right) = \gamma + \delta R_i + u_i$$

where σ^2 is the variance of the relative rank.

The OLS estimator of δ is equal to:

$$(12) \quad \hat{\delta} = \frac{2}{h} \sum_{i=1}^N w_i (h_i - h) \left(R_i - \frac{1}{2} \right)$$

and this, from equation (9) makes δ' equal to C_H . The regression analysis of equation (11) automatically provides estimates for standard error for the concentration index.

Decomposition analysis

The decomposition analysis helps to uncover and quantify to what degree the different sociodemographic determinants of health contribute to the income-related inequalities in health status.¹⁰ Wagstaff et al (2003) demonstrated first how to perform the decomposition analysis when health status is estimated by a linear regression model that includes demographic and socioeconomic explanatory variables (equation 13).

$$(13) \quad h_i = \alpha + \sum_k \beta_k x_{ki} + \varepsilon_i$$

Where h means health status, and X_k represents the socioeconomic and demographic explanatory variables used in the model. The concentration index can be decomposed by:

$$(14) \quad C = \sum_k (\beta_k \bar{x}_k / h) C_k + GC_k / h$$

Where, β_k means the estimated coefficient to X_k , α is the average health value, C_k is the concentration index for variable X_k , and GC_k is the generalized concentration index for the error term.

This shows that the overall health concentration index is the sum of the weighted concentration indices of the explanatory variables plus the unexplained component. The weights of the concentration indices present the elasticity of health status with respect to the explanatory variable.

Robin Hood index-related interpretation

Koolman and Doorslaer (2002) suggested an intuitive way of interpreting the value of the concentration index by quantifying the relationship between the Schutz coefficient and the health concentration index in large sample surveys.

¹⁰ The decomposition analysis can also be used to analyse overall (i.e. not income related) inequalities in health status. In this case, the ranking of individuals is based on their health status rather than by their income.

The Schutz coefficient (equation 15) represents the percentage of the total amount of Y (i.e. health, or any other inequality variable measures in an analysis), which needs to be transferred from that part of the population which is above average income to that part of the population which earns less than the average income. For this reason it is also referred to as the Robin Hood index.

$$(15) \quad S = \frac{1}{2\bar{y}n} \sum_{i=1}^n |y_i - \bar{y}|$$

Koolman and Doorslaer shows that in large samples, the predicted health concentration index value is equal to:

$$(16) \quad C = 16\bar{\sigma}_r^2 S$$

Further they argue that because in large samples the variance of the rank is equal to 1/12; the health concentration index can be expressed as 3/4 times the Schutz index.

Based on this approach, the predicted ill-health (1-EQ-5Dindex) concentration index value of -0.11 can be interpreted in the following way: 8.25% of total amount of ill-health measured by the EQ-5DindexEuro should be redistributed from those above the average income to those below that level in order to equalize the distribution of health.

6.4.3 Measuring inequity in the delivery of health care:

Estimation of a linear OLS model to explain GP, specialist and hospital use can be written - for continuous measures of health care utilization - as follows:

$$(17) \quad y_i = \alpha + \beta \ln inc_i + \sum_k \gamma_k x_{ik} + \sum_p \delta_p z_{ip} + \varepsilon_i$$

Three types of explanatory variables: income itself (lninc), need standardizing variables (x_k) and other variables (z_p).

Concentration indices of all variables can be computed using the simple 'convenient covariance' formula for weighted data:

$$(18) \quad C = \frac{2}{\alpha} \sum_{i=1}^N w_i (y_i - \alpha) (R_i - \frac{1}{2}) = \frac{2}{\alpha} \text{cov}_w(y_i, R_i)$$

where cov_w denotes the weighted covariance and R_i is the (weighted) relative fractional rank of the i th individual, defined as :

$$(19) \quad R_i = \frac{1}{N} \sum_{j=1}^{i-1} w_j + \frac{1}{2} w_i \quad \text{where } w_0 = 0$$

Robust estimates for C and its standard error can be obtained by running the following convenient regression of (appropriately transformed) y on relative rank

$$(20) \quad \frac{2\sigma_R^2}{\bar{y}} y_i = \alpha_1 + \beta_1 R_i + \varepsilon_{1,i},$$

where σ_R^2 is the variance of R_i and $\hat{\beta}_1$ is equal to \hat{C} .

Again, it is possible to estimate the separate "contributions" of the various determinants and their relative importance. The estimated (partial) demand elasticity of each determinant k is then defined as:

$$(21) \quad \hat{\eta}_k = \hat{\gamma}_k \bar{x}_k / \alpha$$

Where α is the mean of y and \bar{x}_k is the mean of x_k .

The total concentration index can be written as:

$$(22) \quad \hat{C} = \hat{\eta}_r \hat{C}_{\ln inc} + \sum_k \hat{\eta}_k \hat{C}_{xk} + \sum_p \hat{\eta}_p \hat{C}_{zp} + G\hat{C}_\varepsilon$$

where the first term denotes the partial contribution of income inequality, the second the contribution of need variables, the third the contribution of the other variables and the last term is the generalized concentration index of ε .

An index of horizontal inequity in health care use can then be computed by subtracting the need-expected inequality from total inequality:

$$(23) \quad HI = \hat{C} - \sum_k \hat{\eta}_k \hat{C}_{xk}$$

Where the second term is the need-expected inequality.

Chapter 7

Equity in the finance of health care

Based on the analysis of the Hungarian Household Budget Panel and the Informal Payment Survey databases, the results on equity in the finance of the health care system are presented in this chapter. The first section summarizes the role of individual payment methods in the overall health care finance. The second section introduces the concentration and progressivity of each of these payments. The last section discusses the key findings of the analysis and provides implications for policy-makers.

7.1 Share of payment methods in health care finance

The share of each payment methods in the overall health care finance was determined from mainly macro level administrative data. As described in more details in Chapter 2, the Hungarian health care system is funded through a mixture of payment methods.

In Hungary, health care is financed 61% from social health insurance contributions, 23.5% from general taxation (income taxes, VAT, excise taxes), and 15.5% out-of-pocket payments (including drug co-insurance and expenditure on OTCs, informal payments, and other direct payments for health care services and medical devices).

Table 7.1: Share of each payment method in total health care finance in 1999

	Billion HUF	Share
Personal income tax	50	0.0681
VAT	82	0.1117
Excise taxes	40	0.0545
Informal payments	30	0.0409
Drug co-payments and OTCs	70	0.0954
Private payments	15	0.0204
Income-related health insurance contributions	324	0.4414
Fix component of health insurance contributions	123	0.1676
Total	734	1

7.2 Concentration of income and payments

Concentration indices have been calculated for income and for each payment method based on the Hungarian Household Budget Panel Survey. The concentration index for informal payments were calculated based on the Informal Payment Survey. An equivalence weight of 0.5 is used for both income and payments in the base-case analysis, whereas equivalence weights of 0.73 and 1 are used in a sensitivity analysis to test how concentration index values change when different assumptions are made on the level of economics of scale in household expenditure. Table 7.2 summarises Gini-coefficients of pre-tax income based on the Household Budget Survey and the Omnibusz (informal payments) database.

Table 7.2: Gini-coefficients for pre-tax income in 1999

	Equivalence weight used		
	0.5	0.73	1
Household Budget Survey	0.3672	0.3627	0.3657
Informal payment survey	0.3613	0.3716	0.3953

*All concentration indices were statistically significantly different from zero ($p < 0.0001$)

The Gini-coefficient's significantly positive value reveals the level of income inequalities in Hungary. The richest ten percent of the population earns 40% of the total income made by the population. The Gini-coefficient derived from the Household Budget Survey and the Informal Payment survey were equal in the base-case analysis but slightly differed when higher equivalence weights were applied.

Table 7.3 shows concentration indices for each payment method that play a role in funding health care in Hungary. Concentration index estimates when alternative equivalence weights are used are presented in Appendix A.

Table 7.3: Concentration indices of payments for health care

	Concentration indices
Income taxation	0.7465
VAT	0.1814
Excise taxes	0.2248
Informal payments	0.0907
Drug co-insurance and OTCs	-0.0346
Direct payments	0.4789
Income-related health insurance contributions	0.4698
Fix component of health insurance contributions	0.2860

*All concentration indices were statistically significantly different from zero ($p < 0.0001$)

Most but one payment methods are concentrated among the higher income groups. The exception is payment for drug co-insurance and OTCs, which is mostly made by those who are the heaviest users of health care and also have lower than average income.

7.3 Progressivity of payments for health care

To assess how payments for health care deviate from proportionality as compared to income level, Kakwani indices are calculated (Table 7.4).

Table 7.4: Kakwani progressivity indices of payments for health care

	Kakwani progressivity indices
Income taxation	0.3793
VAT	-0.1858
Excise taxes	-0.1424
Informal payments	-0.2706
Drug co-payments and OTCs	-0.4018
Direct payments	0.1117
Income-related health insurance contributions	0.1026
Fix component of health insurance contributions	-0.0812
TOTAL KAKWANI	-0.0181

*Individual Kakwani indices were statistically significantly different from zero ($p < 0.0001$)

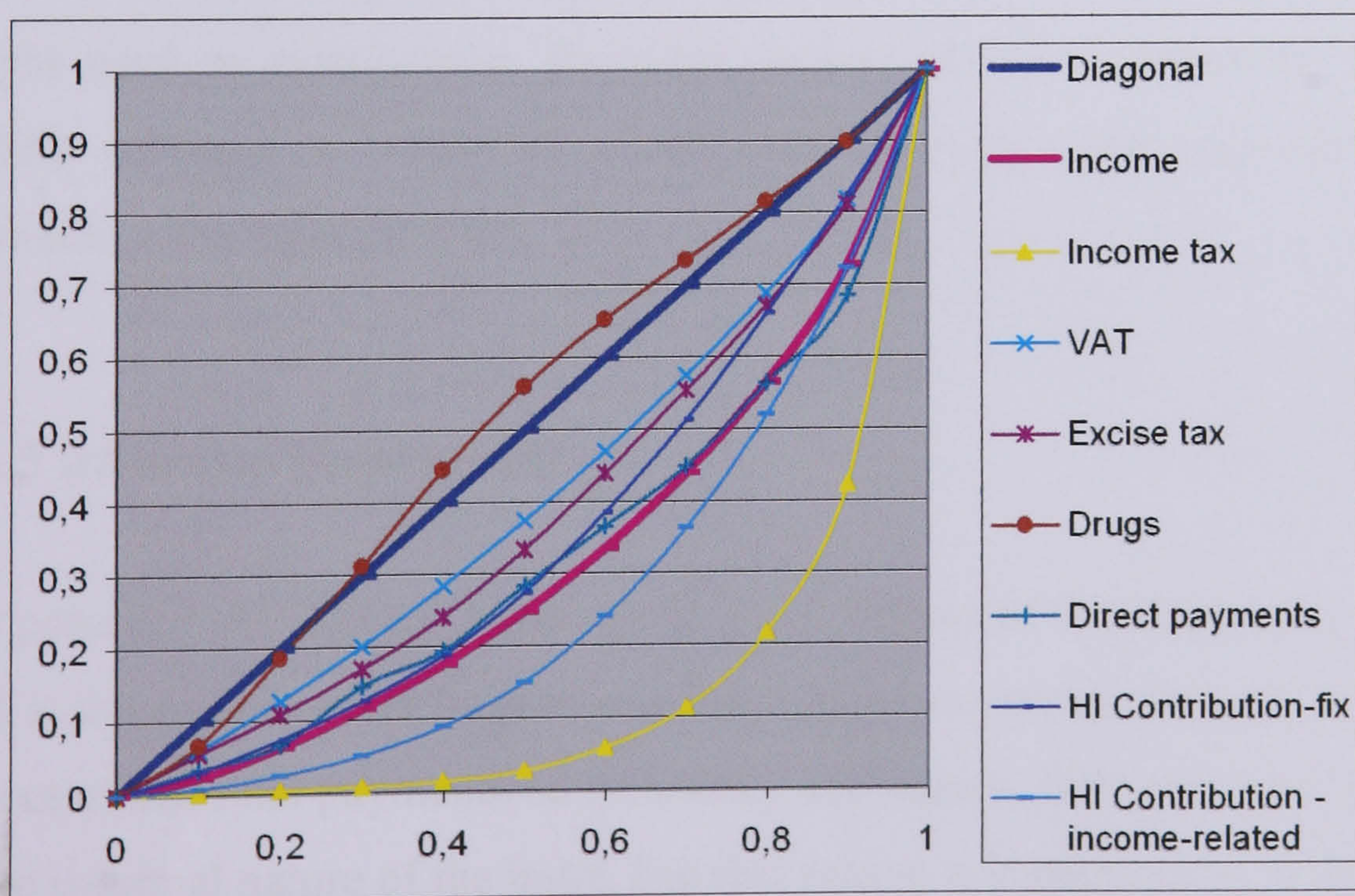
7.3.1 Progressive finance elements

Positive values for Kakwani indices revealed that three payment methods were progressive. This means that the burden of these payments is concentrated among the higher income groups as compared to proportionality. Progressive payment methods included:

- income taxation (0.3793);
- for the income-related component of health insurance contributions (0.1026);
- and other direct payments for health care (0.1117).

Figure 7.1 illustrates the distribution of pre-tax income and burden of payments for health care across income groups. This figure helps to understand the detailed picture of the distribution of tax burden across income deciles. The health insurance component and the income taxation shows a convex nature alongside all income groups, whereas direct payments for health care get its progressive nature in the high income groups. This is probably due to that high-income people are the main purchasers of services provided by the small private health care market in Hungary.

Figure 7.1: Concentration curves of pre-tax income and payments for health care¹¹



¹¹ This figure reflects results from base-case analysis when an equivalent weight of 0.5 is used. For the sake of clear illustration, the concentration curves are constructed based on mean payments by income deciles. However, the calculation of actual indices was based on individual observations as described in Chapter 6.

7.3.2 Regressive finance elements

Negative values for Kakwani indices revealed that four payment methods were regressive. This means that the burden of these payments is concentrated among the lower income groups as compared to a situation when income and payments for health care are proportional.

Regressive payments included the following methods:

- Indirect taxes such as VAT (-0.1858) and excise taxes (-0.1424)
- Fix component of health insurance contributions (-0.0812);
- Drug co-insurance paid by the population (-0.4018);
- Informal payments (-0.2706).

It can be seen from figure 7.1 that the concentration curve of indirect taxes and the fix component of health insurance contributions show a continuous convex pattern, whereas service use related payments such as drug costs are particularly affect middle income population. This is due to that older people (households with pensioners) who are the main users of health care belong to middle income groups.

Kakwani indices of general taxation were not sensitive to the choice of equivalence weight used in calculations. Kakwani indices of health insurance contributions were slightly sensitive to choice of weight and were the most sensitive for out-of-pocket payments. (See Appendix B.)

7.3.3 Informal payments

The presence of informal payments is a key feature of the Hungarian health care system as it is the case in other formerly socialist block countries. Despite the potential adverse impact of informal payments on efficiency and equity, little empirical evidence exists due to the informal nature of the issue. For this reason it is particularly valuable to analyse the

distribution of burden of informal payments based on the unique Informal Payment Survey database.

It is also interesting to test the so called “Robin Hood hypothesis” that providers may price discriminate (i.e. the rich are charged more than the poor) and perform cross-subsidy through the informal payment system (Ensor 2000).

First a regression analysis was run to explain the amount of informal payment given for health care. Results showed that income level of the individual was not a statistically significant explanatory factor in determining the amount of informal payment made. In addition progressivity indices were calculated for total informal payments and for informal payments made for different types of health care services.

Kakwani progressivity indices of informal payments for primary, inpatient, and outpatient care were all negative, reflecting a regressive payment system (Table 7.5).

Table 7.5: Progressivity of informal payments made for health care

Type of medical care	Kakwani indices for informal payments
General practitioner	-0.31
Outpatient specialist	-0.27
Hospital care	-0.24

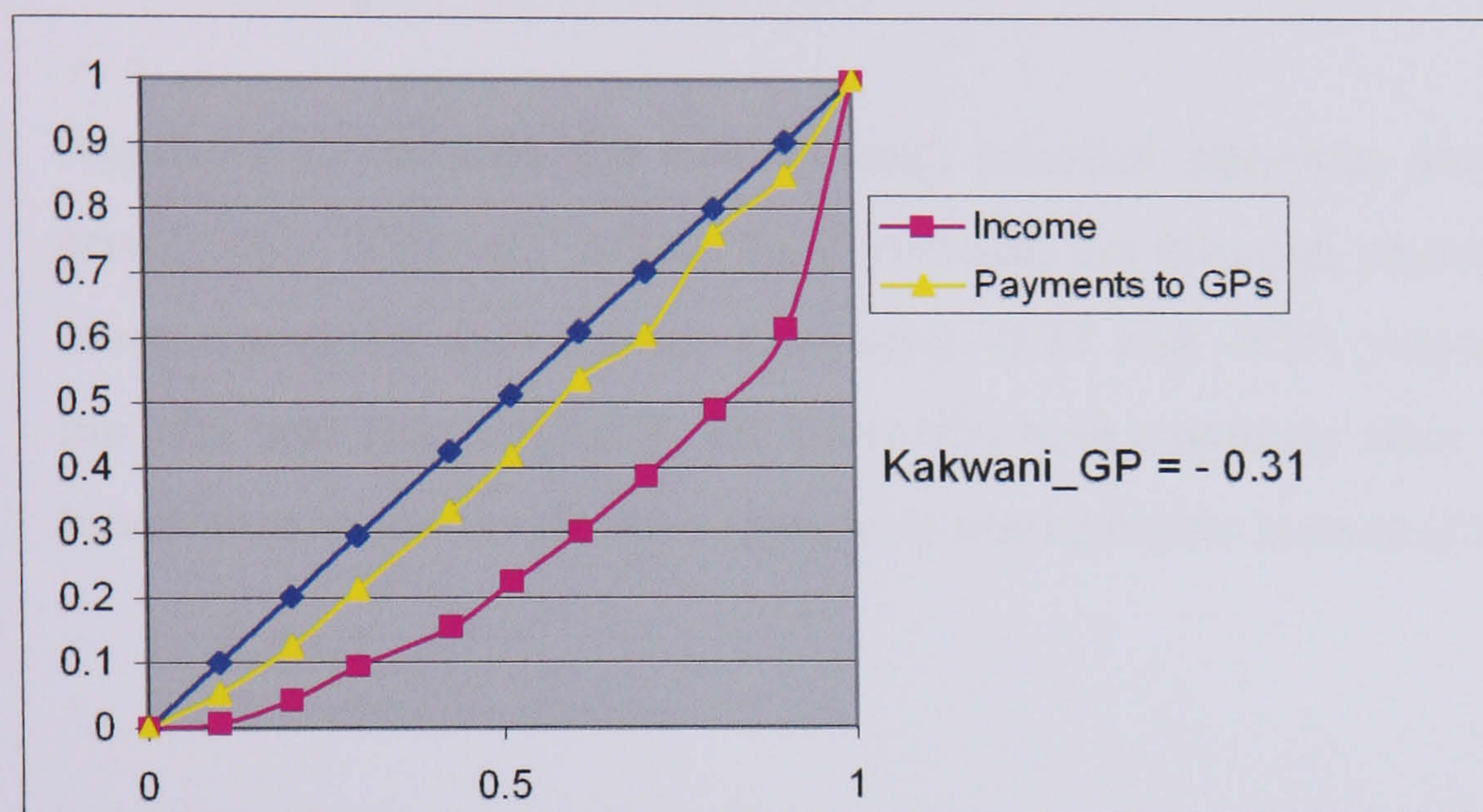
*Individual Kakwani indices were statistically significantly different from zero ($p < 0.0001$)

The above results can be interpreted in the following way. The informal payment concentration curve lies above the income concentration curve in all the three cases. This means that informal payments and income are not proportional to each other. Lower income people spend higher proportion of their income on informal payments.

For example, in the case of primary care, the poorest 20% of the population own less than 5% of the total income while their share in the total informal payments is more than 12%. At the same time, the richest 10 percentage of the population owns almost 40 percentage of the total income of the population and pays less than 15% of total informal payments.

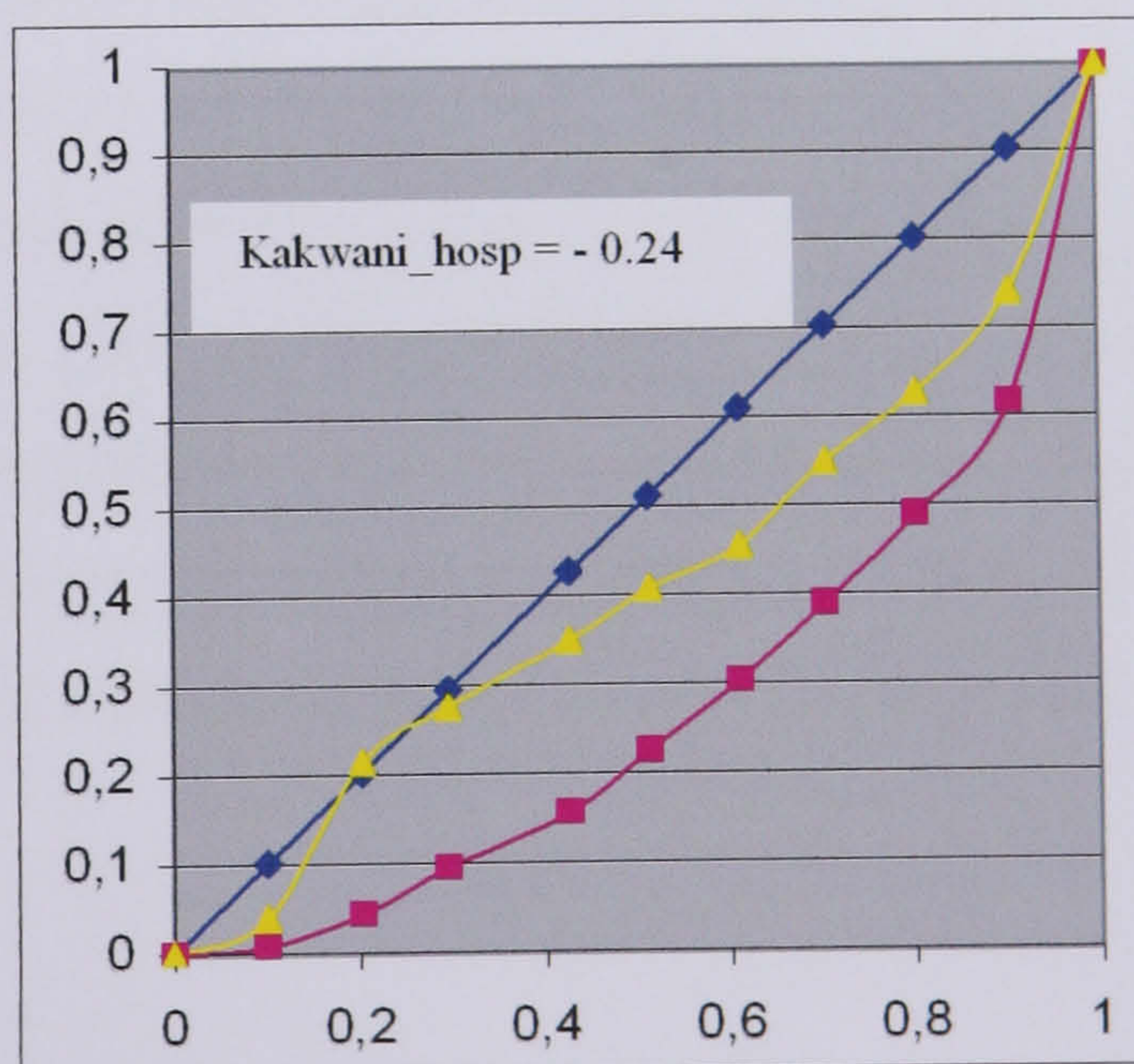
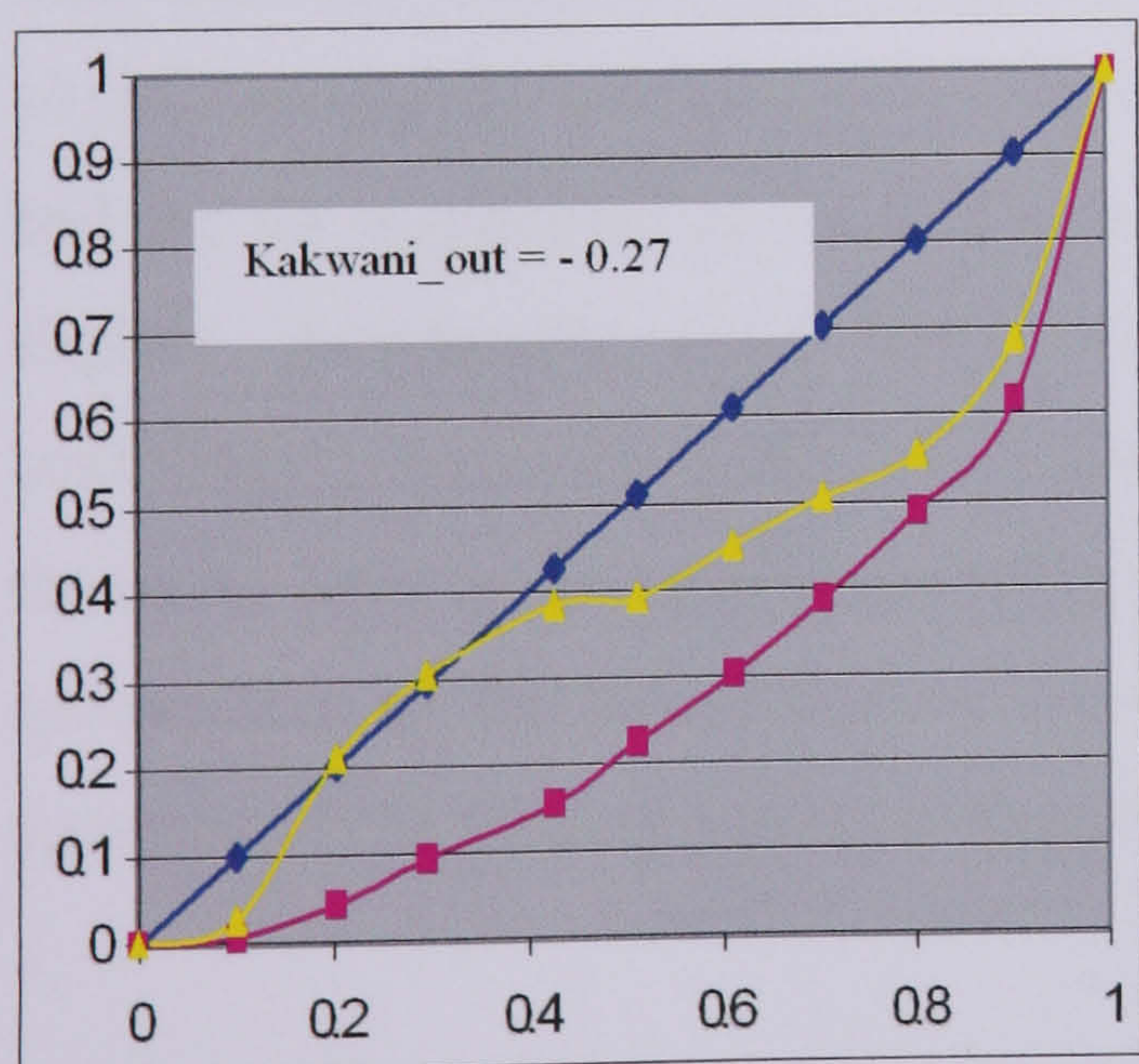
The Kakwani index reflected a most regressive nature for the case of primary care. Figure 7.2 illustrates the concentration of income and the concentration of informal payments made to GPs. The informal payment concentration curve shows that the amount of payment is close to equal across income groups.

Figure 7.2: Informal payments for primary care



The Kakwani index had a slightly smaller value in the case of outpatient and inpatient informal payments (Figure 7.3).

Figure 7.3: Informal payments for outpatient specialist and inpatient care



When comparing primary care with inpatient and outpatient care, it can be seen that the level of progressivity across income groups varies more in the case of inpatient and outpatient care. We can see a more regressive pattern among the lower income groups and a less regressive pattern among the higher income groups.

Appendix C includes the case of total informal payments and payments for official private care. Kakwani indices suggested that the informal payment system was slightly more regressive than private payments; -0.27 and -0.25, respectively. The pattern of inequity was also similar in the sense that both payments were more regressive among lower income groups and less regressive among higher income groups.

7.3.4 Overall progressivity of the finance of health care

The overall Kakwani index is the weighted average of individual Kakwani indices, where weights are the shares of each payment method in total health care funding.

The Kakwani index for the overall health care finance system was -0.0181 reflecting a *slightly regressive* overall nature. The regressive impact of direct, indirect general taxes, and the fix component of the health insurance contributions is *almost fully offset* by the slightly progressive (and large revenue share) income-related social insurance contribution component and the highly progressive (but less revenue share) income taxation. Due to the very large and opposite signed progressivity values of the different components of the mixed finance system, this balanced situation can be changed if the structure of the finance system is modified.

7.4 Discussion

7.4.1 Implication of key findings

In the interpretation of progressivity indices for different payment methods for health care, attention should be paid to the various factors that have impact on the value of the concentration index. Firstly, the payment rule can be such that the tax rate itself varies across income groups. Secondly, the proportion of individuals in different income groups who actually participate in a payment scheme. For example a payment method, such as income taxation, can be progressive because the marginal tax rate increases with income. On the other hand, a payment method can be also progressive because only higher income individuals are making that particular payment. An example for the latter case is direct out-of-pocket payments for private health care in Hungary, which mostly made by higher income individuals who are the users of the small private health care sector.

Results show that the financing of health care in Hungary is broadly speaking proportionate, proportionality turns out to be the result of offsetting progressive and regressive elements. The finding regarding the regressive nature of informal payments is particularly interesting, as it is in contrast with the common belief in the “Robin Hood hypothesis”, that physicians subsidize poor patients at the expense of rich patients.

The close to proportionate nature of the overall finance system of the health care does not necessarily mean an equitable state. Different individuals may regard different level of progressivity of payments equitable. Those seeking a greater degree of progressivity may focus attention on increasing the progressive elements in the current health care finance system.

7.4.2 Distribution of burden of payments among population sub-groups by activity status

Another interesting aspect of discussing the results is related to the composition of households falling in different income deciles and their participation in each payment types.

Table 7.6 summarizes the distribution of the population by activity status along income deciles. Additional tables were developed to illustrate the distribution of the population in payment deciles for each finance method.

Results clearly showed that the burden of policies that aim to increase out-of-pocket payments (i.e. drug co-payments, informal payments, and other direct payments) would fall on households with pensioners who are the key users of the health care system. These households belong to the medium income population of Hungary, including income deciles 2, 3, 4, 5, and 6. This explains why payments related to health care utilization show a progressive feature in this portion of the income distribution scale.

On the other hand, changes in direct and indirect general taxation and social insurance contributions would affect households with active workers (employees at companies and institutes). These households are over represented in the richest half of the Hungarian population.

It is also important to emphasise that households with children below the age of 14 – who are representing the majority of poverty in Hungary – would not be particularly affected by the change of any of the payment methods, as they are currently not major contributors to any of those. Data on the progressivity of payment methods and the population structure by income status is such that any change in the finance structure would lead to redistribution between middle-income and high-income population sub-groups.

Table 7.6: Population structure of activity status by income deciles

Activity status	Percentage (%) of people by activity status in each income deciles										Total
	1	2	3	4	5	6	7	8	9	10	
Children <14	32.7	18.3	16.5	13.2	15.6	16.4	18.8	15.9	12.5	10.1	17
Employee at company or institute											
Company, institute	1.4	3.5	5.4	6	9.3	13.2	16.9	22	26.3	30.1	13.4
Company	2.6	6.9	7.2	7.1	10.8	15.7	17.6	21.8	24.5	29.8	14.4
At one company	1	2.4	1.3	1.8	2.5	2.1	2.5	3.1	2.8	1.7	2.1
Seasonal worker	2.8	1.7	0.7	0.8	0.6	0.7	0.4	0.9	0.2	0.1	0.9
Employee elsewhere											
Agricultural company	0.1	0.2	0.5	0.7	0.7	0.5	1	1	0.9	0.5	0.6
Collaboration comp.	0	0	0	0.1	0.1	0	0	0.2	0.2	0.1	0.1
Ltd	0.1	0.2	0.1	0	0.2	0.1	0.1	0.2	0.6	1.1	0.3
Other type of comp	0	0.2	0.1	0	0.1	0	0.2	0.2	0.3	0.8	0.2
Entrepreneurs											
Private	2	1.5	0.8	0.9	1.5	1.9	2.4	2	3.7	4.1	2
With 1-10 employee	0	0.2	0.1	0.1	0.3	0.4	0.4	0.5	0.6	0.9	0.3
With >10 employee	0	0	0	0	0	0	0	0	0	0.1	0
Supporting family m.	0.4	0	0	0	0.1	0	0	0	0.1	0.1	0.1
Student	10.6	8.1	5.1	5.9	7.4	9.4	9.3	9.2	11.2	10.4	8.7
Housewife	3.8	3	2	1.4	1.1	1.2	0.9	1.1	1	1.1	1.7
Unemployed	14.8	8.3	6.3	4.9	4.6	4	4.7	3.8	3.7	1.3	5.6
Sick person	0	0.1	0	0.1	0.1	0.1	0	0.1	0	0	0
Maternity leave											
Maternity leave	0.1	0.4	0.2	0.2	0.2	0.2	0.2	0	0.3	0.1	0.2
Up to 2 years	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0	0	0.1	0.1
Up to 3 years	5.8	4.1	2.7	2.7	2.7	2.6	2.4	2.2	1.1	0.6	2.7
Pensioner	14.4	37.3	48.3	52.8	40.6	30.1	21	14.9	9.2	6.3	27.5
Disabled	0.8	0.6	0.2	0.1	0.2	0.1	0.2	0.1	0	0	0.2
Other	2.6	1.3	0.9	0.5	0.6	0.5	0.6	0.6	0.4	0.5	0.8
Without work	2	0.8	0.3	0.4	0.3	0.4	0.1	0.2	0.2	0.2	0.5
Long-term maternity l.	2.1	0.7	0.8	0.3	0.4	0.3	0.2	0.1	0.1	0	0.5
Total	100	100	100	100	100	100	100	100	100	100	100

Source: Calculation based on the Hungarian Household Budget Panel Survey database.

7.4.2 The impact of the choice of equivalence weight

An interesting finding from this research is the better understanding how the choice of different equivalence weights may influence the value of the progressivity indices for health care payments. Results suggest that, in Hungary, the value of the Kakwani index was sensitive to the choice of the equivalence weight only in the case of payments that are linked to the utilisation of health care.

The sensitivity of the progressivity index to the choice of the equivalence weight is a function of the joint distribution of income, payments, and household size. Results show that payments linked to health care utilisation look more progressive when a higher equivalence weight is used. Data suggests that this is the case because households with pensioners who are the key users of health care and consist of smaller households are ranked among higher income sup-groups when a higher equivalence weight is made. Therefore, these payments are shown to be more progressive.

7.4.3 Comparison with other Hungarian and international studies

In Hungary, this has been the first study that measured progressivity of payments for health care, and therefore there is no basis for comparison with results from previous years or authors.

The only study on measuring progressivity was that of Toth (1997). Toth looked at the progressivity of personal income taxation in Hungary in 1994 and 1996. The methods he used were similar to this study in the sense that he looked at Tax Authority data in a similar manner (i.e. same tax items have been involved in the analysis). However, his analysis was based on personal level data and was constrained to the adult population. Our different perspective (i.e. household basis) was adapted due to our primary objective, which was to identify level of equity in finance of health care. Tóth found an income tax concentration index of 0.6772 in 1994 and 0.7072 in 1996 and Gini coefficients of 0.49 in 1994 and 0.53 in 1996. Although Tóth did not report Kakwani indices, these can be easily reconstructed by subtracting the Gini-coefficient from the tax concentration index. Toth's

results, therefore, corresponds to a Kakwani index of 0.1872 and 0.1772, respectively. These values were smaller than Kakwani index of 0.3793 calculated the Household Budget Panel Survey. The difference is mainly due to difference in the Gini-coefficients that might be due to different basis of calculation (i.e. adult personal level vs. equivalent income on household level).

Internationally, empirical work in this field has been done exclusively by Doorslaer and Wagstaff. A series of earlier results and results from using refined methodology have been reported extensively (1993, 1997, 1998, 1999). Their study, however, involved local groups of researchers in 13 OECD countries and local results have been published separately in many cases (such as O'Donnell et al. 1991 and Propper 1998).

In international comparison it can be said that results from Hungary are consistent with international experience of other OECD countries in the sense that mainly publicly funded health care systems in general show an overall Kakwani index close to zero (i.e. a proportional overall finance system).

What is different from current international experience is the extreme progressivity values of general taxation elements in either negative or positive direction. Specifically direct taxes, i.e. mainly income taxation is more progressive, while indirect taxes are more regressive than observed in any other countries with comparable data. This is probably due to larger underlying income inequalities, higher marginal income tax rates, and slightly higher VAT tax rates in Hungary as compared to the international average.

Table 7.7 summarises empirical evidence on payment methods from 13 OECD countries in comparison with results from Hungary.

Table 7.7: International comparison of progressivity indices for payments for health care

	Direct taxes	Indirect taxes	Social insurance	Private payments	Overall
Denmark (1987)	0.0624	-0.1126	N/A	-0.2654	-0.0047
Finland (1990)	0.1272	-0.0969	0.0937	-0.2419	0.0181
France (1984)	N/A	N/A	0.1112	-0.3396	0.0012
Germany (1989)	0.2488	-0.0922	-0.0977	-0.0963	-0.0452
Ireland (1987)	0.2666	N/A	0.1263	-0.1472	N/A
Italy (1991)	0.1554	-0.1135	0.1072	-0.0807	0.0413
Netherlands (1992)	0.2003	-0.0885	-0.1286	-0.0377	-0.0703
Portugal (1990)	0.218	-0.0347	0.1845	-0.2424	-0.0445
Spain (1990)	0.2125	-0.1533	0.0615	-0.1801	0.0004
Sweden (1990)	0.0529	-0.0827	0.01	-0.2402	-0.0158
Switzerland (1992)	0.2055	-0.0722	0.0551	-0.3619	-0.1402
UK (1993)	0.2843	-0.1522	0.1867	-0.2229	0.051
USA (1987)	0.2104	-0.0674	0.0181	-0.3874	-0.1303
Hungary	0.3793	-0.1716	0.0419	-0.2808	-0.0181

(Source: Wagstaff and Doorslaer, 1999)

With respect to the overall progressivity of health care finance, Hungary is between those countries that are funded from general taxation, such as the UK, and those where private payments play a highly important role, such as the US and Switzerland. Hungary is closest to those countries where the health care system is funded through social insurance or is based on a mixed finance of social insurance and general taxation.

Chapter 8

Health status

Based on the analysis of the National Health Monitoring Survey OLEF2000 database, the results on income-related inequalities in the health status of the Hungarian population are presented in this chapter. The first section summarizes the core results on inequalities in health status, while the second section presents a decomposition analysis that shows inequalities at the level of quality of life dimensions. The following sections feature the interpretation of the concentration index, illustrate the problems with the comparability of indices based on different measures of health, and their application in inequality aversion studies.

8.1 Inequalities in health status

Table 8.1 presents mean health status values of the EQ-5D measures by income deciles and ill-health concentration indices

Income decile	VAS	EQ-5D index		Reported problems (%) along the 5 dimensions				
	EQ-VAS	York	Euro	Mobility	Self-care	Usual act	Pain/Disc	Anxiety/Depr.
Lowest	70	0,80	83	21	7	17	43	40
2.	68	0,79	82	23	8	18	46	40
3.	68	0,78	82	24	9	19	46	41
4.	66	0,77	81	27	10	21	49	42
5.	69	0,80	83	22	8	17	44	38
6.	70	0,82	84	20	7	16	40	36
7.	71	0,83	85	18	6	14	38	34
8.	72	0,84	86	17	6	13	36	32
9.	76	0,87	89	12	3	9	30	28
Highest	82	0,95	95	3	0	1	16	15
Standardised $C_{ill-health}$	-0.06	-0.13	-0.11	-0.15	-0.19	-0.16	-0.10	-0.10

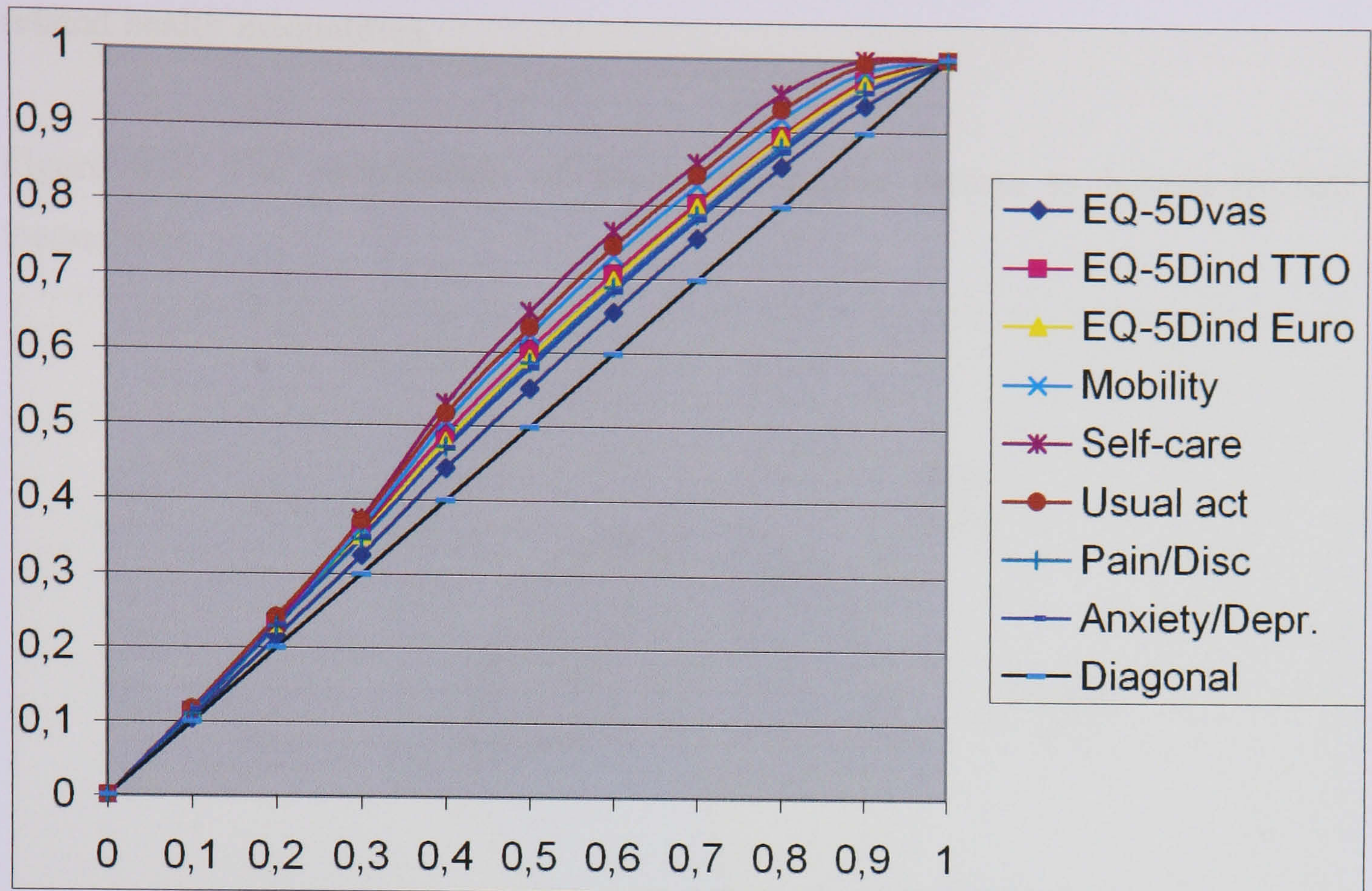
Important differences can be observed in the Hungarian population in all EQ-5D measures by different income groups. For example, the difference in the EQ-5D indexEuro between the richest and the poorest tenth of the population corresponds to a quality of life difference between a 50 year old and a, 80 year old person. The large differences in the summary index measures of health status can be derived from the reported problems along the five dimensions of the EQ-5D. For example, while 40% of the poorest tenth of the population suffers from anxiety/depression, the prevalence of this problem among the richest group is only 15%.

The relationship between income and health status is reflected in the negative values of the ill-health concentration index. These index values cannot be compared across the different EQ-5D measures because the neither of the EQ-5D measures can be derived from each other through a linear transformation. EQ-5D measures could be compared across countries had there been available such data available for countries other than Hungary.

Finally, Figure 7.1 illustrates the concentration curves graphically¹². It can be seen that decrease in health by income is slightly inconsistent among the poorest four income deciles groups. It is unclear from the model used in the analysis what was the reason for this phenomenon. A hypothesis could be the differences in reporting income level among the low-income groups.

¹² For practical reasons the illustration is based on mean ill-health values by income deciles.

Figure 8.1: Ill-health concentration curves based on the EQ-5D health status measures



8.2 Decomposition analysis

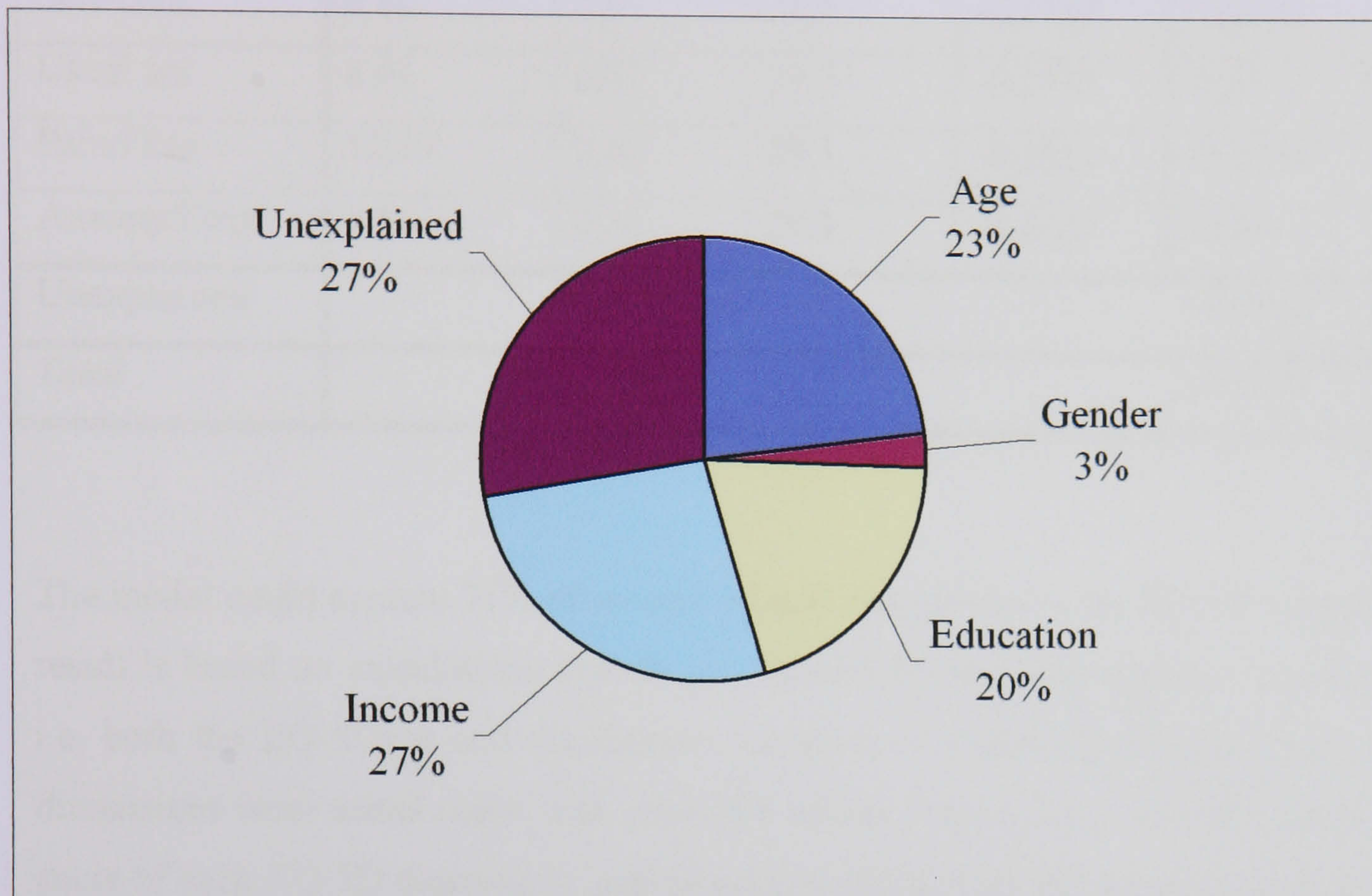
Table 8.2: Results of the decomposition analysis by sociodemographic factors

	β_k	X_k	μ	C_k	Components
Age	0,38	46,7	15	-0,035	-0,0414
Gender	-3	0,48	15	0,048	-0,0046
Education	-4,48	0,39	15	0,31	-0,0361
Income	-0,00005	49408	15	0,29	-0,0478
Unexplained					-0,0501
<i>Total</i>					-0,1800

β_k values show how health status changes with a unit of change in the explanatory variable. The direction of changes in health status is consistent with the positive or negative sign of the concentration index of the explanatory variable: being older, being female, having low education, and having low income contribute to worse health. Figure

8.2 illustrates the final contributing portions of each of the explanatory factors to income-related health inequalities.

Figure 8.2: The contribution of sociodemographic factors to income-related health inequalities



The largest portion of income-related health inequalities was explained by income level itself. The second and third most important factors were age and education level. Gender had the smallest fraction in total income-related health inequalities.

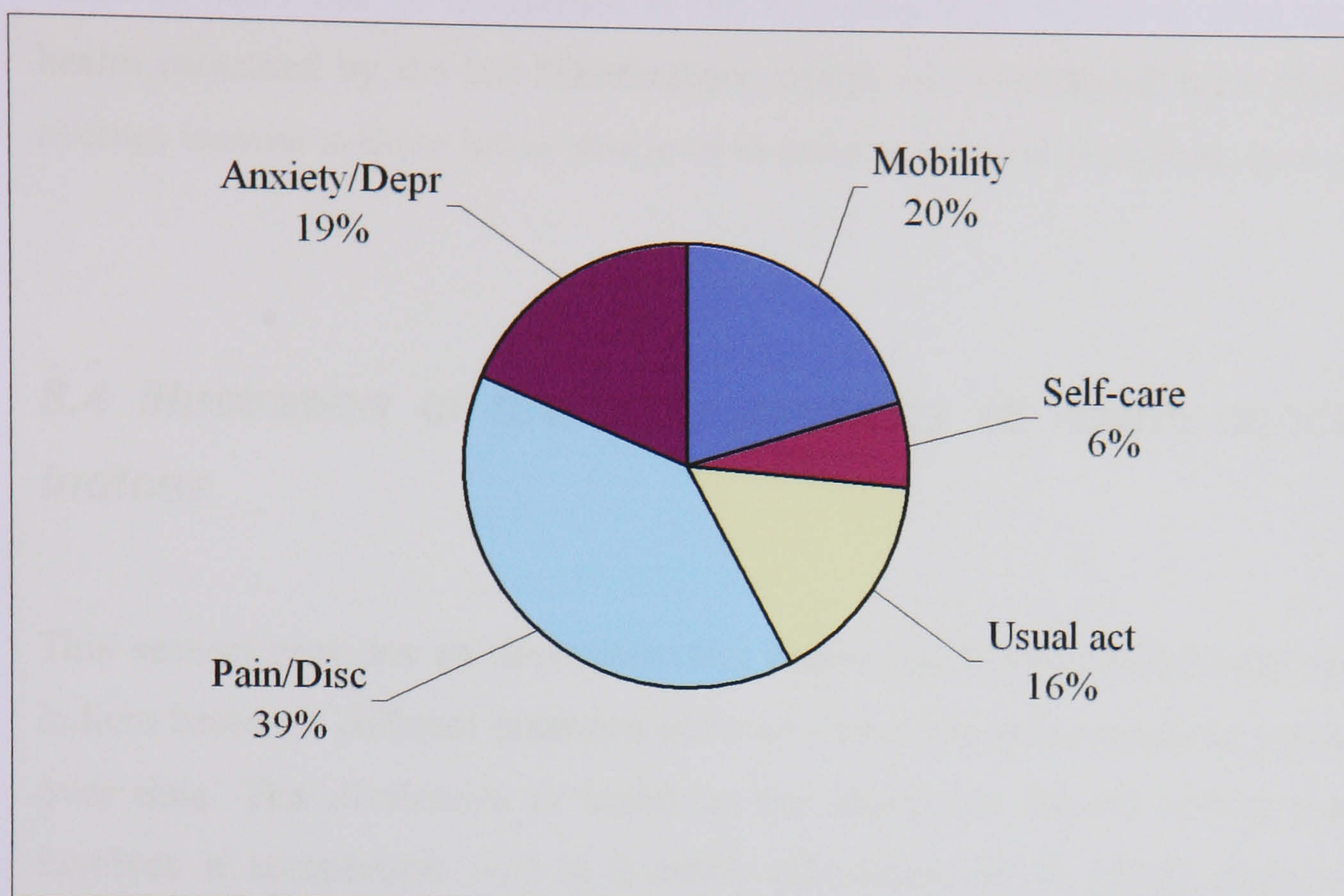
A particularly useful property of the EQ-5D instrument that income-related inequalities can not only be decomposed into sociodemographic components but also into health-related quality of life domain components. Table 8.3 describes the results of the decomposition analysis that is based on a regression model in which the dummy variables along the EQ-5D five domains explain the EQ-5Dvas score. The five dummy variables of the reported problems along the EQ-5D domains explained close to 50% of the variations in reported EQ-5Dvas values ($R^2=0,46$).

Table 8.3 Results of the decomposition analysis by the EQ-5D domains

	β_k	X_k	α	C_k	Components
Mobility	9,60	0,19	29,3	-0,2291	-0,0143
Self-care	6,60	0,06	29,3	-0,3167	-0,0043
Usual act	8,01	0,15	29,3	-0,2718	-0,0111
Pain/Disc	12,47	0,40	29,3	-0,1612	-0,0274
Anxiety/Depr	7,58	0,30	29,3	-0,1687	-0,0131
Unexplained					-0,0292
<i>Total</i>					-0,0994

The model could explain 71% of income related inequalities in the EQ-5Dvas score. This result is based on calculations that do not account for sociodemographic characteristics, i.e. both the EQ-5Dvas and the dummy variables of reported problems along the five dimensions were actual rather than predicted values. Figure 8.3 graphically illustrates the share of each EQ-5D domains in income-related inequalities in ill-health measured by the EQ-5Dvas.

Figure 8.3 The contribution of EQ-5D domains to income-related health inequalities



Problems with pain and discomfort are the major contributor to income-related health inequalities in Hungary, while self-care has the smallest component. Problems with mobility, anxiety/depression, and usual activities have around the same share in explaining the income-related health inequalities.

8.3 Robin Hood interpretation of the concentration index

Koolman and Doorslaer (2002) suggested an intuitive way of interpreting the value of the concentration index by quantifying the relationship between the Schutz coefficient and the health concentration index in large sample surveys.

The Schutz coefficient (equation 19) represents the percentage of the total amount of Y (i.e. health, or any other inequality variable measures in an analysis), which needs to be transferred from that part of the population which is above average income to that part of the population which earns less than the average income. For this reason it is also referred to as the Robin Hood index.

Based on this approach, the predicted ill-health (1-EQ-5DindexEuro) concentration index value of -0.11 can be interpreted in the following way: 8.25% of total amount of ill-health measured by the EQ-5DindexEuro should be redistributed from those above the average income to those below that level in order to equalize the distribution of health.

8.4 Illustration of the incomparability of health concentration indices

This section provides an illustration and then a justification why health concentration indices based on different measures of health status are not comparable across studies or over time. The illustration is based on the Hungarian EQ-5D survey data and also involves a comparison with a Swedish (Gerdtham et al. 1999) study results. The comparison with the study by Gerdtham et al is interesting because this Swedish tested if the value of the concentration index differs when different measure of health is used. They used the comparison of the concentration index for the validation of a new continuous health measure of health (i.e., the WvD measure).

First, Table 8.4.1 describes mean ill-health values of continuous variables for the five response categories of the self-assessed health question when constructed from the Hungarian survey data as compared to the Uppsala study.

Table 8.4: Mean ill-health values of continuous health variables for the five response categories of the self-assessed health question

	Hungarian study			Uppsala study		
	WvD	EQ-5D vas	EQ-5D indexTTO	WvD	RS	TTO
Poor health	9.63	61	0.69	10.08	55	0.38
Fair health	3.77	51	0.46	3.89	33	0.23
Good health	1.40	32	0.18	1.60	19	0.12
Very good health	0.47	18	0.05	0.67	10	0.06
Excellent health	0.14	9	0.02	0.24	5	0.05

All of the continuous measures were consistent in showing higher values for disease categories of worse health. There was also a tendency of increasing differences in mean in-health values with increasing level of ill-health categories. The only exception was the difference between “poor” and “fair” health in the case of EQ-5D mean values in the Hungarian study¹³. On the other hand, there have been some differences in mean ill-health values between different continuous measures used in the study populations.

Nevertheless, the concept and methodology of constructing the WvD variable and comparing its health concentration index with concentration indices of other continuous measures of health was identical across the two studies.

Table 8.4.2 summarizes concentration indices for continuous and categorical assessment of health status. Results from the Hungarian survey are also compared to the Swedish Uppsala study results. Concentration indices are measuring ill-health rather than health. This means that continuous measures of health are subtracted from the value of full health. For comparability reasons, the concentration indices presented in the table are not standardized for demographic or socioeconomic characteristics.

Results show that concentration indices had negative values along all health measures. This confirms that there are significant income-related inequalities in health status favouring the rich.¹⁴

Appendix D shows T-test results. According to the results, most variables (both categorical and continuous) lead to statistically significantly different concentration indices.

¹³ This might be partly due to the slightly different wording of the Hungarian categorical question. The closer translation of health states were: “very bad”, “bad”, “fair”, “good”, and “very good”.

¹⁴ Sensitivity analysis on income equivalence weights showed that income-related health inequalities get consistently smaller values by using 0.73 or 1 equivalence weights. Similarly, the calculation of age and

Table 8.5: Ill-health concentration indices

Measure of health	Ill-health concentration index (C_H)	Standard error	95% confidence interval	
Hungary study				
EQ-5D_index (TTO)	-0.2128	0.0119	-0.2366	-0.1890
EQ-5D_vas (RS)	-0.0994	0.0058	-0.1110	-0.0878
EQ-5D_european (RS)	-0.1857	0.0104	-0.2065	-0.1649
EQ-5D_mobility	-0.2291	0.0172	-0.2635	-0.1947
EQ-5D_self care	-0.3167	0.0319	-0.3805	-0.2529
EQ-5D_usual activities	-0.2718	0.0201	-0.3120	-0.2316
EQ-5D_pain/discomfort	-0.1612	0.0103	-0.1818	-0.1406
EQ-5D_anxiety/depression	-0.1687	0.0114	-0.1915	-0.1459
Functionality	-0.1867	0.0015	-0.1897	-0.1837
Chronic illness	-0.0647	0.0069	-0.0785	-0.0509
WvD measure of health	-0.1398	0.0096	-0.1590	-0.1206
Uppsala study				
WvD measure of health	-0.1166	0.0095	-0.1356	-0.0976
RS	-0.0987	0.0082	-0.1151	-0.0823
TTO	-0.1285	0.0172	-0.1629	-0.0941

In case of *continuous measures*, the t-value for testing the hypothesis that difference between the concentration index for WvD measure of health and for the EQ-5Dindex, EQ-5Dvas, and EQ-5Deuropean is equal to zero was 4.77, 3.60, and 3.24, respectively. This means that the hypothesis about equivalence could be rejected at 99% confidence level. The only hypothesis about equivalence of concentration indices that could not be rejected at 90% confidence level was the equivalence of concentration index based on the EQ-5DindexTTO and the EQ-5DindexEuro measure of health status.

The reason for no statistically difference between the EQ-5DindexTTO and the EQ-5DindexEuro was that the two formulas lead to almost identical health status values. The

gender standardised indices lead to consistently smaller (by about one third of the index) inequalities shown

reason for this is that the coefficients used in the formula – despite different elicitation method and data sources – are very close to each other for level 2 problems (see Table 1). More differences can be found in level 3 coefficients as the EQ-5DindexTTO coefficients' values are always larger in negative direction. However, in general population surveys, there are only few people reporting level 3 problems, and therefore the two formulas lead to very similar values.

The following section provides an explanation for incomparability of health concentration indices.

8.5. Explanation of incomparability of concentration indices based on different health status measures

The use of concentration curves and concentration indices in the measurement of inequalities and inequity was adapted from the literature of income distribution (Lorenz, 1905) and taxation (Kakwani, 1977) to health and health care (Wagstaff, Paci and van Doorslaer, 1991). In the original literature everything was expressed in money terms, which is a straightforward cardinal type of measure. The measurement of health, however, is not as straightforward as the measurement of money and this leads to a number of challenges in the adaptation of methodology across disciplines.

First, Wagstaff and van Doorslaer (1994) discussed the limitations of comparability of ill-health concentration indices. They emphasised that categorical questions might vary across surveys and their dichotomization can lead to confusing conclusions in cross-country comparisons. They also emphasised difficulties of comparing the commonly used chronic illness data as the method of asking the question (for example open or list type in nature) may influence responses. In addition, the findings of O'Donnell and Propper (1991), i.e. the poorer are more likely to have multiple chronic conditions and more severe types of diseases, were also used to explain the limitations of a yes-or-no dummy variable in expressing the level of inequalities.

in the case of all variables. Table 4, later in the paper, includes the standardized index values.

To overcome some of the limitations of using dichotomised categorical health variables, Wagstaff and van Doorslaer suggested the construction of a continuous health measure based on the five point categorical self-assessed health.

Other researchers, such as Gerdtham et al (1999) or Gerdtham and Johannesson (2000) started to use newer continuous measures of health status, such as the visual analogue scale or the time trade-off methods and compared health concentration index results across different health status measures. Gerdtham et al. (1999) even performed the validation of the WvD measures of health status by comparing its health concentration index with health concentration indices based on two direct utility measures.

The rest of this section demonstrates that the positive validation results by Gerdtham was an “accident” and, in fact, health concentration indices based on different measures of health status can not be directly compared¹⁵.

Lets assume first that there is a proportional re-scaling between the two health measures:

$$(24) \quad h^* = bh$$

By using the convenient regression method, the value of the concentration index will be the following.

$$(25) \quad C_{h^*} = \frac{2}{N} \frac{\sum_{i=1}^N (bh_i - bh) \left(R_i - \frac{1}{2} \right)}{bh}$$

By re-arranging equation (25), equation (26) shows that concentration indices are identical.

$$(26) \quad C_{h^*} = \frac{2}{N} \frac{b \sum_{i=1}^N (h_i - h) \left(R_i - \frac{1}{2} \right)}{bh} = C_h$$

¹⁵ This demonstration is derived from a consultation with Professor Andrew Jones.

This can be typically observed when a 0-100 VAS values are re-scaled to values between 0-1.

In most cases, however, there is a more complex relationship between different health status measures due to reasons listed above.

Let assume that one health measure (h^*) can be predicted from another health measure (h) by the following linear transformation (27).

$$(27) \quad h^* = a + bh$$

By replacing h with h^* in equation (8), we get equation (28).

$$(28) \quad C_{h^*} = \frac{2}{N} \frac{\sum_{i=1}^N (a + bh_i - (a + bh)) \left(R_i - \frac{1}{2} \right)}{a + bh}$$

By re-arranging equation (28), equation (8) makes C_{h^*} equal to:

$$(29) \quad C_{h^*} = C_h \frac{bh}{a + bh}$$

Equation (29) means that if a or/and b differs from zero then C_{h^*} will also differ from C_h . This finding is relevant for both continuous and categorical measures of health status. In general, it is argued that incomparability of different continuous generic health measures is due to variations in the properties of individual health status assessment methods (Van Doorslaer and Jones 2003).

There is substantial empirical evidence (for example a review of studies by Green et al, 2000) on various reasons why different continuous (such as utility-type) health measures can lead to different results if used on the same population sample:

- The SG method normally gives higher values than TTO method that again gives higher values than the RS method. This means that ill-health values (i.e. 1-health) will also vary across methods. This can be seen from Table 2 by comparing EQ-

5Dvas values from the Hungarian study and RS values from the Uppsala study with the TTO values from the Uppsala study.

- It is also known that people evaluate health states worse when they answer hypothetical questions compared to that when they have to directly evaluate their own health. This can also explain differences between utility-based quality of life questionnaires (that are based on weights elicited by using hypothetical questions, such as the EQ-5Dindex or the EQ-5DEuropean index) and direct utility measurement methods.
- Finally, the role of including or excluding the state of death from utility measurement should also be explored. In the Hungarian study concentration index based on the EQ-5DindexTTO and the EQ-5DindexEuro lead to significantly higher values than the EQ-5Dvas or the WvD measure.

Unfortunately, this means that concentration indices based on different continuous measures of health are not directly comparable unless exactly the same method is used. This, however, highlights how important role the EQ-5D instrument could be as a standardized cross-culturally validated measure of health status could play in analyzing differences in health inequalities across countries. Section 5 reviews and illustrates the potential methods of analyzing and interpreting health inequality concentration indices based on EQ-5D data.

8.6 Social preferences for health inequality aversion and the health-related social welfare function

A practical use of the health concentration index values could be related to the analysis of societal attitudes concerning health inequality.

For this purpose a separate survey was conducted with leading health care decision-makers in Hungary about their attitude to inequality aversion. The results of this survey were then used on the Hungarian EQ-5D database to simulate how the health concentration index value changes at different scenarios of inequality aversion.

The questionnaire used to measure preferences for inequality aversion was a modified version of the questionnaire developed by Shaw et al (2001) at the University of York. Data were collected from 44 health care decision-makers at conference programs at two occasions. One was a workshop for higher level civil servants of the National Health Insurance Fund, while the other was a workshop for a mixed audience of health care decision-makers of public health officers from different parts of the country. There was one respondent in the health care decision-makers group who indicated difficulty of understanding the questionnaire from its second question. This questionnaire was excluded from the analysis.

The adaptation of the questionnaire included two main components. Firstly, the questionnaire was modified to reflect close to realistic data on the current level of health inequalities in Hungary. Data were taken from the Health Monitoring OLEF2000 Survey. Non-standardised values of the EQ-5DindexTTO were used to construct baseline data for the morbidity question. According to the survey, the richest quintile of the population had a value of 0.90¹⁶ while the poorest quintile had a mean value of 0.75. Secondly, more text-based explanation was given to each graphical question. This was done in order to increase the probability that respondents understand the full meaning of the questions. No test of comprehension or any validation of this instrument was performed.

The questionnaire first describes the current situation of inequalities in health status in Hungary. It explains that the richest quintile of the population have better health related quality of life.

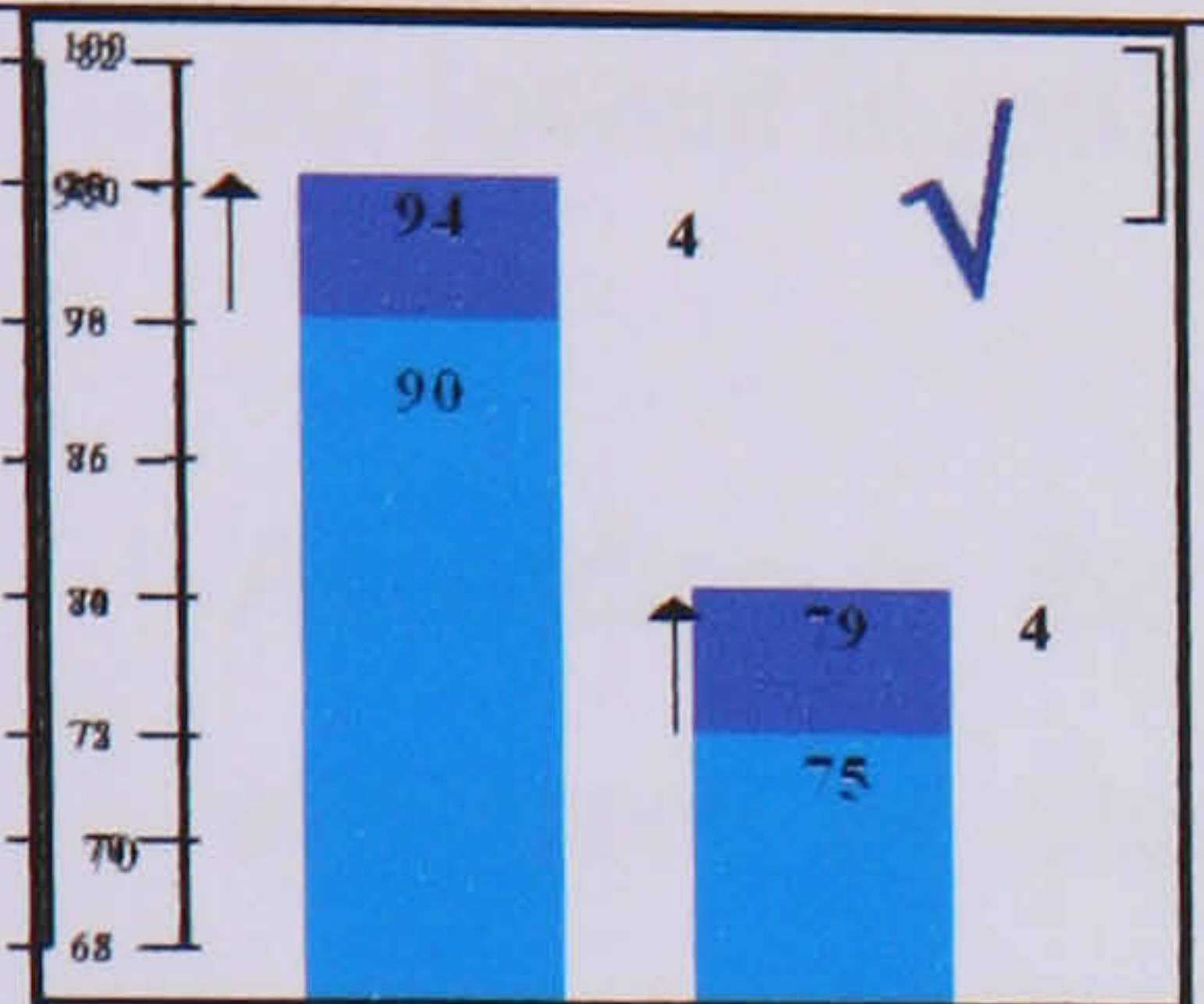
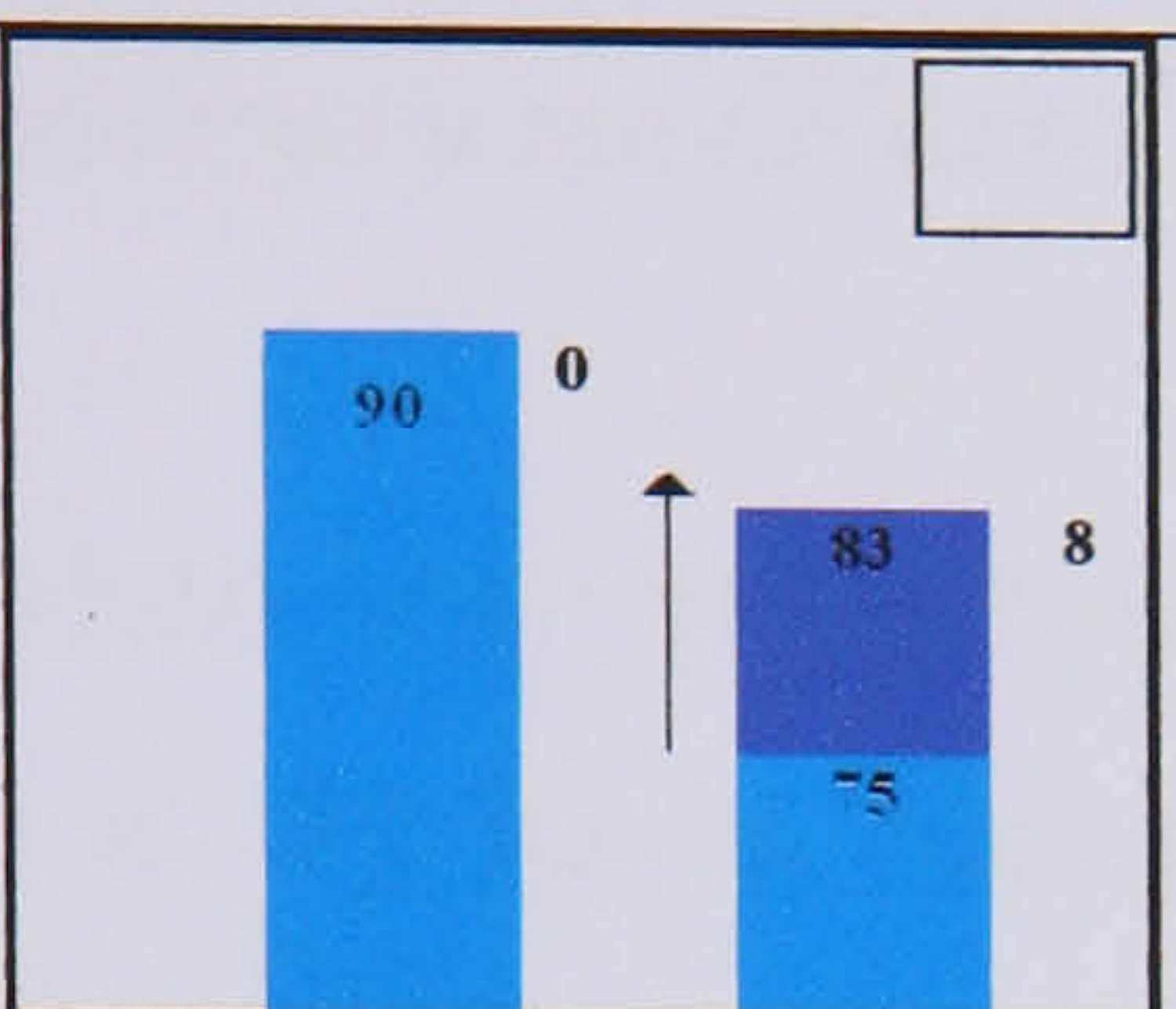
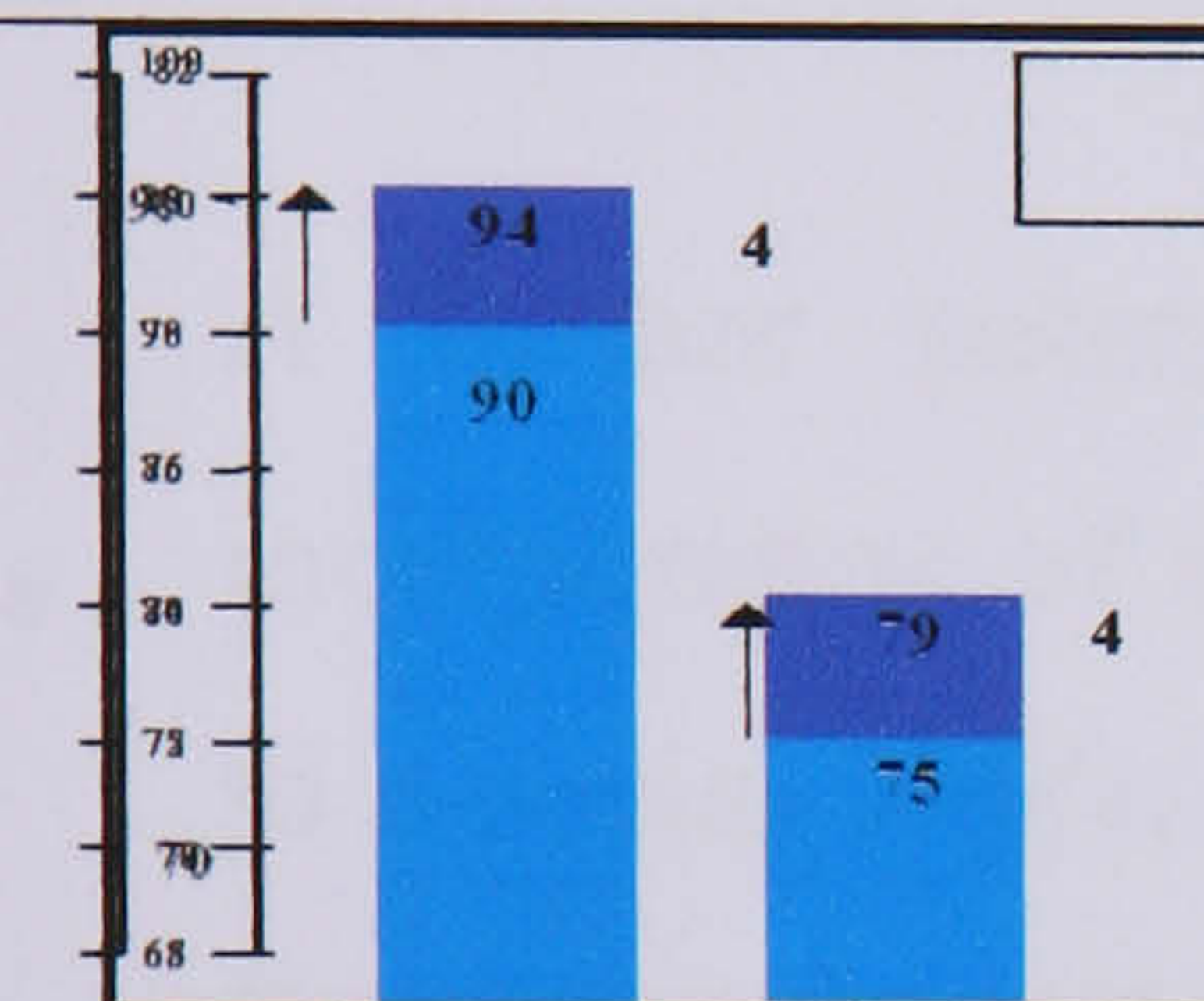
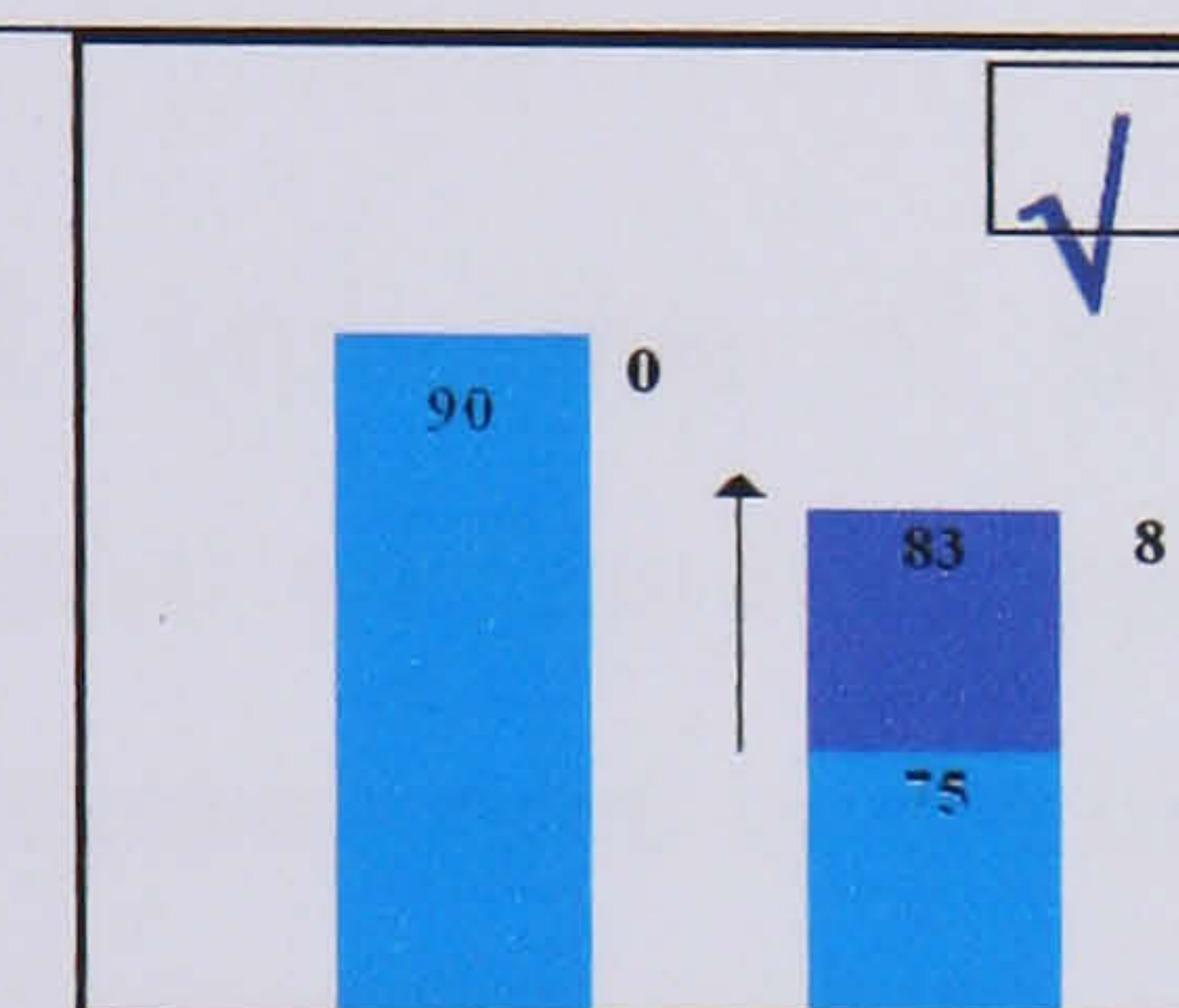
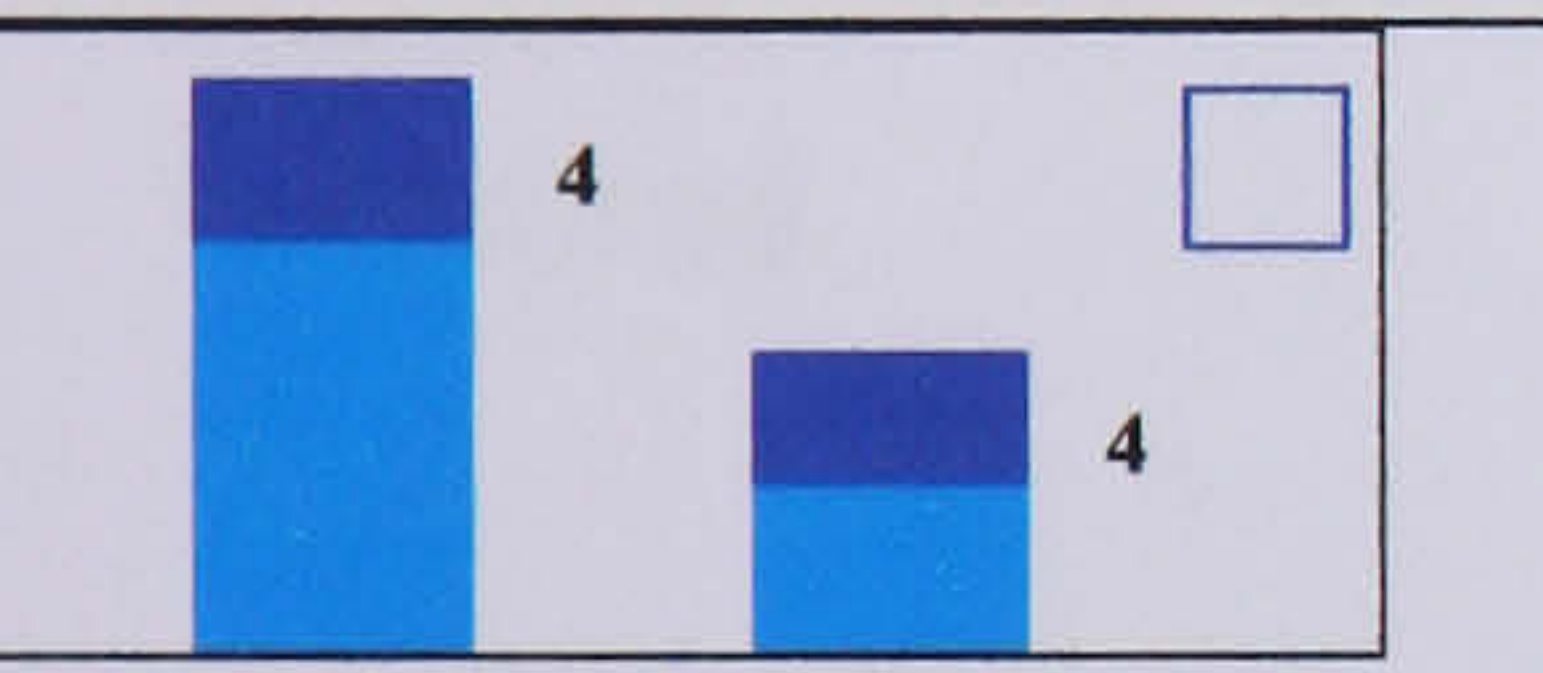
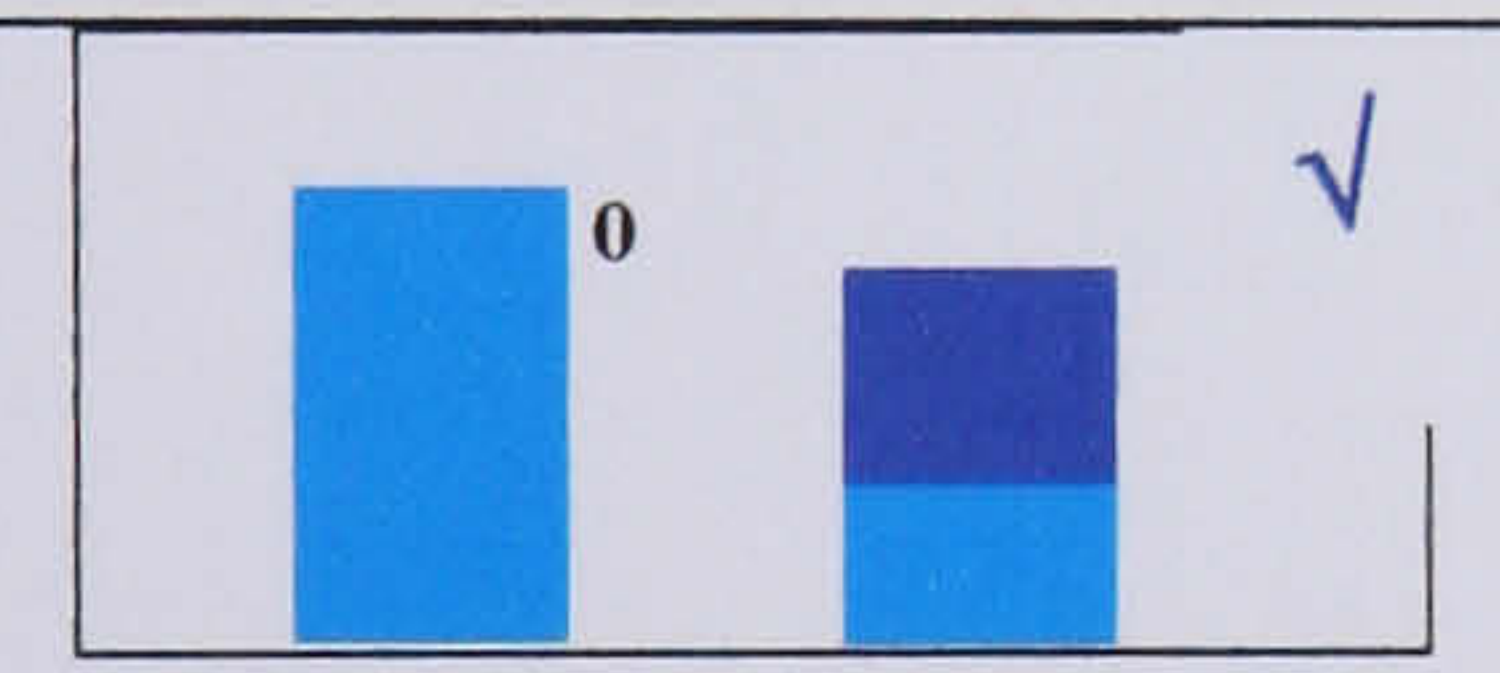
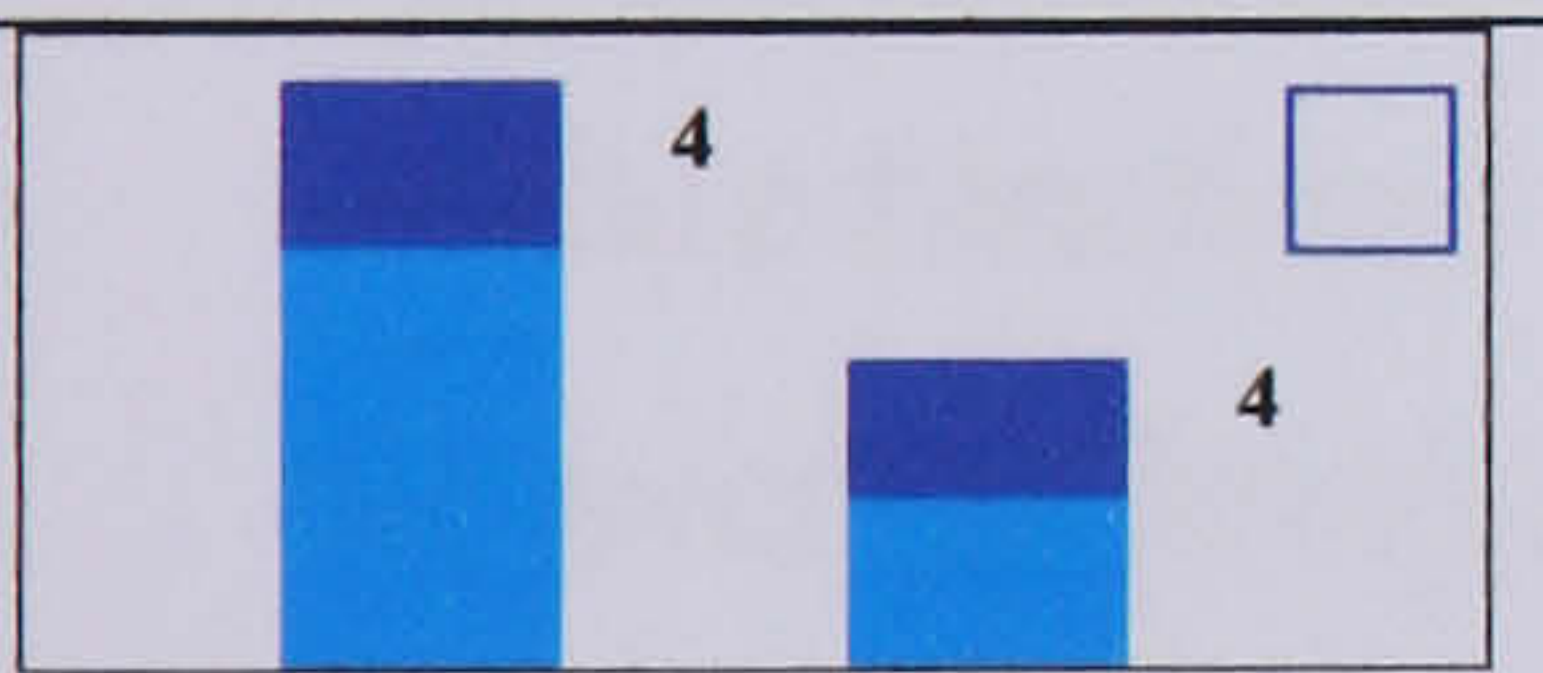

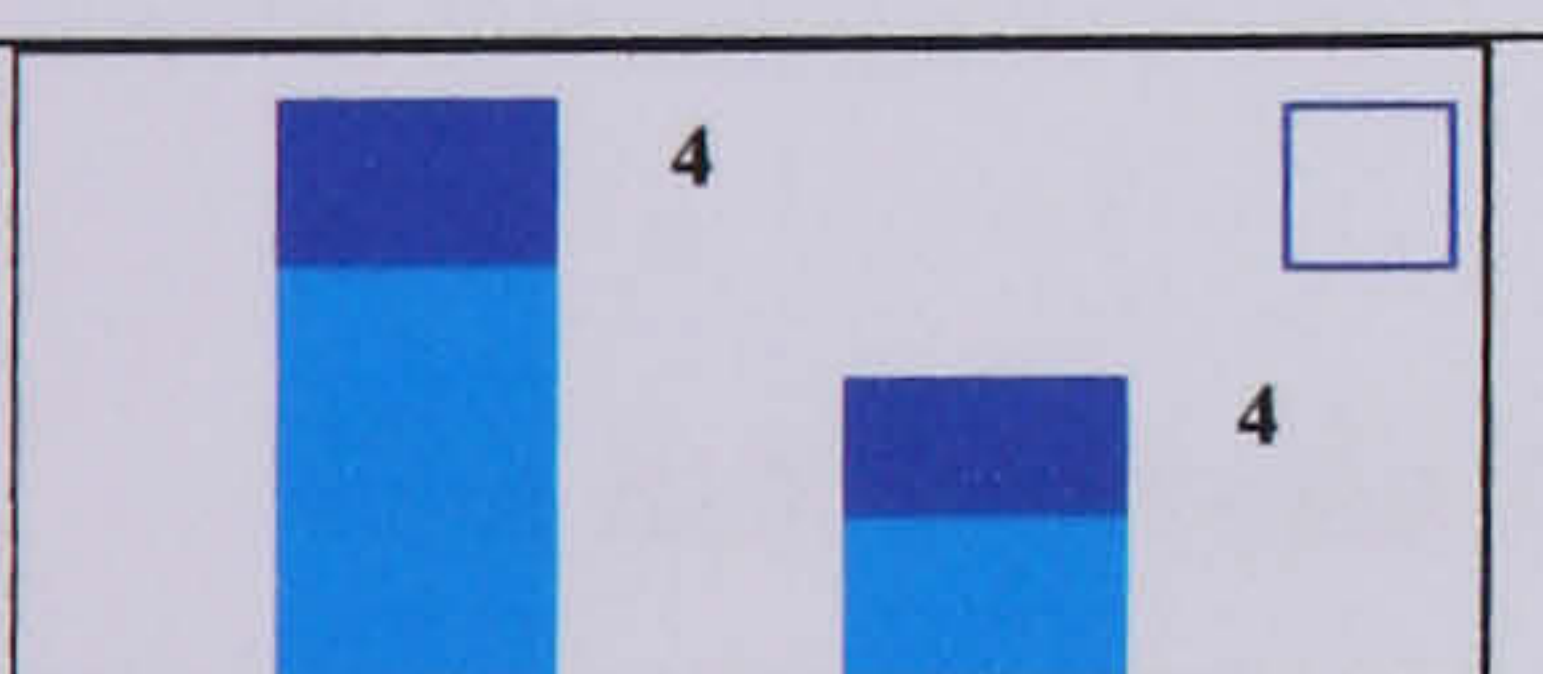
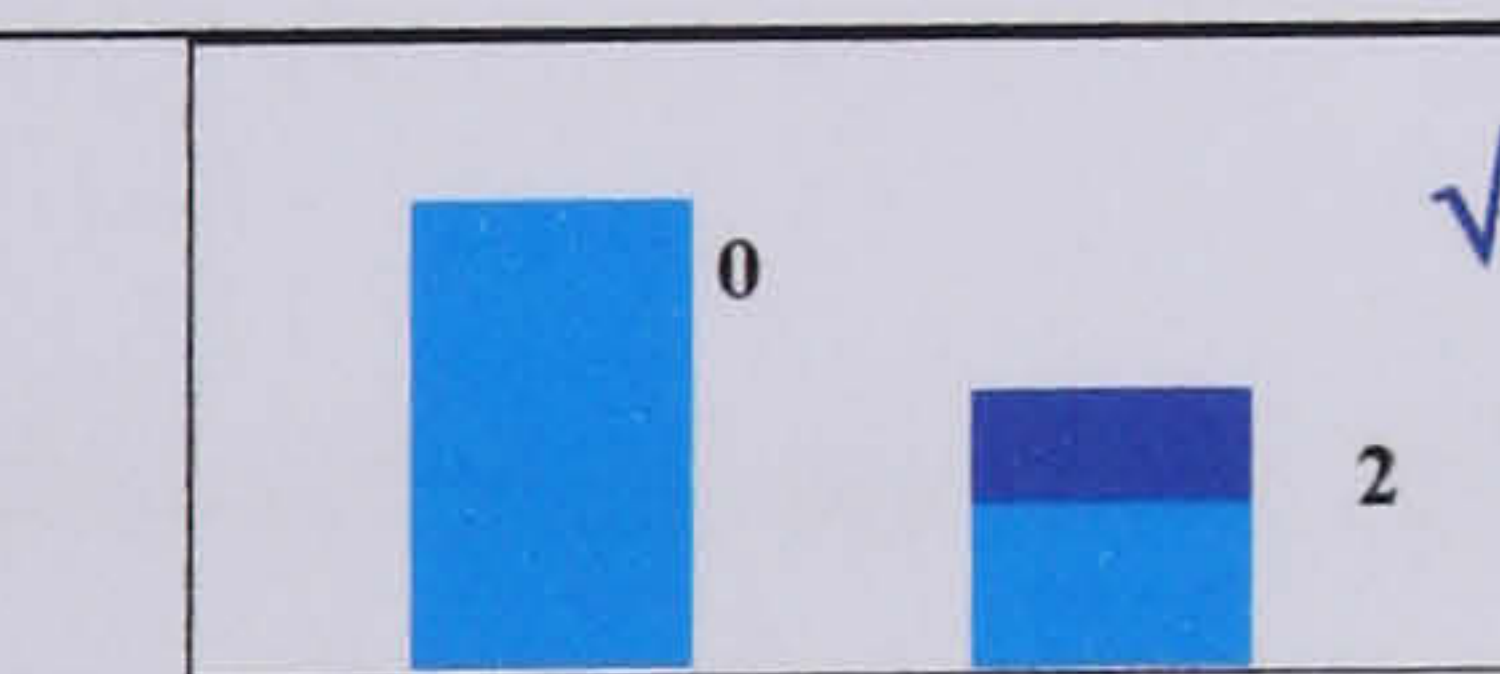
The questionnaire then describes that there are alternative health care programmes (A and B) that can lead to the improvement of health status of the population. The programmes differ with respect to their targeting of individuals with different income levels. The alternatives highlighted in the questionnaire represent trade-offs between efficiency (overall level of health in the population) and inequalities in the population. The questions represent situations when the involvement in the health care programme is more and more expensive when targeting low-income people (an example is given that

¹⁶ This is somewhat an overestimated value for the rich for the sake of better understanding the questions.

inviting low income people to prevention programmes can be more costly than involving higher income people to the same program).

The last programme among those ones when the respondent still chooses the targeting intervention (Programme B) represents the final willingness to sacrifice efficiency for inequality aversion. Table 8.6 represents the options included in the questionnaire and the results.

Table 8.6: The relationship between social preferences and the value of the concentration index

	<i>Health improvement programmes</i> A and B (in each choice, programme A and B cost the same)	Number of respondents preferring this option	Ill-health concentration index after program	Mean health after program	Health-related social welfare function
Non-targeting group	 	9	-0,101	0,836	8,3
	 	6	-0,055	0,836	15,2
Targeting group	 	19	-0,067	0,832	12,4
	 	2	-0,078	0,828	10,6
	 	7	-0,089	0,824	9,3
Total		43			

There were 9 out of the 43 respondents preferred not to target low-income individuals. 6 respondents preferred to target but was willing to pay no scarifies (i.e. any loss in total health) for that. 19 preferred to target low-income people even if this led to lower total health improvement in the population. This group was the median voter group. 9 other

respondents wanted to target the reduction of inequalities even at the price of no or lower health improvement for the poorer group.

A simulation was then performed on the database assuming that the health improvement programs were implemented. In this analysis, it was assumed that only the highest and the lowest income quintiles were affected by the programs.

According to the median voter preferences, the value of the desire to reduce inequality expressed as change in the health concentration index of 0,034 was equivalent to the value of 0,004 unit average EQ-5D utility in the population.

A further potential application of the health concentration index could be its incorporation of a social welfare function used in priority setting processes. Approaches to a social welfare function used in the income redistribution literature can be borrowed. For example, Atkinson (1980) and Kakwani (1980) proposed that the preference between two income distributions depend together on the level of inequalities and the mean income.

The direct application of this approach to the construction of a “health-related social welfare function” would mean that welfare is greater in a population if:

the average level of health is greater
and inequalities are smaller.

The most simple health-related social welfare function can be expressed as:

$$(30) \quad \textit{Health - related - SWF} = - \frac{\bar{h}}{C_{ill-health}}$$

As the last column of Table 8.7 shows, the use of this social welfare function always leads to the prioritization of ‘Programme B’ in this particular Hungarian example, contradicting to the preferences of health care decision-makers expressed by the inequality aversion survey. Nonetheless, the objective of the example was to highlight the potential possibility of incorporating health inequality indices into social welfare functions, and hence into priority setting processes. The use of the EQ-5D utility index in

this context can be particularly relevant due to its property of expressing health status itself as valued by the society.

Table 8.7: Inequality aversion: the physicians' view

	<i>Health improvement programmes</i> A and B (in each choice, programme A and B cost the same)	Number of respondents preferring this option	Ill-health concentration index in after performing this health improvement program		
Non-targeting group		40	-0,115		
Targeting group		4	-0,055		
				19	-0.067
	3	-0.078			
		6	-0.089		
	Total	72			

Chapter 9

Delivery of health care

9.1 Main results for equity in delivery of care in Hungary

Summary results for inequality indices for GP, specialist, dentist visit, inpatient care, and total health care utilization and their variance are presented in Table 9.1. Detailed results including the concentration of health care utilization and health care utilization after standardizing for health need are presented in Appendix E.

It can be seen from the tables that most types of health care utilization is concentrated towards the lower income groups. This is reflected in the negative values of the health care utilization concentration indices of -0.1376 , -0.013 , and -0.1782 for GP, outpatient specialist visits, and hospital days, respectively. The distribution looks particularly skewed to the left for GP and hospital care. For outpatient specialist care, the concentration index values are close to zero, indicating a more equal distribution of visits. The only type of care that was concentrated towards the higher income groups was the annual dentist visits ($C_M=0.1464$).

Due to the relatively high cost of hospital care as compared to other types of care, the distribution of total health care utilization is driven by hospital care and therefore is highly skewed to the left ($C_M= -0.1782$).

If health need were distributed equally among the lower and higher income groups then the concentration of health care among the poor would mean that inequity in overall health care utilization would favour the poorer groups. However, as Chapter 8 indicated ill-health was *also* concentrated among the lower income groups. For this reason, the need-based estimated utilization of health care should also be concentrated among the lower income groups¹⁷.

¹⁷ Concentration index values for estimated utilization of dental care based on health needs were close to zero, indicating that dental care should be distributed equally in the population irrespective of socio-economic status (at least when using generic health measures for estimating need for dental care).

Inequality indices presented in Table 9.1 indicate whether the distribution of health care service utilization is proportional to health needs. HI_{wv} indices are calculated for GP, outpatient specialist, dental care, inpatient care, and total health care utilization. Each row in Table 9.1 show results for the HI_{wv} index and its variance depending on which health status measure was used in estimating health needs.

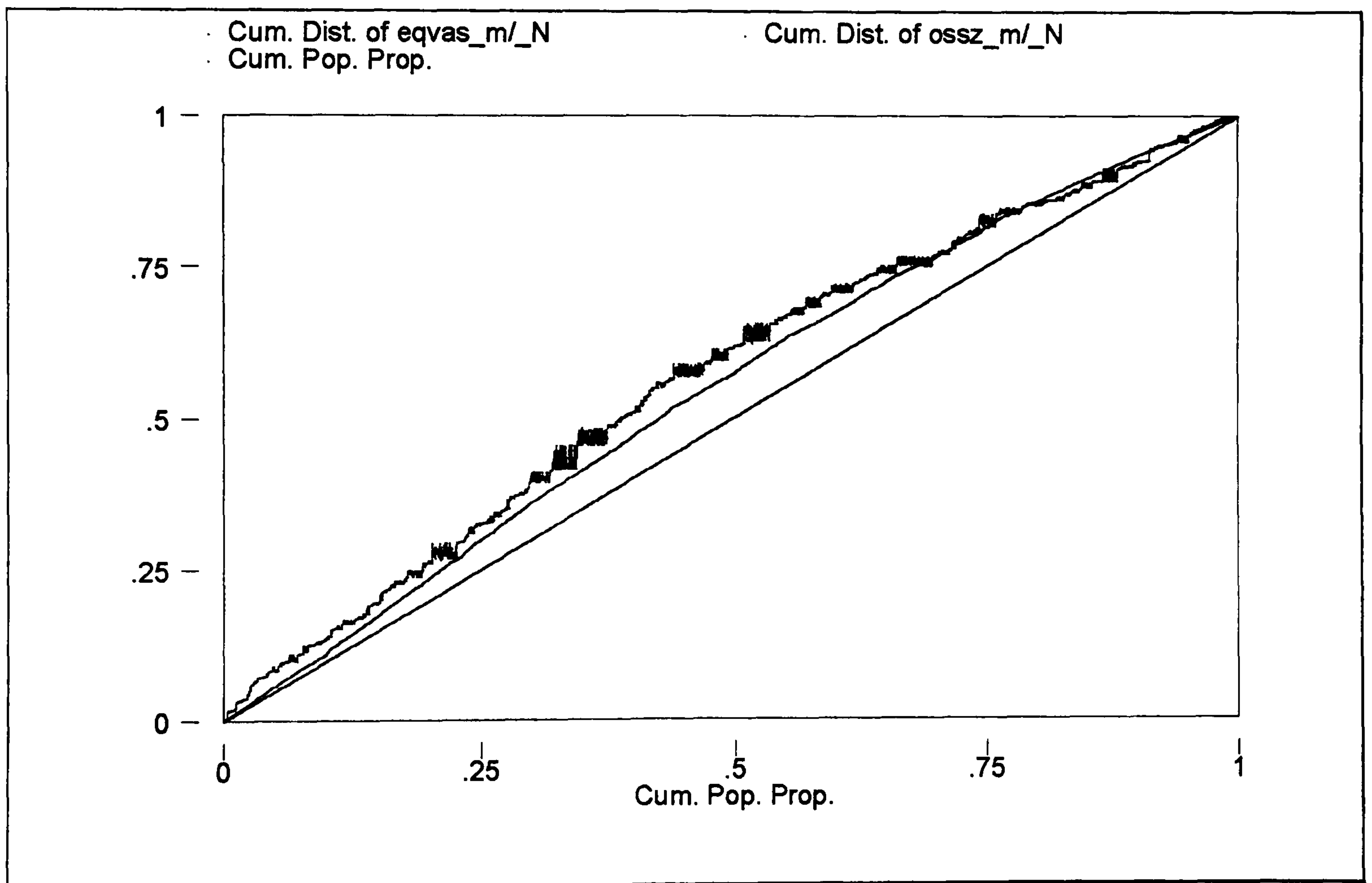
With the exception of the HI_{wv} index for GP and outpatient specialist care estimated by using the EQ-5D European index formula, all indices were statistically significantly different from zero. These results indicate that there is significant inequity in the utilization of health care in Hungary. Negative values of the HI_{wv} index for GP and inpatient care shows that people in lower income groups use proportionally more health care of these types of services based on their health status. On the other hand, positive values of the HI_{wv} index for outpatient specialist and dental care indicates inequity favouring the rich. Again, the inequity index for overall health care delivery is driven by the distribution of outpatient care and therefore indicates a pro-poor inequity pattern. In summary, higher income individuals with similar need tend to be making more use of outpatient specialist care and dental care, while lower income individuals with similar need tend to make more use of GP and inpatient hospital care.

Table 9.1: HI_{wv} indices for GP, outpatient specialist, dental, inpatient, and total health care in Hungary

Need estimator	GP care		Outpatient specialist		Dental care		Inpatient care		Total care	
	HI _{wv} index	Var HI _{wv}	HI _{wv} index	Var HI _{wv}	HI _{wv} index	Var HI _{wv}	HI _{wv} index	Var HI _{wv}	HI _{wv} index	Var HI _{wv}
EQ-5D mobility	-0,0762	0,0013	0,0390	0,0027	0,1364	0,0012	-0,0880	0,0069	-0,0682	0,0047
EQ-5D self-care	-0,1106	0,0014	0,0146	0,0027	0,1380	0,0012	-0,1144	0,0069	-0,0940	0,0047
EQ-5D usual activities	-0,0762	0,0013	0,0508	0,0026	0,1378	0,0012	-0,0666	0,0068	-0,0506	0,0045
EQ-5D pain/discomfort	-0,0618	0,0013	0,0594	0,0026	0,1398	0,0012	-0,0808	0,0069	-0,0598	0,0047
EQ-5D anxiety/depression	-0,0848	0,0013	0,0424	0,0027	0,1396	0,0012	-0,0936	0,0070	-0,0732	0,0047
EQ-5D index reverse	-0,0474	0,0013	0,0796	0,0026	0,1338	0,0012	-0,0212	0,0067	-0,0102	0,0045
EQ-5D vas	-0,0440	0,0012	0,0702	0,0026	0,1320	0,0012	-0,0354	0,0067	-0,0216	0,0045
EQ-5D european	0,0000	0,0013	0,0000	0,0026	0,1320	0,0012	-0,0288	0,0067	-0,0216	0,0045
Disability	-0,0798	0,0013	0,0484	0,0027	0,1396	0,0012	-0,0936	0,0070	-0,0724	0,0047
Chronic illness	-0,0936	0,0013	0,0138	0,0027	0,1456	0,0012	-0,1442	0,0071	-0,1158	0,0048
Subjective health	-0,0456	0,0013	0,0744	0,0026	0,1300	0,0012	-0,0442	0,0068	-0,0288	0,0046
EQ-5D any	-0,0694	0,0013	0,0558	0,0027	0,1394	0,0012	-0,0878	0,0070	-0,0664	0,0047

The distribution of need-based (here, EQ-VAS) estimate for and the actual utilization of total health care among the whole population are illustrated in Figure 9.1. It can be seen that the actual utilization of total health care is proportionally higher than the estimated utilization based on need among the 70% of the population in the lower income groups. Among the 30% richest population, actual health care utilization is close to proportional or falls slightly below the level of health care utilization that would be estimated based on health care needs.

Figure 9.1: Utilization of total health care: actual vs. expected utilization based on need as assessed by the EQ-VAS instrument



HI_{WV} index values vary according to the health status measure used in the model. It can be generally observed that continuous measures of health, such as the EQ-5Dindex and the EQ-VAS, leads to indices that reflect smaller pro-poor inequity. This finding is in line with the results of Doorslaer et al. (2000) that health measures with more extensive specification used to predict need decrease the likelihood of finding inequity favouring the poor. However, HI_{WV} index values remained statistically significantly different from zero when different health status measures were used to predict need, and this could be

observed for all health care services. The only exception was the EQ-5D index with using the European formula to estimate health utilities. Its value was not statistically different from zero for GP and outpatient specialist care.

HI_{WV} index values were moderately sensitive to the income equivalence weight used. The HI_{WV} index depends on the value of the concentration indices for actual and need-based estimated utilization of health care. With selecting higher income equivalence weights both indices decreased for all types of health care services. The direction and magnitude of change in the HI_{WV} index is subject to these two components. A general tendency was found that the HI_{WV} index values increased with choosing a higher income equivalence weight. This means that detected pro-poor inequity becomes smaller and pro-rich inequity becomes larger when using higher income equivalence weights. The direction of detected inequity only changed from pro-poor to pro-rich in the case of GP care when the equivalence weight of 1 was used. HI_{WV} index values for dental care showed a different tendency. When using higher income equivalence weights, pro-rich inequity became smaller.

In general, the impact of the income equivalence weight on the concentration index value is influenced by the joint distribution of income and the household size. However, no consistent connection between income level and household size could be observed in this representative Hungarian population sample. Therefore, the most likely explanation remains that the method of using “1” as an income equivalence weight can not discriminate between higher and lower income individuals as efficiently as a lower equivalence weight does. In other words, the use of an equivalence weight of 0.5 can better reflect the “true” income status of the individuals as it takes into account the decreasing marginal cost of living in larger households. Therefore, the use of 0.5 as income equivalence weight can also better reflect income-related inequalities in health and health care both within lower and higher income groups.

9.2 Decomposition analysis of inequity in delivery of care

To understand whether income-related inequalities in health care delivery are directly linked to income level or income-level itself is linked to other socio-economic characteristics, such as education level or activity status, a decomposition analysis was performed. Potential explanatory variables included in the model were:

- Income itself
- Education level
- Activity status
- Region
- Size of location
- Roma minority status.

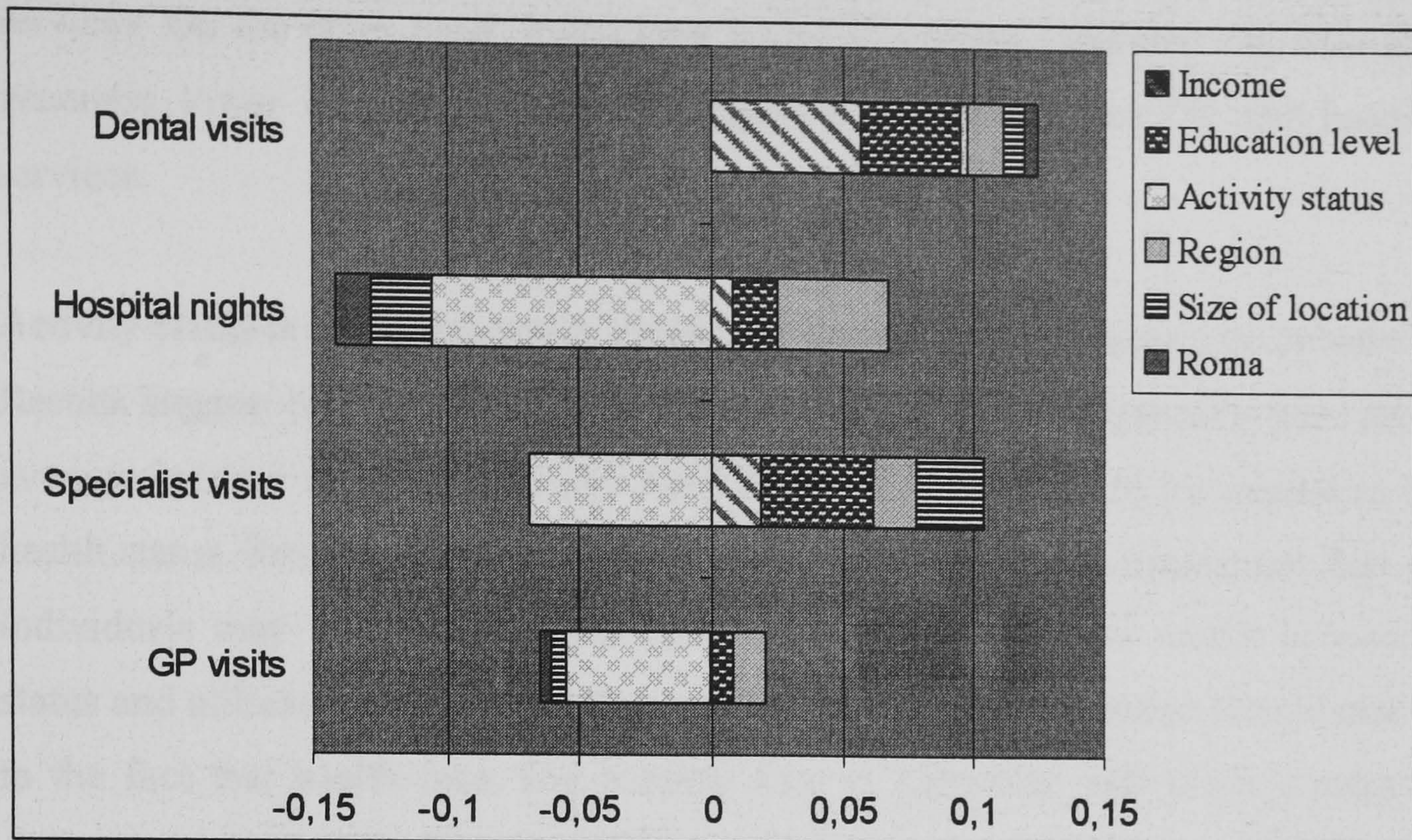
Table 9.2 summarises the results of the decomposition analysis, while Figure 9.2 illustrates the contribution of each of the explanatory variables to the overall income-related inequity index.

Table 9.2 Results of the decomposition analysis of equity in delivery of care

	Inequity index	Income	Education level	Activity status	Region	Size of location	Roma
GP visits	-0,044	-0,001	0,008	-0,054	0,012	-0,006	-0,004
Specialist visits	0,035	0,019	0,043	-0,069	0,016	0,026	0,000
Hospital nights	-0,074	0,008	0,017	-0,105	0,042	-0,023	-0,013
Dental visits	0,124	0,057	0,038	0,002	0,014	0,008	0,005

As Figure 9.2 highlights, income itself plays a significant role in income-related inequity in delivery of care only in the use of dental and specialist care.

Figure 9.2 Composition of the inequity index by type of health care



A significant part of income-related inequity in delivery of care is not directly linked to income-level but to other social, economic, and living area characteristics that are, however, related to income.

Having medium or higher education level always has an impact towards pro-rich inequity, meaning that higher income individuals who also have higher average income tend to use proportionally more health care as compared to their health needs. This is true for each type of health care services, although the impact is small in the case of GP visits.

Similar impact can be observed for the regional factor. Living in the “Middle Hungary” region, which includes the capital of Hungary, Budapest, has a pro-rich inequity impact on the use of health care services. This means that people who live in the capital of Hungary and have also generally higher income level use proportionally more health care services than their health status would explain. This phenomenon is undoubtedly linked to the over capacities in health care services in the capital of Hungary.

The size of the location of the living area, which is also a proxy for the distance to health care facilities, is another important factor in determining income-related inequity in health care delivery. Results suggest, that pro-rich inequity can be observed for specialist and dental care services, meaning that higher people living in larger locations and also

have generally higher income tend to use proportionally higher level of care from these services. On the other hand, individuals living in smaller locations, and who also have generally lower income level, tend to use proportionally more GP and hospital care services.

Activity status is a major factor in explaining income-related inequity in delivery of care. Results suggest that disabled individuals and pensioners, who generally have lower than average income level, tend to use more health care that would be explained by their health status. Results should be handled with caution due to the assumption that disabled individuals may need more health care than the applied linear model between health status and utilization predicts. With respect to retired status, attention should also be paid to the fact that health care, and hospital care in particular, still plays a substitute for alternative social care. This means that retired people with less severe health condition often use hospital care because there is a lack of nursing homes and home care facilities in Hungary.

Finally, the Gipsy minority status was proved to contribute little to the overall income-related inequity in health care delivery. Data shows that the Gipsy population, who also tend to have lower than average income level, uses slightly more hospital services than non-gipsy individuals with the same need characteristics.

9.3 Discussion

Hungarian results show similarities with other countries in terms of presenting some inequity in GP and hospital care delivery favouring people in the lower income groups and some inequity in outpatient specialist and dental care favouring people in the higher income groups. Table 9.3 presents a summary of empirical evidence for inequity indices in selected OECD countries as compared to the Hungarian results. Although inequity indices from different surveys cannot be compared to each other, they are informative in understanding main patterns across countries.

Limitations in direct comparison of the HI_{WV} index values across surveys are due to that the value of the index can be very sensitive to variations in methodology and variables used. Regarding methodological differences, the Hungarian survey used a simple OLS model to estimate need-adjusted utilization of services, while one of the international studies (Doorslaer et al. 2002) used a two-part logit model to handle the skewed distribution of health care cost. Doorslaer et al (2000) found that although the two methods gave similar results for Dutch survey data, some minor differences could be observed for (the particularly skewed) hospital care. In the Hungarian and the international studies (Doorslaer et al 2002, Koolman and Doorslaer 2002, and Doorslaer et al, 2000), HI_{WV} index values have been shown to be highly sensitive to the method of measuring health status and slightly sensitive to other variables used in the standardisation, such as demographic characteristics, region of living, and insurance status.

Nevertheless, despite some differences in methodology and variables used across surveys, a similar pattern in inequity can be observed in most OECD countries. People in lower income groups tend to use proportionally more GP and hospital care services than individuals in higher income groups with similar health needs. Contrary, individuals in higher income groups tend to use proportionally higher level of specialist and dental care services as compared to lower income individuals with similar health needs.

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Table 9.3: International data on equity in delivery of health care

	GP care		Outpatient specialist		Dental care		Inpatient care		Total care	
	C _M	HI _{wv}	C _M	HI _{wv}	C _M	HI _{wv}	C _M	HI _{wv}	C _M	HI _{wv}
Austria	-0.050*	0.018*	0.036*	0.081*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Belgium	-0.102*	-0.020*	-0.030*	0.036*	0.057***	n.a.	-0.324**	-0.140**	-0.279**	-0.119**
Canada	-0.079*	-0.006*	0.001*	0.063*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Denmark	-0.079*	-0.004*	0.020*	0.072*	0.056***	n.a.	-0.341**	-0.130**	-0.259**	-0.110**
Finland	-0.063**	0.004**	-0.036**	0.007**	0.091***	n.a.	-0.282**	-0.134**	-0.187**	-0.083**
East Germany	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.156**	n.a.	-0.129**	n.a.
West Germany	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.168**	n.a.	-0.146**	n.a.
Germany	-0.063*	-0.019*	0.015*	0.059*	0.016***	n.a.	n.a.	n.a.	n.a.	n.a.
Greece	-0.126*	-0.011*	-0.036*	0.077*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Ireland	-0.128*	-0.43*	0.070*	0.150*	0.205***	n.a.	-0.137**	-0.050**	-0.140**	-0.056**
Italy	-0.064*	-0.028*	0.020*	0.062*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Luxembourg	-0.088*	-0.032*	-0.066*	-0.004*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Netherlands	-0.047*	-0.003*	-0.021*	0.037*	0.056***	n.a.	-0.207**	-0.127	-0.159**	-0.088**
Portugal	-0.070*	0.015*	0.096*	0.190	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Spain	-0.091*	-0.044*	0.025*	0.076*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Sweden	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.028**	-0.075**	-0.019**	-0.054**
Switzerland	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.158**	-0.035**	-0.144**	-0.040**
UK	-0.115*	-0.014*	-0.024*	0.083*	0.072	n.a.	-0.171**	-0.107**	-0.117**	-0.050**
US	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	-0.195**	-0.101**	-0.145**	-0.066**
Hungary****	-0.1376	-0.0936	-0.013	0.0138	0.1464	0.1456	-0.1782	-0.1442	-0.1486	-0.1158

* Doorslaer et al. 2002

** Doorslaer et al. 2000

*** Doorslaer and Koolman 2002

**** Data based on using chronic illness variable in the Hungarian survey

PART IV. CONCLUSIONS

Chapter 10

Review and future directions

This research was the first to explore equity in the health care system in Hungary. Results revealed that in Hungary, health care is financed 23.5% from general taxation (income taxes, VAT, excise taxes), 61% from social health insurance contributions, and 15.5% out-of-pocket payments (including drug co-payment and expenditure on OTCs, informal payments, and other direct payments for health care services and medical devices). This finance structure is usual in most transitional countries of Central Europe who shifted to a social health insurance system.

Kakwani progressivity indices of individual payment methods were positive for:

- income taxation (0.3793);
- for the income-related component of health insurance contributions (0.1026);
- and other direct payments for health care (0.1117).

Regressive payments included:

- Indirect taxes such as VAT (-0.1858) and excise taxes (-0.1424);
- Fix component of health insurance contributions (-0.0812);
- Drug co-payments by the population (-0.4018);
- Informal payments (-0.2706).

The regressive nature of informal payments refutes the common belief in the “Robin Hood hypothesis”, that physicians subsidise poor patients at the expense of rich patients.

The overall Kakwani index for the health care finance system was -0.0181 indicating a *slightly regressive* overall structure. The regressive impact of direct, indirect general taxes, and the fixed component of health insurance contributions was *almost fully offset*

by the slightly progressive income-related social insurance contribution component and the highly progressive income taxation.

Although estimates show that the financing of health care in Hungary is broadly speaking proportionate, proportionality turns out to be the result of offsetting progressive and regressive elements so that those seeking a greater degree of progressivity may focus attention on increasing the progressive elements.

Important income-related inequalities exist in the health status of Hungarians. These inequalities exist irrespective of the health status measure used. For example, the difference in the EQ-5D index for the richest and the poorest tenths of the population corresponds to a quality of life difference for a 50 year old and an 80 year old person. Forty percent of the poorest tenth of the population suffer from anxiety/depression, whereas the prevalence is only 15% among the richest tenth.

The relationship between income and health is revealed by the negative values of the ill-health concentration index. Ill-health concentration indices were found to be -0.2128 for the EQ-5DindexTTO; -0.0994 for the EQ-VAS; -0.1857 for the EQ-5Deuro; -0.2291 for EQ-5Dmobility; -0.3167 for EQ-5Dself care; -0.2718 for EQ-5Dusual activities; -0.1612 for EQ-5Dpain/discomfort; -0.1687 for EQ-5Danxiety/depression; -0.1867 for functionality; -0.0647 for chronic illness; -0.1398 for WvD continuous measure of health.

The chapter demonstrates that the indices are highly sensitive to choice of measures of health. It is shown that two measures of health will always result in different concentration indices unless one measure is a linear transformation of the other. The implication of the sensitivity of the concentration index to the measure of health is that previously published comparative studies have an inherent bias that may lead to false references about relative inequalities across health care systems.

This is the first analysis which used the EQ-5D health-related quality of life questionnaire for the analysis of income-related health inequalities. The EQ-5D is a powerful tool for the analysis of health inequalities. A major reason why this is the case is because the inequalities can be seen at the level of each of the five quality of life dimensions. The decomposition has revealed that problems with pain/discomfort are the principal

contributor to income-related health inequalities in Hungary. Thirty-nine percent of inequality can be explained by this dimension alone. This finding has a major implication for health policy-making by highlighting the potential role of pain management programmes.

Another distinctive feature of this research is the analysis of public preferences concerning income-related health inequality. A recently developed inequality aversion questionnaire (Shaw 2000) was adapted to study health inequality aversion in Hungary, using actual data on the health status of the population from my survey. Results revealed (for a relatively small sample) that a majority of health care decision-makers were willing to trade efficiency for greater equity. The main implication of this finding is that there appear to be a desire to reduce social health inequalities in Hungary.

By contrast, physicians were less willing to trade efficiency for greater equity. The contrast between the views of health policy-makers and physicians suggests that the implementation of health inequality reduction programmes may be difficult in practice. The idea that it might be morally acceptable to sacrifice some health gain in order to have a fairer distribution of health is one that physicians are likely to resist strongly, and any strategy to change this culture will be a major challenge.

The lower income groups are the main users of health care. This is reflected in the negative values of the health care utilisation concentration indices of -0.1376 , -0.013 , and -0.1782 for GP, outpatient specialist visits, and hospital days respectively. For outpatient specialist care, the concentration index values are close to zero, indicating a virtually equal distribution of visits. The only type of care that was concentrated towards the higher income groups was annual dentist visits ($C_M=0.1464$).

However, as Chapter 8 has shown, ill-health was *also* concentrated among the lower income groups. For this reason, in an equitable state, utilisation should also be concentrated among the lower income groups.

With the exception of the HI index for GP and outpatient specialist care, all indices were statistically significantly different from zero. This indicates that there is significant inequity in the utilisation of health care in Hungary. Negative values of the HI index for

GP and inpatient care show that people in lower income groups use proportionally more health care of these types than would be predicted by their health status. On the other hand, positive values of the HI index for outpatient specialist and dental care indicate inequity favouring the rich.

We sought to determine whether income-related inequalities in health care delivery were directly linked to income or more fundamentally to socio-economic characteristics, such as education level, which affect income. Explanatory variables included in the model were:

- Income
- Education
- Activity status
- Region
- Size of location
- Roma status.

A significant part of income-related inequity in delivery of care turns out not to be directly linked to income but to other social, economic and geographical characteristics that are, however, associated with income level.

Perhaps surprisingly, the Roma minority status proved to contribute little to the overall income-related inequity in health care delivery. The Roma population, which also tends to have lower than average income level, uses slightly more hospital services than non-Roma individuals with the same need characteristics.

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Appendix A

Sensitivity analysis on equivalence weight

Concentration indices of payments for health care

	Equivalence weight used		
	0.5	0.73	1
Income taxation	0.7465	0.7463	0.7410
VAT	0.1814	0.1798	0.1943
Excise taxes	0.2248	0.2171	0.2164
Informal payments	0.0907	0.1267	0.1814
Drug co-payments and OTCs	-0.0346	-0.0082	0.0591
Direct payments	0.4789	0.4787	0.8176
Income-related health insurance contributions	0.4698	0.4609	0.4471
Fix component of health insurance contributions	0.2860	0.2714	0.2564

Appendix B

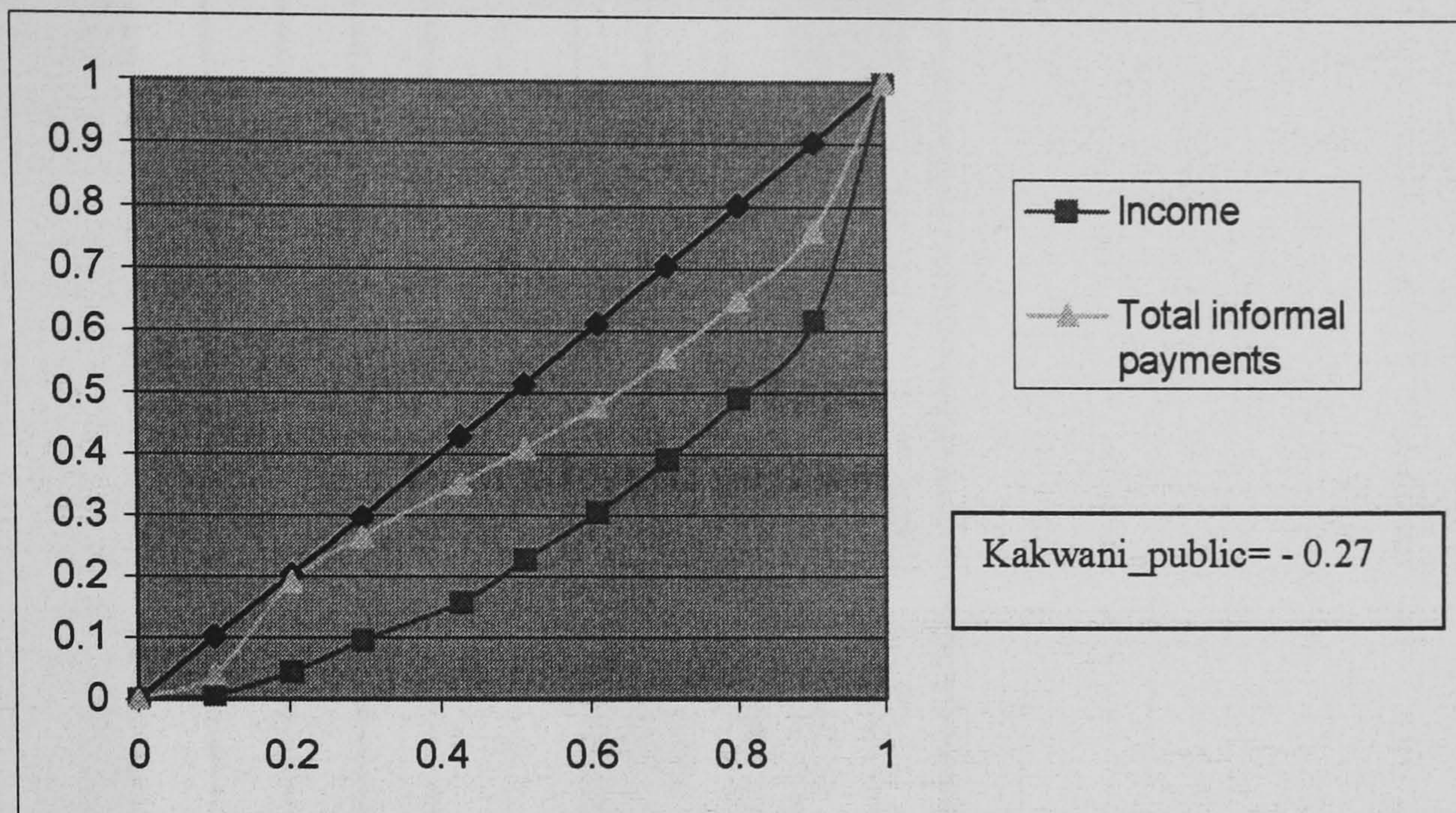
Sensitivity analysis on equivalence weight

Kakwani progressivity indices of payments for health care

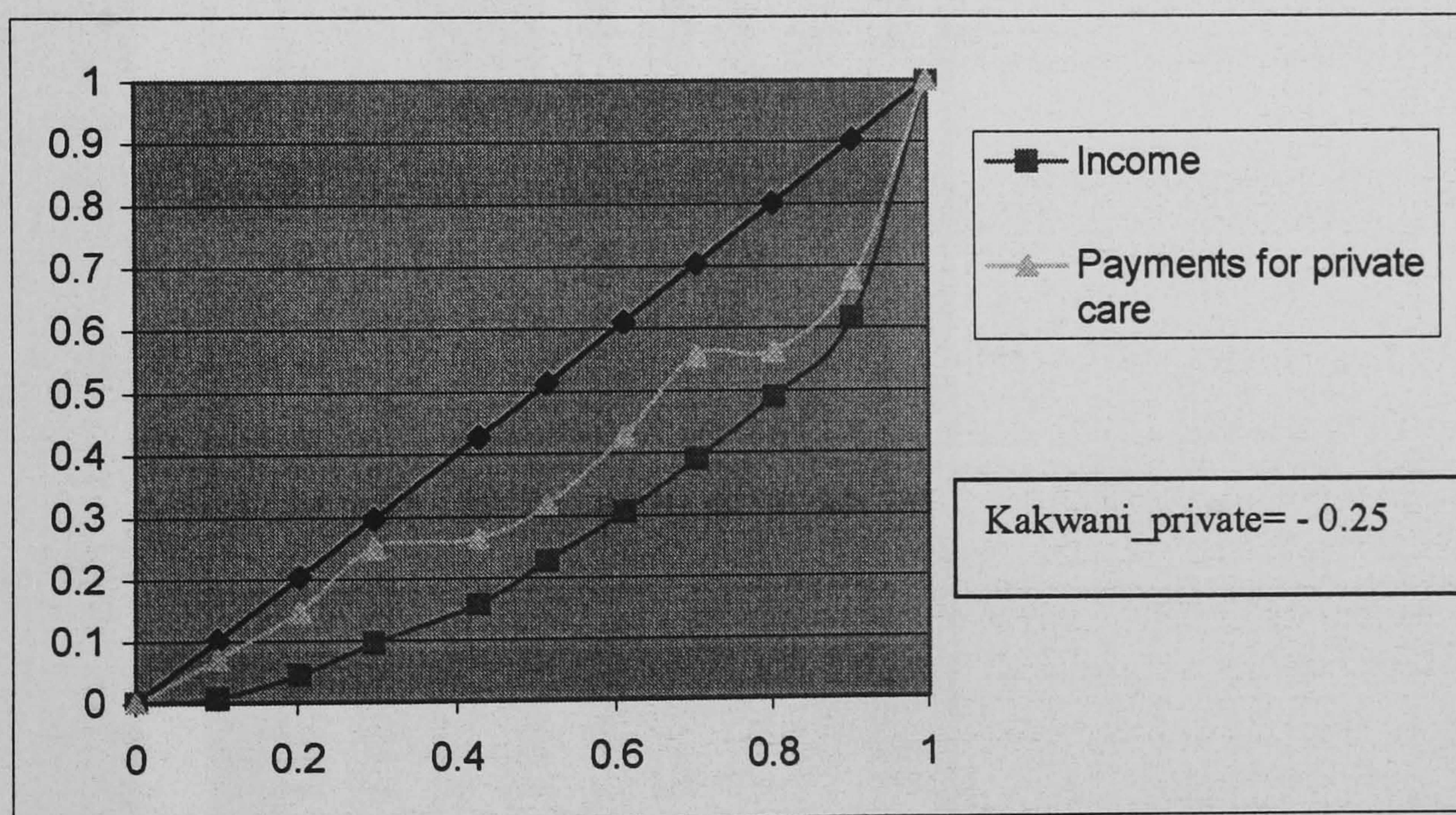
	Equivalence weight used		
	0.5	0.73	1
Income taxation	0.3793	0.3836	0.3753
VAT	-0.1858	-0.1829	-0.1714
Excise taxes	-0.1424	-0.1456	-0.1493
Informal payments	-0.2706	-0.2449	-0.2139
Drug co-payments and OTCs	-0.4018	-0.3709	-0.3066
Direct payments	0.1117	0.1160	0.4519
Income-related health insurance contributions	0.1026	0.0982	0.0814
Fix component of health insurance contributions	-0.0812	-0.0913	-0.1093
TOTAL KAKWANI	-0.0181	-0.0211	-0.0129

Appendix C

Total informal payments for public health care



Direct payments for private health care based on data from the Informal Payment Survey database



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Appendix D

T-test results for testing differences between health concentration indices

Hungarian study results	EQ-index TTO	EQ-vas	EQ-5D european	EQ-5D mobility	EQ-5D self-care	EQ-5D usual	EQ-5D pain	EQ-5D anxiety	Functionality	Chronic illness
EQ-5D_index (TTO)										
EQ-5D_vas (RS)	8.566118									
EQ-5D_european (RS)	1.714743	7.2472406								
EQ-5D_mobility	0.779334	7.1453819	2.159231							
EQ-5D_self care	3.051635	6.7020355	3.904329	0.2106						
EQ-5D_usual activities	2.525846	8.2408839	3.804487	1.614081	1.19084					
EQ-5D_pain/discomfort	3.278587	5.2280971	1.67381	3.38684	4.6388	4.89697				
EQ-5D_anxiety/depression	2.676071	5.4180322	1.10167	2.92708	4.3689	4.4617	0.488157			
Functionality	2.176058	14.57228	0.095169	2.4558	4.07074	4.22209	2.449885	1.565454		
Chronic illness	10.76643	3.849619	9.6949	8.87095	7.72113	9.74526	7.78378	7.80456	17.2776	
WvD measure of health	4.774506	3.6019779	3.243027	4.53352	10.1585	5.92596	1.51987	1.93912	4.82685	6.352329

Appendix E

Decomposition analysis: delivery of care

GP care

	Mean	CI	ME	Contrib	Sum
r	0,501	0,334		0,006	
visitgp	4,969	-0,101		-0,101	
yhat	4,972	-0,062		-0,106	
HI				-0,044	-0,044
lninc	10,452	0,028	-0,017	-0,001	-0,001
EQ-5Dindex	85,267	0,030	-0,089	-0,046	-0,046
male2	0,093	0,018	0,299	0,000	
male3	0,151	-0,099	0,763	-0,002	
male4	0,047	0,032	1,406	0,000	
male5	0,022	-0,039	0,574	0,000	-0,002
female1	0,155	0,155	0,479	0,002	
female2	0,091	-0,022	1,077	0,000	
female3	0,170	-0,099	2,185	-0,007	
female4	0,070	-0,079	5,139	-0,006	
female5	0,044	-0,168	2,009	-0,003	-0,014
roma	0,024	-0,535	1,701	-0,004	-0,004
set2	0,509	-0,002	0,964	0,000	
set3	0,315	-0,188	0,510	-0,006	-0,006
ED2	0,551	0,048	0,336	0,002	
ED3	0,135	0,475	0,510	0,007	0,008
inactive	0,022	-0,485	7,611	-0,017	
housework	0,049	0,031	0,547	0,000	
retired	0,333	-0,136	3,774	-0,034	
unemployed	0,046	-0,414	0,344	-0,001	
student	0,002	-0,476	-0,196	0,000	
selfemploy	0,060	0,253	-0,552	-0,002	-0,054
region2	0,100	-0,123	0,380	-0,001	
region3	0,104	0,072	0,584	0,001	
region4	0,267	0,256	0,970	0,013	
region5	0,132	-0,103	0,405	-0,001	
region6	0,165	-0,215	-0,113	0,001	
region7	0,138	-0,132	0,137	-0,001	0,012
				-0,106	-0,106

Specialist care

	Mean	CI	ME	Contrib	Sum
r	0,501	0,334		0,008	
visitgp	2,554	-0,020		-0,020	
yhat	2,557	-0,063		-0,028	
HI				0,035	0,035
lninc	10,452	0,028	0,166	0,019	0,019
EQ-5Dindex	85,267	0,030	-0,067	-0,067	-0,067
male2	0,093	0,018	-0,038	0,000	
male3	0,151	-0,099	-0,082	0,000	
male4	0,047	0,032	-1,184	-0,001	
male5	0,022	-0,039	-1,433	0,000	0,000
female1	0,155	0,155	0,759	0,007	
female2	0,091	-0,022	0,437	0,000	
female3	0,170	-0,099	0,257	-0,002	
female4	0,070	-0,079	0,390	-0,001	
female5	0,044	-0,168	-0,116	0,000	0,005
roma	0,024	-0,535	0,066	0,000	0,000
set2	0,509	-0,002	-0,847	0,000	
set3	0,315	-0,188	-1,124	0,026	0,026
ED2	0,551	0,048	1,448	0,015	
ED3	0,135	0,475	1,111	0,028	0,043
inactive	0,022	-0,485	7,000	-0,030	
housework	0,049	0,031	1,927	0,001	
retired	0,333	-0,136	2,095	-0,037	
unemployed	0,046	-0,414	0,009	0,000	
student	0,002	-0,476	1,593	-0,001	
selfemploy	0,060	0,253	-0,533	-0,003	-0,069
region2	0,100	-0,123	-0,181	0,001	
region3	0,104	0,072	-0,227	-0,001	
region4	0,267	0,256	0,380	0,010	
region5	0,132	-0,103	-0,311	0,002	
region6	0,165	-0,215	-0,277	0,004	
region7	0,138	-0,132	-0,064	0,000	0,016
				-0,028	-0,028

Hospital stay

	Mean	CI	ME	Contrib	Sum
r	0,501	0,334		0,009	
visitgp	2,486	-0,163		-0,163	
yhat	2,489	-0,098		-0,171	
HI				-0,074	-0,074
lninc	10,452	0,028	0,067	0,008	0,008
EQ-5Dindex	85,267	0,030	-0,099	-0,102	-0,102
male2	0,093	0,018	0,279	0,000	
male3	0,151	-0,099	0,251	-0,002	
male4	0,047	0,032	0,238	0,000	
male5	0,022	-0,039	0,419	0,000	-0,001
female1	0,155	0,155	0,079	0,001	
female2	0,091	-0,022	0,712	-0,001	
female3	0,170	-0,099	-0,027	0,000	
female4	0,070	-0,079	-1,905	0,004	
female5	0,044	-0,168	-0,430	0,001	0,006
roma	0,024	-0,535	2,513	-0,013	-0,013
set2	0,509	-0,002	1,023	0,000	
set3	0,315	-0,188	0,951	-0,023	-0,023
ED2	0,551	0,048	0,569	0,006	
ED3	0,135	0,475	0,420	0,011	0,017
inactive	0,022	-0,485	11,909	-0,052	
housework	0,049	0,031	1,161	0,001	
retired	0,333	-0,136	2,920	-0,053	
unemployed	0,046	-0,414	-0,032	0,000	
student	0,002	-0,476	-0,178	0,000	
selfemploy	0,060	0,253	-0,205	-0,001	-0,105
region2	0,100	-0,123	-0,267	0,001	
region3	0,104	0,072	0,504	0,002	
region4	0,267	0,256	1,206	0,033	
region5	0,132	-0,103	0,239	-0,001	
region6	0,165	-0,215	-0,408	0,006	
region7	0,138	-0,132	-0,238	0,002	0,042
				-0,171	-0,171

Dental care

	Mean	CI	ME	Contrib	Sum
r	0,501	0,334		0,003	
visitgp	1,036	0,136		0,136	
yhat	1,038	0,009		0,133	
HI				0,124	0,124
lninc	10,452	0,028	0,206	0,057	0,057
EQ-5Dindex	85,267	0,030	-0,003	-0,008	-0,008
male2	0,093	0,018	-0,315	-0,001	
male3	0,151	-0,099	-0,348	0,005	
male4	0,047	0,032	-0,407	-0,001	
male5	0,022	-0,039	-0,714	0,001	0,004
female1	0,155	0,155	0,276	0,006	
female2	0,091	-0,022	0,548	-0,001	
female3	0,170	-0,099	0,000	0,000	
female4	0,070	-0,079	-0,330	0,002	
female5	0,044	-0,168	-0,721	0,005	0,012
roma	0,024	-0,535	-0,392	0,005	0,005
set2	0,509	-0,002	0,078	0,000	
set3	0,315	-0,188	-0,144	0,008	0,008
ED2	0,551	0,048	0,187	0,005	
ED3	0,135	0,475	0,541	0,033	0,038
inactive	0,022	-0,485	0,119	-0,001	
housework	0,049	0,031	0,306	0,000	
retired	0,333	-0,136	0,075	-0,003	
unemployed	0,046	-0,414	-0,085	0,002	
student	0,002	-0,476	0,055	0,000	
selfemploy	0,060	0,253	0,276	0,004	0,002
region2	0,100	-0,123	0,035	0,000	
region3	0,104	0,072	-0,121	-0,001	
region4	0,267	0,256	0,129	0,008	
region5	0,132	-0,103	-0,007	0,000	
region6	0,165	-0,215	-0,163	0,006	
region7	0,138	-0,132	-0,053	0,001	0,014
				0,133	0,133