HEALTH CARE EXPENDITURE AND DECENTRALIZATION: A NATIONAL AND INTERNATIONAL EMPIRICAL ANALYSIS FOR OECD COUNTRIES

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ABSTRACT

The consistent rise in health care expenditure in these last years has attracted a lot of attention by academics, policy makers, and politicians. The quota of GDP spent on health has become considerably high in many OECD countries and pundits searched for possible solutions to increase the efficiency of the health care sector and to contain waste. Decentralization has been perceived as a solution to be pursued in order to achieve better economic performance thanks to the closeness of the government to the local population, which should allow to shape policies that satisfy their preferences. Such a form of multi-level governance has generated consistent interest because the allocation of health responsibilities between layers of government is far from being permanently set. A rapid look at OECD countries reveals a complex scenario: in some cases funding and management responsibilities have been decentralized to lower levels of government, while in other cases only decisions about the management and organization of the health care system have been relinquished by the center.

The goals envisaged in this research are twofold: first, to understand the different level of health decentralization reached in a sample of 20 OECD countries. It will be shown that many factors (historical, cultural, administrative and basic structure of the state) contribute to the set-up of a health care system and to varying practices of decentralization. Second, to investigate econometrically the determinants (demographic, supply-related and socio-economic causes) of national and regional differences in per-capita health care expenditure. It is important to stress that the focus of this study is purely on the level of costs incurred by a group of health care systems of OECD countries and by the Swiss health care system. Unfortunately, because of lack of data, there is thus no consideration of variables measuring the quality of care and the health

care system's effectiveness, the access to medical care, and the level of public satisfaction over health services.

The results point in the direction that, from a cost viewpoint, socialized health insurance (SHI) countries with a decentralized health care setting spent more resources in the last decade (1990-2000) than the other three typologies of health care system (SHI centralized, National Health System centralized and decentralized respectively). The variable measured is the level of health expenditure and this result must not be construed as a "failure" of SHI decentralized systems, because no implication is formulated about the performance of these countries in terms of health outcomes and quality of care. The Swiss analysis highlights that in such a decentralized context, regional differences in terms of per-capita health care expenditure tend to be wide. The empirical results show the existence of different regional patterns of consumption of health care services between the linguistic areas of the country, and a positive impact on health outlays derived by citizens' participation in the political process.

Keywords: health care system organization, decentralization, health policy, determinants of health expenditure, panel data analysis.

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LIST OF ABBREVIATIONS

OECD   Organization for Economic Co-operation and Development

NHS   National Health System

SHI   Social Health Insurance (system)

OLS   Ordinary Least Squares (model)

FEM   Fixed Effects Model

REM   Random Effects Model

LSDV   Least Squares Dummy Variable (estimator)

GLS   Generalized Least Squares

FGLS   Feasible Generalized Least Squares

IV   Instrumental Variable (Model)

FHIL   Federal Health Insurance Law

CHI   Compulsory Health Insurance

SUHI   Supplementary Health Insurance

FFS   Fee-for-service

CHAPTER 1: INTRODUCTION

1.1   Problems and objectives

There has been much attention given in these last few years by academics, policy makers and professionals to the topic of health care and decentralization. In many countries decentralization is deeply anchored in the health care system and these states can draw on decades of organizational and managerial skills. In other countries decentralization has come to the fore as a means to revamp the performances of the health care sector, seeking to remedy the inadequacies of centralized national models of decision making. Decentralization is increasingly seen as an attractive framework for health system organization and management, incorporating elements of local control and gains in efficiency in the management of financial and human resources.

The economic theory of fiscal federalism supports this move because through decentralization of competences there is a higher and tighter commitment of the local governments to shape services according to the needs of the local population. In this way the economic efficiency is increased and wastes contained. Furthermore, decentralization allows to experiment. If one sub-layer of government performs well, then the experiment can be replicated somewhere else.

This form of multi-level governance has generated considerable interest because the optimal assignment of health policy issues to sublevels of government is far from being crystal clear. A closer look at the OECD health care landscape reveals a complex picture. There exists no singular pattern of devolution of competences and the implementation of decentralization has generated marked differences in the health care sector. However, a common trend has been to decentralize some functions to local

jurisdictions: more specifically, in some cases both funding decisions and management responsibilities have been delegated to local governments (regions, counties, provinces). In other cases only decisions pertaining to the organization and management of the health care system have been relinquished by the central government, which is still in charge of financing the health care sector.

The impact of multi-level governance on health care has also been investigated by Banting and Corbett (2002) who put forward a descriptive analysis based on a comparative study of five federalist countries. The authors researched the impact of federalism on cost containment, access to health care, and health care policy. They find that federal institutions on their own cannot be viewed as determinative. In general, the simple distinction between federal and non-federal countries does not take one very far. Other factors such as economic interests and political ideologies as well as the norms and values embedded in the underlying culture leave powerful imprints on the health care systems that emerge in different countries. Nevertheless, the structure of the federal political institutions matter in shaping national health policies. The broad patterns emerging from the study are that in none of the five federations analyzed is health care a purely local responsibility. There is always some central intervention in the set-up of the health care system. Moreover, federalism is important with respect to two distinct agendas at the heart of health policy: first, access to services; and second, rational planning. Federal states have successfully managed to establish interregional evenness in health services. In contrast, federations have proven to be less able in the politics of cost containment.

Rich and White (1996) also contribute in highlighting the relationship existing between federalism and health policy. In their book they stress that health care policy is probably the most critical issue at stake in the ongoing debates about those who favor a decentralized versus a decentralized government. In their research they illustrate that the

theories of fiscal federalism and intergovernmental relations can provide a useful framework for examining the subdivision of roles between layers of government in the health care sector. Another important contribution to this topic is the book of Holahan et al. (2003) who focus on the Medicaid program existing in the United States.[1] In particular the aspect on which the authors dwell on is the increasing role of the states in the program due to the fact that Medicaid has been lately plagued by an array of problems that have made it unpopular and difficult to use to extend health care coverage. In recent years states have been given the flexibility to change many features of their Medicaid programs. The research examines the record on the changing health safety net; in particular how well states have done in providing acute and long-term care services to low-income populations, how they have responded to financial incentives and federal regulatory requirements, and how innovative they have been. The striking fact is that nowadays there is a constant "struggle" between the two layers of government for defining the precise set-up of this insurance, and the decision recently taken points into the direction of a larger scope for decentralization.

At this point I would like to draw the attention of the reader on the fact that on the one hand, when one refers to federalism, the existence of a form of multi-level governance and the decentralizion of functions to the lowest possible level of government are always assumed. However, this is not always accomplished; in fact, some federalist countries are characterized by a highly centralized health care system (e.g. Belgium). On the other hand, some unitary countries that are normally thought to be very centralized, show full decentralization of responsibilities to sublevels of government (e.g. Finland). Thus, the

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[1] There are two insurance programs in the United States. Medicaid is a health insurance that helps poor people who cannot afford medical care pay for some or all of their medical bills. It is both a federal and a state responsibility. In particular, states define their own guidelines regarding eligibility and services. Medicare is a federal health insurance for people 65 years of age or older, certain younger people with disabilities, and people with end-stage renal disease. The responsibility for the Medicare program is federal.

scope of this study is not to focus on the simple classification of federalist versus non-federalist country because this does not allow to capture the degree of decentralization of health care systems. The goal of this research is hence to concentrate on the issue of decentralization. Furthermore in this work, besides descriptive country case analyses on decentralization in the health care sector, there will be two empirical applications on one of the most severe strains faced nowadays by governments, namely the level of health costs. The first empirical analysis will shed light on the different levels of per-capita total health care expenditure in a group of OECD countries. We are aware that there exist different shares of private health care expenditure in all countries partaking in the international analysis; however, this research has relied on previous studies conducted by Gerdtham et al. (1998), in which covariates have been regressed on the level of total health expenditure. Subsequently, the Swiss case will show that even within a state there can be some wide differences between its regions in terms of per-capita health outlays. Pundits are interested in understanding the main determinants of health care expenditure but also the impact of the overall organization of the health care system and its degree of decentralization on the level of health expenditure. In focusing on the centralization and decentralization of management and financing responsibilities respectively, I am certainly not arguing that these are the only relevant influences on national paths. Other features have to be taken into consideration such as the legal tradition, the major institutional solutions within a constitutional system, the political set-up, the economic, cultural and historical background.

An ample part of this thesis deals with the empirical analyses on OECD countries and Switzerland; it is important to stress that more attention has been assigned to the empirical part. Therefore, no theoretical model of federalism in health care has been formulated in this work.

The scope of this thesis is twofold:

- First, to assess the pros and cons related to fiscal federalism in the health care sector. This research will investigate the different degree of decentralization of health policy reached in a sample of OECD countries, and will provide an overview of the different experiences with decentralization.

- Second, to empirically investigate the main determinants of health care expenditure. To do this, two econometric analyses will be performed. The first one is on a sample of OECD countries and measures the impact of the health care system organization (centralized vs. decentralized) on the per-capita health care costs. The second analysis is an intra-national study of Switzerland, a federal state that has a long-standing tradition of multi-level governance and direct democracy, and the focus is on the level of per-capita health care expenditure and its determinants.

It is beyond the ambition of this book to offer a detailed blueprint for the set-up of a health care system that performs well and succeeds in curbing health expenditure. The goal is to shed light on the different models of decentralization experienced in the countries partaking in the analysis and to understand whether decentralized health systems have incurred a higher (or lower) level of health care expenditure than centralized structures. The focus of the research is on the level of health care expenditure; other factors that capture the effectiveness and quality of the system as well as equity variables have not been considered in this study because of lack of data.

1.2 Structure of the thesis

The thesis is structured in six chapters. Following this introductory first chapter, where the goals have been illustrated and presented, the second chapter will outline the fundamental theoretical basis of the theory of fiscal federalism. An ample margin will be given to the explanation of the various arguments in favor and disfavor of decentralization. Furthermore, Chapter 2 will put forward empirical applications of the impact of decentralization on service delivery, economic growth, corruption and governance, and macro management and fiscal imbalance. Chapter 3 will provide deeper insights of decentralization in the health care sector. Here the main goal is to explain the relationship between decentralization, health policy and the level of health care expenditure in some OECD countries. The delicate topic of the allocation of health responsibilities to sub-layers of government will also be set forth. Chapter 4 sets out the first empirical analysis with panel data on a sample of OECD countries. Per-capita health care expenditure is modeled on a set of demographic, socio-economic, and supply-related factors, and the analysis will also check the impact of decentralized and centralized health care systems respectively on costs for the period 1990-2000. In addition to the econometric estimations and results, there will be a description of the four most popular approaches for analyzing panel data. Chapter 5 will deal with an intra-national analysis. It will be focused on the Swiss case and cantonal data will be used. The choice of the country is straightforward: Switzerland is characterized by a high decentralized health care system and by the principle of subsidiarity, which assigns responsibilities to the lowest level of government possible. The study will present the estimations of an econometric model of per-capita socialized health care expenditure. An overview of the conclusions is set out in chapter 6.

CHAPTER 2: THE THEORY OF FISCAL FEDERALISM AND SOME APPLICATIONS

2.1   Introduction

The decentralization of the public sector is a topic of great debate worldwide. There is a widespread devolution of tasks from the center to local governments in both industrialized and developing countries. On the one hand, through this "instrument" countries seek to improve their public sector performance by allowing greater competition between different layers of government, by improving the efficiency of the delivery of goods and services, and by bringing decision making closer to the people. On the other hand, there is also a process of centralization in Europe with a new layer of government (EU) that constitutes a more centralized decision making procedure thereby allowing greater coordination between member states on various topics.

The literature on fiscal federalism has been very productive over the last forty years and has developed a particular view of multi-level governance finance.[2] Scholars have

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[2] The major figures in the fiscal federalism theory are Samuelson (1954, 1955), who is particularly known for his work on determining the optimal allocation of resources in the presence of both public and private goods; Tiebout (1956), who built an economic theory of local government expenditure by arguing that people vote with their feet and move to places with the right combination of taxes, freedom, and public versus private choices; Arrow (1970), who conceptualized the roles of the private and public sectors; Oates (1972, 1999), who formalized his proposition on the multi-level government setting as the *Decentralization Theorem*; and Musgrave (1959, 1983), who set forth the allocation of roles between layers of government. Other important contributions were given by Olson (1969) with the *fiscal equivalence* principle that related the provision of public goods with the spatial/geographical patterns of benefits; Boadway and Flatters (1982) addressing the issue of equalizing, lump-sum grants from the central to regional government; McLure (1983), who questioned what forms of taxation are best employed at the different levels of government; Inman (1988) explaining the concept of intergovernmental grants; and Fischel (2001) who showed that local property taxation fosters efficient local budgetary decisions.

addressed questions relating to the assignment of governmental functions, the design of a tax system and intergovernmental grants. Recently, researchers have moved in other directions frequently including important contributions from disciplines outside public economics. Wallace Oates himself, who can be thought of as the "father" of the fiscal federalism literature, recently stated that a "second-generation theory of fiscal federalism" is emerging.

The purpose of this chapter is to highlight the main advantages of decentralization and shed light on the principal drawbacks that may occur if this powerful instrument is misused. Decentralization can neither be conceived of as a magical recipe that automatically stimulates public sector efficiency, nor is it a way to revamp the state. On the contrary, the issues to be considered are: which governmental functions are best decentralized, the institutional environment in which one wants decentralization to take place,[3] and the type of decentralization one has in mind.[4] The crucial aspect remains of course the identification of the best level of government that can deal with each kind of activity.

The structure of this chapter is the following: in section 2.2 the economic, political, and historical justifications for decentralization will be exposed. The analytical tool used is drawn from the standard fiscal federalism theory. Some arguments that support centralization will be put forward in section 2.3. Section 2.4 will deal with the allocation of tasks by level of government. Section 2.5 briefly deals with the recent evolution of the theory on fiscal federalism, and section 2.6 will present some empirical evidence on the effects of fiscal decentralization. Conclusions will be drawn in section 2.7.

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[3] Fiscal decentralization can appear to be good in some countries, while it can have different results in other nations. For example, one should expect that decentralization of competences works more effectively in those countries characterized by different ethnic groups.

[4] The reference is to the scheme adopted by Rondinelli (1981), namely deconcentration, delegation, devolution and privatization.

2.2   Why decentralize? Economic rationales, political justifications, and historical reasons

In recent years, a growing number of countries has implemented fiscal decentralization programs as part of structural reforms of the state (De Mello, 2004). The majority of these programs has devolved revenue sources, expenditure functions, and managerial decisions to sublevels of government, namely provinces, regions, and municipalities.

A unique definition of decentralization does not exist; such concept has been defined in a variety of ways, according to the degree of delegation and autonomy granted to local actors.[5] The most often cited typology of decentralization is Rondinelli's (1981), who specifies four different analytical frameworks. In particular, Rondinelli thought of decentralization as "the transfer of authority, or dispersal of power, in public planning, management and decision making from the national level to subnational levels or, more generally, from higher to lower levels of government". There are basically four different types of decentralization: deconcentration, devolution, delegation, and privatization. Financial authority, means of representing the local community, geographical conditions, and their legal status are important factors in classifying them.

Deconcentration refers to the dispersion of activities previously carried out by the central government to local bodies. The center retains control over decision making and financial decisions so that local officials still remain accountable to the central administration. Local authorities are able to make very few decisions without referring

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[5] The extensive literature on decentralization, centralization and devolution covers a wide range of disciplines including politics, public administration, economics, management, sociology, and organizational studies. Some relevant references in this field are Bossert (1998), Levaggi and Smith (2005), Bennet (1980), Buchanan (1950), Oates (1972), and Putnam (1993). An interesting report investigating the prolific literature about decentralization is Peckham et al. (2005).

to the center. This type of decentralization is normally found in unitary systems of government.

Delegation refers to the transfer of decision making authority from the central administration to the local authorities for pre-defined activities. It usually involves the distribution of fiscal resources to the local level accompanied by specific instructions about their allocation. Since the central administration retains the power of reallocating resources, this form of decentralization has some of the characteristics of a principal-agent relationship, with the central government as the principal and the local governments as the agents. The autonomous organizations receive public funds and they are accountable to the central government. Delegation thus occurs when central actors lend authority to semi-autonomous organizations, with the understanding that the authority can be withdrawn. Federal governments in recently independent countries are more likely to opt for this kind of decentralization.

Devolution refers to the transfer of significant fiscal and allocative decisions to local authorities that gain full responsibility for them, with no interference from the central administration. In practice, the central government relinquishes administrative and political powers. Devolution may be accomplished by granting substantial tax powers to local governments. This latter type of decentralization is qualitatively different from the two previous ones, because the lower tiers of government gain complete control over resource allocation and are generally accountable to local constituencies, which should increase decision making responsiveness to local needs.

Finally, privatization is a transfer of responsibilities from the public to private enterprises, both for profit and non profit, which assume functions that were previously carried out by the central government itself.

The arguments for decentralizing specific functions rely on economic, political, and historical reasons. As we will see in the next section the main economic argument suggests that the performance of the public sector can be enhanced by taking into account the local differences in culture, environment, preferences and needs, endowment of natural resources, and economic and social institutions (Frey, 1997; Putnam, 1993; Putzel, 1997). The local government has an information advantage over the central government, being closer to the local people and hence more identified with the local causes, more sensitive to local problems, and more responsive to local demands. Fiscal decentralization thus shortens the "informational distance" (De Mello, 2004) between the providers and the recipients of public goods and services, so as to diminish information costs and to boost public sector efficiency in service delivery. Moreover, public economists also affirm that one advantage of a decentralized governmental system is that it allows for experimentation; it is a laboratory for government. Should one local government perform well, then it can be viewed as a "best practice" and as an example to be followed. On the contrary, if it does badly, it has a "worst practice" and the negative outcome of such policy is confined to that sub-layer of government and not to the whole country.

Another concept that lies behind decentralization is that the different jurisdictions can act and function as if they are in a competitive market. This is based on the assumption that the subnational levels of government will interact with each other in a similar way as firms compete in a market place. Political scientist Thomas Dye (1990) observes "Matching public policy to citizen preferences is the essence of responsive government". Like economic competition, political competition is driven by informed choice among alternatives. People can choose not only how to vote, but also where to live, work and run businesses, and thus also where to pay taxes and receive the public services. Citizens, through their "voting with the feet" mechanism, can penalize bad performing

local governments by exerting their right to exit or, alternatively, they can reward their local governments by simply residing there. The mobility of individuals and businesses increases as the size of governmental units decreases, because movement across nearby jurisdictions is culturally and economically much easier than longer-distance movement. By exerting their right to exit, citizens manage to realign people's preferences with the jurisdiction policies. Furthermore, a jurisdiction can change its policies in response to an actual or threatened movement, further increasing the possibility of realignment. Proponents of jurisdiction competition suggest that residents of different subnational levels of government would be worse off if forced to shift toward a national system.

Another pro-decentralization argument belongs to what the public choice school has popularized as the Leviathan hypothesis,[6] whereby decentralization prevents taxpayer's exploitation by government's bureaucrats and in so doing it protects its citizens from the danger of the Leviathan. Brennan and Buchanan (1980) have asserted that "total government intrusion into the economy should be smaller, ceteris paribus, the greater the extent to which taxes and expenditures are decentralized". The arguments used by the two authors is that as long as individuals and firms, or at least some of them, are mobile, then having a multi-level system of governments forces jurisdictions to engage in tax competition, thus destroying the Leviathan's monopoly on taxation and, furthermore, bringing government outlays closer to citizens' preferences.

Decentralization is politically interesting because politicians and local officials have an incentive to be responsive since their careers depend on whether they pursue efficient policies. Politicians become more concerned about local self-governance because they are personally held responsible for the outcomes they reach. In the absence of local governments' accountability, strong economic incentives may result in corruption,

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[6] The Leviathan hypothesis basically states that public officials behave in a budget maximizing way.

provincial protectionism, and capture by vested interests (Tanzi, 1996; Sonin, 2003; Enikolopov and Zhuravskaya, 2003).

Historical factors also contribute to decentralization. Nordic countries of Europe and countries characterized by multilinguism have traditionally delegated responsibilities of services (health, education, social services) to the lowest possible tier of government, on account of the principle of subsidiarity.

To conclude, there exists no single pattern to decentralize functions; each country has its own economic and political reasons, historical paths, and has developed its public administration system differently. As Tuohy (1999) suggests, choices about delegation of responsibilities are "accidental" in the sense that they occur in a place and at a time in which there is a unique window of opportunity shaped by ideas and agendas within a broader social and political system.
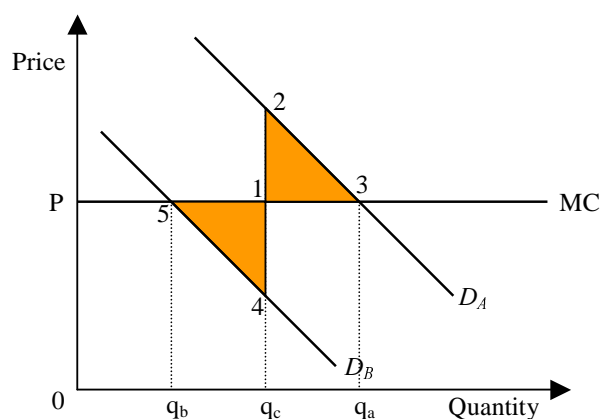
2.2.1   The welfare gains from multiple fiscal units: the decentralization theorem of Wallace Oates

The traditional economic theory of fiscal federalism assumes the existence of a "benevolent dictator" who manages to satisfy the heterogeneous preferences of the population through sub-layers of government (Liberati, 1999). The Decentralization Theorem of Wallace Oates (1972) states that for a public good – the consumption of which is defined over a geographical subset of the total population, and for which the cost of providing each level of output of the good in each jurisdiction are the same for the central or the respective local government – it will always be more efficient (or at least as efficient) for local governments to provide the Pareto efficient levels of outputs

for their respective jurisdictions than for the central government to provide any specified and uniform level of output across all jurisdictions (the "one-size-fits-all" concept).

Figure 1 depicts the decentralization theorem. Assume that the population of a particular state is divided into two distinct localities. A local public good is to be provided in each locality, which shows different preferences, and there are no spillover effects. The cost is to be shared equally by residents. In figure 1 D_A and D_B respectively represent the demand for the local public good of two representative individuals, one from each locality *A* and *B*. The marginal costs (*MC*) of providing such good are assumed to be constant. The price each individual is asked to pay is *P=MC*.

Figure 1: Oates' decentralization theorem

Source: Cullis and Jones (1998)

In this figure, if a centralized regime provides a single uniform level of the good in question, the level of output provided would be a compromise between the two representative individuals in each locality (q_c). Such a quantity is lower than the amount that would be asked by *A* but more than the quantity demanded by the representative individual in the jurisdiction *B*. The ensuing welfare losses are experienced by each of the two individuals. They are represented by the colored areas in Figure 1; these are the triangles 123 and 145 respectively. Triangle 123 shows the loss that arises because the individual *A* does not consume as much good as he would choose if there was a decentralized provision. Triangle 145 indicates the welfare loss experience by *B* because he is consuming more than what he would otherwise choose. If each jurisdiction provides itself with the quantity of the good required, then such deadweight losses could be prevented. Decentralization thus allows to adjust to the preferences expressed by the local population.

Notice that there are a number of points to add:

- As Oates (1979) notes, if q_a and q_b are closer, then q_c would provide a close approximation. It becomes evident that decentralization works well where there is a high heterogeneity of tastes and preferences in the different jurisdictions.

- One should not take it for granted that, within a jurisdiction, preferences are homogeneous. With very heterogeneous tastes in a jurisdiction there can be some welfare losses even within the local government. Furthermore, some individuals may be more unhappy about a decentralized provision of goods than a centralized one; this depends on the degree of heterogeneity in the local preferences compared with the national average preferences.

- Welfare losses also depends on the elasticity of the demand. The more rigid (steeper) the demand curves, the larger the area of the shaded triangles.

- The above analysis presumes that there are no economies of scale. However, if they exist, a centralized provision of the good would perform better. Moreover, spillover effects are not taken into consideration. If there are some externalities, then it is preferable to enlarge the dimension of the sublevel of government.

2.2.2 The optimum size of local authorities: the theory of the clubs

The Decentralization Theorem shows that local governments perform better when tastes are heterogeneous, however it does not give any insight about the determination of the optimal size of the local authorities. It is assumed that jurisdictions have the optimal dimension, and no space is left for the presence of economies of scale and/or externalities. Moreover, through the correspondence principle,[7] Oates states that for each public good there must exist a territorial entity responsible for the provision of good for all citizens.

The question of how big the jurisdiction should be was first investigated by Buchanan (1965) with the theory of the clubs. The main hypotheses are that there is an impure public good, whose consumption is not confined by technology to a precise geographical subset of economic units, and that people group together in clubs.[8] The two main features of clubs are: first, people join the club on a voluntary basis; second, the

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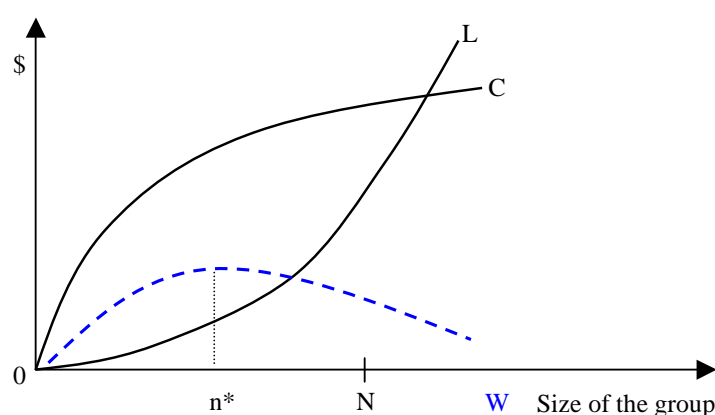
[7] The correspondence principle is when the government size corresponds perfectly to the area of benefit of the good it provides.
[8] The good envisioned here is of a complex but not unrealistic nature. While the good may in fact be consumed collectively in groups of different sizes, it is also assumed that each group of individuals can exclude others from the consumption of the group's own units of the good. The point is thus that the number of individuals who jointly consume a particular output is itself a variable. Some examples of impure public goods are the education system and the fire protection services.

possibility of leaving the club and joining a different one. This in turn means that there are no relevant financial barriers to join a new club.

On the one hand, by consuming the good jointly it may be possible for individuals to get it at a lower price, so that some economies of scale in the consumption of the good can arise. On the other hand, if the dimension of the club increases congestion costs emerge. There are hence two opposing forces: congestion costs push for a smaller dimension of the club, while the reduction of per-capita costs pushes for a bigger dimension. The optimal solution is shown in figure 2.

Figure 2: The optimal-sized jurisdiction

Source: Oates (1972)

The line *OC* represents the aggregate cost savings from increasing the number of individuals who jointly consume a particular good. The line *OL* represents the congestion price to be paid because of joint consumption of the good. There is reason to believe that the aggregate welfare loss, due to the differences between the actual and

desired levels of consumption, will tend to increase with the magnitude of *n* (the size of the group). As the group size increases, the influence of any particular individual on his own level of consumption of the good diminishes. As a consequence, a greater aggregate welfare loss is expected with larger groups. The curve *OW* is the vertical subtraction of *OL* from *OC*, and represents the net increase in welfare from joint consumption for each group size. The curve reaches its maximum at point *n**, which represents the optimal-sized group to consume the good jointly. The conclusion therefore is that, the more widely the efficient levels of consumption vary across jurisdictions, the more pronounced is the potential welfare loss from the centralized provision of goods.

The theory of the clubs rely on some important assumptions:

- The first assumption is that the members of the club consume the good equally (equal sharing).

- The presence of some spillover effects is not taken into consideration. Obviously, the smaller the group, the smaller the likelihood to internalize the externalities. For this reason, the expected loss in welfare from such externalities will tend to vary inversely with the size of the jurisdiction. Furthermore, there will also be an incentive to engage in a free-rider behavior that will be accentuated with a large number of relatively small groups of consumers.

- Economies of scale can be experienced in the provision of increased quantities of a local public good. The solution would be to enlarge the jurisdiction.

- If individuals with similar income are grouped together, the outcome can be unstable. If the taxes that the individuals pay for a local public good were higher as a consequence of higher income, the poor might enjoy a greater quantity of a local public good if they were resident in a high-income area. There may well be a tendency for zoning on the part of high-income groups in order to exclude the poor.

2.2.3   The Tiebout hypothesis: "voting with your feet"

Following the previous discussion of the Buchanan's theory of the clubs, it is appropriate to consider now how individuals take up club membership, that is how they choose to reside in a particular jurisdiction. Note that the decentralization theorem of Oates explains the superiority of a decentralized setting in two cases: first, when preferences within a jurisdiction are homogeneous (so that there is a representative individual); second, if preferences are less heterogeneous than national tastes. But what if the starting point of analysis is a highly heterogeneous distribution of preferences at the local level? In such a case it is clear that even in a context of decentralization there can be welfare losses, because the consumption of the representative individual in the jurisdiction is far too much (or too low) for the other individuals and hence some of them could be better off if the provision of the good in question is centralized. It thus becomes a question of comparing welfare losses experienced under decentralization with those resulting from centralization.

In order to tackle this problem Tiebout (1956) argued that individuals select those communities whose provision of local public goods and tax prices best satisfy their demands and needs. Individuals reveal their preferences by moving to the locality that best reflects their tastes and offers the preferred tax-benefit mix. By so doing, preferences within a jurisdiction will tend to level out and become homogeneous. Tiebout's analysis was framed as a direct response to Samuelson's (1954) conclusion that individuals are not willing to reveal their preferences for public goods. However, in Tiebout's view individuals "vote with their feet" and hence they do show their preferences by picking up one specific community. It is clear that the Tiebout model reinforces the welfare gains from decentralization stated in the Decentralization Theorem.

The restrictiveness of the assumptions underlying the model are manifold:

- It is assumed that all individuals have perfect knowledge and complete information of the local taxes, expenditure, and range of services provided.

- The mobility of individuals is supposed to be costless. Costless mobility implies that there are no work problems, or that households do not have to worry about transport costs to their place of work. This assumption "makes the voting by feet hypothesis somewhat unrealistic, except in a setting where people work in the inner city and may choose among the suburbs for residence" (Musgrave and Musgrave, 1989).

- When preferences over public goods are very heterogeneous the number of local communities required to produce an equilibrium is extremely large. This might imply the presence of many small communities that miss out on possible gains derived by the existence of economies of scale in the production of the local public good.

- The movement of one individual from one community to the other may well generate some spillovers in the form of added congestion. In fact, when a household moves to a new region, he can add congestion costs to already crowded facilities.[9]

- Benefits provided by one jurisdiction may spill over to another community. The two localities may decide to internalize such externalities by a process of direct bargaining or, alternatively, the central government may decide to step in and play a role.

- Preferences are non-static. The needs of households change during the life cycle. For example the need for good educational services can be a priority at certain ages, but later on individuals might be more concerned with facilities for the elderly.

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[9] This literature has extensively been discussed by Boadway (1979).

It is obvious that the improbability of all the above assumptions casts doubts on the Tiebout proposition in practice.

2.3   The other side of the coin: some pro-centralization arguments

Some recent literature has started to question whether the major advantages of decentralization – that is the possibility of tailor-made policies, service delivery based on a greater knowledge of local preferences, greater chances for civil participation, and, in general, a more efficient allocation of public goods and services – are still valid nowadays.[10]

The following paragraphs shed light on some specific arguments that support a more centralized public administration organization.

2.3.1   The information argument

The point of departure of the Decentralization Theorem implicitly assumes that under certain conditions, a varied pattern of local public goods in accordance with local tastes will be Pareto superior to an outcome characterized by a uniform provision of output, determined centrally, across all jurisdictions. The literature has suggested that a central authority would face a difficulty in determining the preferences of each single jurisdiction. However, with perfect information, one could also think of an outcome in

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[10] Please refer to Cummings (1995), Popkewitz (1996), Regulska (1997), De Vries (2000) and Walker (2002).

which the central government establishes Pareto efficient levels of public goods. Note also that when the distribution of preferences is very much heterogeneous at the local level, a centralized provision of goods could result in a minor welfare loss than under a decentralized setting.

Furthermore, as stressed by Prud'homme (1995), the standard theory of fiscal federalism only takes into consideration the demand side (namely the preferences expressed by citizens), ignoring completely the supply side of goods and services. The hidden assumption is that supply is always efficient, but that might not always necessarily be the case.

The "perfect mapping" of citizens' preferences and jurisdictions may also encounter additional problems. In fact, a variety of local public goods may have different geographical patterns of consumption, making it hard to believe that it could exist a level of government whose jurisdiction coincided perfectly with the pattern of geographical benefits for every local public good. In particular, there might arise problems of interjurisdictional spillovers. First of all externalities (both positive and negative) may be present. A spatial externality arises whenever a cost or a benefit is not internalized, that is to say that a cost or a benefit resulting from the consumption of one good does not include only the residents of one single jurisdiction but also residents of other jurisdictions.[11] Of course, the presence of spillover effects should be taken into consideration when it comes to determine the optimal-sized group to consume a particular public good. The smaller is the group, the less the external effects are likely to be internalized: for this reason the expected loss in welfare from such externalities will tend to vary inversely with the size of the jurisdiction (Oates, 1972). The economic

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[11] One plausible example could be the educational system. In fact, as shown by Weisbrod (1964) the quality of education in one area may have significant effects on the welfare of individuals in other jurisdictions.

theory suggests some options in order to solve the spillover effects: to enlarge the dimension of the jurisdiction, to arrange for some Coasian bargains or a system of intergovernmental grants (Fisher, 1996).[12]

Another important point to underline is the presence of economies of scale, that is when the minimum average cost of producing public goods is reached. The optimal dimension of the community should be one where the economies of scale are all exhausted, that is, that it is not possible to decrease further the average cost of production. One plausible solution to this aspect is, again, to modify the dimension of the jurisdiction.

2.3.2   The competitive market argument

Another strand of criticism against decentralization stresses the weaknesses of the view that jurisdictions play in the political market as private enterprises do in a competitive one. And even if it is assumed that such competition exists between jurisdictions, one might also argue that interjurisdictional competition is harmful and not beneficial (McGuire, 1991; Revesz, 1992; Inman and Rubinfeld, 2000). The arguments that support this view are twofold: first, the fierce competition can unleash a "race-to-the-bottom" in providing benefits rather than a "race-to-the-top" in innovation and good administration. Needy beneficiaries of public programs would move from less generous jurisdictions to their more generous neighbors, and this, in the long term, would undermine the stability of the latter ones. Jurisdictions that are willing to improve their services could probably not afford to do so after a while, no matter how efficiently they

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[12] Coasian bargains are voluntary contractual agreements between the user and provider of a good and/or service. They are thus direct agreements and do not involve any central intervention by governments or other regulatory bodies.

run their programs. As a consequence, in order to avoid migration, jurisdictions would rather opt for reducing their program benefits below what they would have otherwise chosen, in order to become less attractive to beneficiaries, who would then go to the next highest jurisdictions, which would go on with this "vicious cycle" by cutting their benefits as well. By reducing their public programs, jurisdictions would also become very similar to each other. The diversity across them would tend to diminish.

Second, competition undercuts jurisdictions' ability to tax residents as much as they would like. In order to keep wealthy citizens on its territory, a jurisdiction is not willing to impose taxes that are much higher than the neighboring jurisdictions, simply because residential and commercial taxpayers will move. Hence, jurisdictions fear to lose high-income taxpayers; for this reason they will tend to have low rates of taxes, and this would cause a lower provision of public goods and services that would go to the detriment of low-income residents in a particular jurisdiction.

2.3.3 The technological argument

Decentralization not only transfers power from the central to the peripheral government, but also from central to local bureaucracies. The technological argument states that public local officials may lack of capacity to provide highly skilled quality public management (Prud'homme, 1995; Letelier, 2004). Thus, central bureaucracies are likely to attract more qualified personnel because of different reasons: better salaries, better career paths, greater diversity of roles, and greater chances of promotion. Moreover, access to up-to-date and comprehensive information will be initially at disposal at the higher administrative level of government, because central bureaucracies are likely to invest more in technology, research and development.

2.3.4   The corruption and lobby argument

Alongside the public management quality, previously described, there is also concern for corruption. Corruption might probably be more widespread at the local level rather than a national one, since excess closeness of local officials to private local interests is a potentially dangerous fact, especially in developing countries. As Conyers (1990) has stressed, "… decentralization may increase the participation of people at the local level, but sometimes it is only a small privileged elite group who gets to participate". And it is likely that such elites may pursue, and lobby for, their own narrowly focused self-interest. The outcome of local policies will hence not reflect the preferences and the needs of the population of the constituency, but the interests of the lobby group(s) that might act both legally and illegally, generating corruption.

2.4   Allocation of tasks by level of government

The economic theory of federalism has stressed the importance of decentralizing the provision of goods and services to sublevels of government. Another important aspect to take into consideration relates to the assignment of tasks to sub-layers of government (who does what) that was first investigated by Musgrave (1959). The author delivered important and crucial insights into the question of assignment of responsibilities.[13] According to Musgrave the government has to perform three main tasks: changing the allocation by providing public goods and correcting the external effects of private economic behavior; redistributing income in order to equalize income distribution that is

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[13] For further knowledge see e.g. Anderson et al. (1997), Hemming and Spahn (1997), and Pehnelt (1999).

the result of market forces; and stabilizing the economic process in order to reduce business cycle fluctuations. The solution usually proposed is that redistribution and stabilization should be performed at a national level whereas, according to the "correspondence principle" stated by Oates (1972), the provision of public goods should be performed at the lowest governmental level. This allows an approximate correspondence between those who benefit from their provision, those who have to pay, and those who decide on the amount provided.

The following paragraphs describe the Musgravian theory and present some additional references supporting the tripartition of roles.

2.4.1   Allocation function

Public goods cannot be provided by the market system, that is by transactions between individual producers and consumers. In fact, in some cases, the market mechanism fails entirely, while in some other cases it works, but inefficiently. The basic reason for market failure in the provision of public goods is that the benefits to which public goods give rise are not limited to one particular consumer who purchases the good, as in the case for private goods, but become available to others too. A consumer is prone to spend part of his income to buy the private good he desires, and the consumption of that good stands in a rival relationship. Public goods' consumption, however, is non-rival. Clean air is something that is available to everybody. The benefits derived by anyone's consuming a public good are externalized, in the sense that they become available to the whole society. Conversely, in the case of private goods, the benefits of consumption are internalized with a particular consumer, whose consumption excludes consumption by others. The market mechanism is thus well suited for the provision of private goods

because it is based on exchange, and an exchange can occur only where there is an exclusive title to the property that is to be exchanged. However, this system does not work with public goods. It would be inefficient to exclude any one consumer from partaking in the benefits, when such participation would not reduce someone else's consumption. But when benefits are available to all, consumers will not voluntarily offer payments to the suppliers of public goods. They will tend to free-ride and that is the reason why the government should step in to provide such goods. The initial difficulty for the government is thus to decide the type and quality of a public good to be supplied, and how much a particular consumer should be charged. Consumers have, of course, no incentive to step forward and declare how much they value the public good and how much they are willing to pay. Hence, a different technique is needed by which the supply of the public goods and its cost allocation can be determined. This is where the political process enters the picture as a substitute for the market mechanism. Thus decision making by voting becomes a substitute for preference revelation through the market. The result will probably be a second best, in the sense that a number of voters are bound not to be pleased with the outcome of the political process. Yet this is the only way to approximate an efficient solution. Reaching an approximately efficient solution will depend in particular on the community's preferences over the matter and on the efficiency of the polling process itself.

But is it realistic to think of a local public good whose benefits are spread only within the boundaries of a politically-defined jurisdiction? According to Olson (1969) there can be three possible relations between the benefits of a local public good and the boundaries of a sublevel of government: (1) the local public good reaches beyond the boundaries of the government that provides it, (2) the local public good reaches only a part of the constituency that provides it, or (3) the boundaries of the local public good are the same as those of the jurisdiction that provides it. It is obvious that the first two

situations do not lead to an efficient outcome, and only the third setting reaches the fiscal equivalence, or perfect mapping principle. If this is a straightforward theoretical conclusion, one should question what happens in reality. A very interesting contribution in this field is the *constitutional proposal* suggested by Frey (2001). The author advances this proposal based on the notion that there are meaningful government units, whose major feature is not the territorial extension but its function. The constitutional proposal allows the creation of governmental organizations, which do not have any territorial monopoly, their territory is variable and are in competition with each other. Frey reports some examples of jurisdictions that are close to the constitutional proposal. In Switzerland for instance, in addition to political communes, there are roughly 5,000 overlapping, functional special communes. The most important are school communes offering education for the children of one or several political municipalities.

In a World Bank paper Shah (1994) has identified the spatial area of benefits for some public services and goods.[14] His conclusions are that national defense, international and national trade, immigration, employment, railway and air transportation, foreign affairs, and monetary policy are examples of functions with national costs and benefits. Local fire brigades, police, environment, agriculture, local roads, garbage collection, and city parks are classified as public goods and services whose benefits are delimited locally.[15]

The allocation function can thus be performed either by the central government or by a sublevel of government; the crucial feature to be established is that of spatial limitation of benefit incidence. In any case, the choice of the proper level of government that deals with the allocation function is sensitive to the specificities of each country. Moreover,

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[14] Although Shah's work focuses only on developing countries, it is believed that the criteria used could perform well also in industrialized nations.
[15] Owens and Norregaard (1991) also reach in their analysis a similar subdivision of duties among layers of government.

the motivations that point to decentralize some particular functions are dynamic and evolving in time, so that they are necessarily subject to revision.

2.4.2   Distribution function

The distribution of income and wealth depends chiefly on the distribution of factor endowments. The distribution of income might be so that it is not perceived as "right" by the society. The answer to the question of fair distribution of income and wealth involves value judgments. As Musgrave and Musgrave (1989) have pointed out, there are two difficulties in "the translation of a justice role into an actual state of income distribution". The first one is related to the fact that it is impossible to compare the utility which various individuals get from their income. This limitation has thus forced people to think more in terms of social evaluation rather than subjective utility measurement. The other difficulty is that all redistributional policies entail an efficiency cost that should be taken into account when deciding on the extent to which equity objectives should be pursued.

Notwithstanding these difficulties, distributional policies have become an important issue of public policy. As underlined by Musgrave, policies to adjust for these differences in income and wealth should be pursued by the central state. If these policies are assigned to the lowest layers of government, then the risk is to have local inefficiencies. Let us consider now the case where regional measures for redistribution are present: what may happen is that the rich will leave the jurisdiction while the poor will move to the more egalitarian-minded jurisdictions. There would be a flow of rich people from the cities to the suburbs, while poor people would migrate from the low-

benefit rural areas to the high-benefit urban locations.[16] A vicious cycle triggers in such a situation because the inflow of needy citizens in richer jurisdictions undermines their sustainability. The creation of a single jurisdiction where all poor people go must be avoided, because this brings a very unstable outcome. The case for assigning the distribution function to the national government rests on two assumptions: first, the national government's broad taxing powers can more easily redistribute income; and second, the ability of taxpayers to move from one jurisdiction to another to take advantage of more attractive spending and taxation policies weakens local government's ability to "soak up the rich and redistribute to the poor" (Kee, 2004).

However, Pauly (1973) argues that redistribution can also be interpreted as a local public good; individuals might be more prone to give money to the poor of their own jurisdiction than to the others. It is true that some local governments enforce redistributive policies (for instance by defining the criteria of eligibility for public housing). The Swiss example clearly shows that, under certain conditions, redistribution can also be successfully pursued at the state (cantonal) level (Bird et al., 2003). In the health care sector for example a system of subsidies both from cantonal and federal level has been established in order to help needy citizens pay their health insurance premiums. Notwithstanding the fact that the financing of this system of subsidies is borne for two-thirds by the Confederation and the remainder by cantons, it is remarkable that the implementation of the subsidy distribution lies solely within the single cantons. Hence, redistribution of financial resources follows a decentralized framework in this case.

Note that a decentralization of health care expenditure makes redistributive policies important since the fear is that via decentralization there might be an impoverishment of the access to health care, because of the different fiscal capacity and wealth of

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[16] This happens because one expects a higher public assistance to poor people in urban areas instead of in rural locations.

jurisdictions. Redistributive policies tackle the problem of horizontal inequity that arises when individuals with the same needs and fiscal capacity have a different access to the health care sector because they live in two different parts of a country. Not only should redistributive polices be concerned with equal access to health care, but they should also assure that there exists no differences in health per se. An equal access to inappropriate health services brings discomfort, however it is "equitable". Likewise an excellent distribution of facilities spread out all over the country could be totally meaningless if the service was shunned by the population. Hence, even when redistributive policies are an affair of sub-layers of government, it is advisable to have a central participation in order to not exacerbate regional differences.

2.4.3   Stabilization function

The goal of a stabilization policy is to maintain a high employment rate, to control inflation and to secure an acceptable rate of economic growth. Unfortunately full employment and price stability do not happen automatically in a market economy, so that public policy guidance is a must. Without it, the economy would tend to be subject to fluctuations, and it may undergo periods of inflation and unemployment.[17] The overall level of employment and prices in the economy depends on the level of the aggregate demand. A central government has two instruments to stabilize the economy: fiscal and monetary devices. The array of fiscal instruments includes how to maneuver public expenditures and tax rates. Government expenditures add to total demand, while taxes

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[17] Note that inflation and unemployment can occur simultaneously in a country (stagflation). This contradicts the famous Phillips curve, which stated in the mid-fifties that the rate of inflation of a country was inversely related to the rate of unemployment.

reduce it. The budgetary effects on demand will be the larger, the higher the level of expenditures and the lower that of tax revenue.[18] The monetary instrument basically includes proper money supply. Money supply has to be controlled by the central bank and it must be adjusted to the needs of the economy in terms of short-run stability and long-run growth.

It is readily understandable that the stabilization function should be pursued by the central (national) government. In fact, fiscal measures cannot work in the jurisdictions since they all are open economies within the national market areas and thus local fiscal measures would suffer from many leakages.[19] Furthermore, the use of monetary instruments at the lower levels of government is even less acceptable, since central-bank policy is inherently a national function. The power to print money would, in fact, invite monetary irresponsibility at the local level. There is hence general agreement among the public finance experts that the national government should have the stabilization responsibilities.

2.5 Evolution of the theory of fiscal federalism: the second generation studies

In the last years the fiscal federalism theory has developed further and some scholars have started to talk about a "second generation theory" (Oates, 2004; Qian and Weingast, 1997). The main areas of interest of the second generation studies in fiscal

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[18] The government may increase its expenditures or decrease its taxes if demand is to be expanded, and vice versa if demand is to be contracted.

[19] Note that, given fixed exchange rates, monetary policy has a special advantage (due to its effects on international capital movements) in securing balance of payment adjustments, whereas fiscal policy is more effective in dealing with domestic needs.

federalism dwell on two topics: first, the behavior of political agents who can have their own objective function to maximize; second, the information problems. In settings of asymmetric information, the literature has shown us that optimal "procedures" or institutions are likely to be quite different from those in a setting of perfect information.

In particular, Qian and Weingast (1997) stress that the first generation economic theories ignore the problem of why government officials have an incentive to behave in the manner prescribed by the theory. They take for granted that political officials provide public goods and preserve markets. According to the authors, governments are seen as black boxes where people act benevolently, but only a modest explanation is given for why government officials would behave in such a way. In Qian and Weingast's work it is thus assumed that participants in the political process have their own objective function to maximize, and they try to do so in a political context that constraints their behavior. And even in the case in which local officials would like to fulfill the local preferences, it is not sure whether the local bureaucracies would follow. The principal-agent problem can emerge: the mayor is the principal who gives order to his local bureaucracy, the agent. The degree of control of the principal over the agent and the efficiency of this control is very much likely to vary from country to country. But one can presume that in many cases, local bureaucracies are not responsive, as they rather follow their own agenda with their own objectives than the principal's.

The point of departure of Qian and Weingast's study is that the local government should respect two market incentives: (1) the state must maintain positive market incentives that reward economic success. In the terms of North (1990), the "state predation" problem should be avoided;[20] (2) the state must also commit to negative market incentives that

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[20] The state predation problem emerges when the government takes away too much income and wealth generated by the future success, and in so doing individuals have no incentives to take risks and make efforts today (Qian and Weingast, 1997).

punish economic failure. In the terms of Kornai (1986) problems related to "soft budget constraint" should disappear.

According to the authors this capacity of the public sector to respect the abovementioned goals depends on two elements. Firstly, through the appropriate decentralization of information and state power, federalism can establish positive incentives to limit the state predation problem and negative incentives to reduce the soft budget constraint problem. Through a decentralized allocation of information and authority the local governments give credible signals of its actions, the efficacy of which can be more easily tested by citizens. Secondly, competition among jurisdictions forces governments to represent citizen interest and to preserve markets. As already underlined by Tiebout (1956) interjurisdictional competition allows for increases in efficiency through sorting and matching. Qian and Weingast's approach also adds that competition among sub-layers of government serves as a disciplinary device to punish inappropriate market intervention by lower government officials. Their argument parallels the recent models developed in corporate control and the theory of the firm. Just as market competition pressures firm managers to reflect the interests of the shareholders, competition among local governments help to limit the government's predatory behavior. Similar arguments can be used for the soft budget constraint problem (Qian and Roland, 1996). A jurisdiction that incurs in inefficient expenditures will find it harder to attract mobile resources. As a consequence, competition endogenously hardens the budget constraints of local government and changes the incentives of local politicians.

This is the contribution of the second generation studies on fiscal federalism, which must be seen as a complement and not a substitute of the traditional approaches. Qian and Weingast (1997) appeal to the theory of the firm to address incentive problems and their main result is that political institutions serve a similar role for government officials

as firm institutions do for firm managers. Appropriately designed institutions help align the public officials' interests with the ones of the citizens.

The other area of interest of the second generation studies in fiscal federalism deals with the problem of imperfect information. Information asymmetries have long been cited as part of the case for fiscal decentralization. In the first generation studies the local governments were thought to have a better knowledge of local preferences and needs. However, there is the interesting question of why this would be so. An important contribution to this topic is the work of Cremer et al. (1996) who suggest that the information acquisition is endogenous and there is no reason why a central authority could not make use of a variety of channels (for example surveys or pricing mechanisms) to collect information on local conditions. But such activities are not costless, and the failure of the central authorities to obtain such information must reflect its lesser value to central, than to local, public agents.

2.6   What do the literature findings suggest?

The theoretical aspects of fiscal federalism have been outlined so far, but what do empirical applications reveal about this issue? Does decentralization imply a better provision of goods and services? In other words, do services provided correspond to citizens' preferences? The goal of this paragraph is to shed light on this aspect: to review the empirical literature of the impact of decentralization on service delivery, economic growth, corruption and governance, and macro management and fiscal imbalance. Unfortunately, the literature provides mixed results; some studies find fiscal decentralization to be a sort of panacea for reforming the public sector, while others consider it a solution not to be undertaken, or at least to be taken with caution.

2.6.1   Service delivery

A consistent number of studies has recently explored the impact of fiscal decentralization on service delivery in various countries. There is not a clear-cut evidence of these analyses, since the results go both in a positive and negative direction.[21] One of the most representative contribution has been given by Enikopolov and Zhuravskaya (2003), who explore the impact of decentralization on the efficiency of public good provision, along with government performance and economic growth, by using a large sample of 95 countries (both developed and developing) for 25 years. Their main results are that the effect of decentralization depends on two aspects of political centralization: first, the strength of national party system (measured by the age of the main parties and fractionalization of the government parties); second, subordination (whether local and state executives are appointed or elected). Solid support is found for Riker's (1964)[22] theory in developing countries, namely that strong parties significantly improve the results of fiscal decentralization in terms of economic growth, quality of government, and public goods provision. There is also some evidence that subordination of local to higher-level governments improves the effect of decentralization on growth

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[21] The positive impact of decentralization on service delivery has been found by Alderman (1998), Bardhan and Mookherjee (2003), Galasso and Ravallion (2001), Foster and Rosenzweig (2001), Eskeland and Filmer (2002), King and Ozler (1998), and Huther and Shah (1996). However, some other studies find a negative or inconclusive impact: Ravallion (1998), West and Wong (1995), Azfar and Livingston (2002), Azfar et al. (2000a; 2000b), Winkler and Rounds (1996), and Khaleghian (2003).

[22] Riker argued that a strong party system is a very important source of political accountability; even more important than any other administrative and constitutional arrangements. When political parties are strong, the career of politicians in the local government depends on their party's political and financial support to get reelected, as well as on the possibility of promotion to the national government. Parties, in turn, are interested in extending their control over competent local politicians, so that their policies become associated with the party, and therefore, increase the number of party supporters.

and public goods provision both in developed and developing countries, and government quality in developing countries. Their main conclusion is hence that a remedy to poor service provision in inherently decentralized countries is building strong national parties.

The impact of decentralization on education and health has been tackled by Letelier (2001), who depicts a strong and positive relationship between decentralization and governments' performance on education and health.[23] Decentralization thus seems to have a positive and significant effect on the governmental technical efficiency. This result has been later confirmed by Habibi et al. (2003), who analyze the impact of decentralization on health outcome (infant mortality rate) and on education in Argentina. They use panel data for the period 1970-1994 on the 23 Argentine provinces and conclude that fiscal decentralization had a positive impact on the delivery of health and education services, and reduced, at the same time, intra-regional disparities.

2.6.2   Economic growth

The relationship between decentralization and economic growth has been frequently analyzed by scholars in the last 30 years.[24] As Breuss and Eller (2004) have stressed, linking economic growth and decentralization has mainly three reasons: first, growth is perceived as one of the main goal pursued by the process of decentralization, because it brings with itself a better allocation of resources in the public sector; second, it is one of the primary role and intention of each government to pursue policies that accrue per-capita income; third, per-capita growth is easier to calculate and construe than other

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[23] Letelier uses a sample of both developed and developing countries.
[24] For further knowledge please refer to Bahl and Linn (1992), Oates (1995), Lin and Liu (2000), Akai et al. (2004), Akai and Sakata (2002), Zhang and Zou (1997), Desai et al. (2003), Woller and Phillips (1998), Xie et al. (1999), and Ebel and Yilmaz (2002).

economic performance indicators. Both theoretical and empirical analysis that investigated the relationship between federalism and economic growth tend to be inconclusive and come up with different results.

One of the most important contribution in this field is the work of Thiessen (2000), who analyzes the impact of decentralization on economic growth for a sample of OECD countries.[25] The author tests the hypothesis of a hump-shaped relationship between fiscal decentralization and economic growth. Where the level of decentralization is too high, the spillover effects cannot be internalized and economies of scale are not exploited; the consequences are negative growth effects. However, the same argument holds for a lower level of decentralization: preferences are not taken into consideration and this leads to inefficiencies in the provision of public goods, what inhibits, in turn, economic growth. This theoretical framework hence supports the view that, in order to achieve economic growth, it is necessary to set the optimal degree of fiscal decentralization. Thiessen finds that this hump-shaped relationship is particularly pronounced in high income countries, while there is evidence that low per-capita income countries grow linearly with higher decentralization degrees. Moreover, the observed trend of convergence among high-income OECD countries toward a medium degree of fiscal decentralization tends to promote economic growth.

2.6.3   Corruption and governance

The word "governance" has emerged to be a catch-all term when one speaks about the role of institutions in economic activity and particularly socioeconomic development.

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[25] The countries partaking in the analysis are the EU 15 (Western) members, Switzerland, Norway, Japan, USA, Australia, Canada, New Zealand, Argentina, Republic of Korea, Brazil, and South Africa.

According to the World Bank (1994) definition governance stands for "the manner in which power is exercised in the management of a country's economic and social resources for development". Being a complex term, governance is thus tough to measure. Some papers have aimed to test the hypothesis that fiscal decentralization improves governance in a set of countries. An important contribution concerning the effect of decentralization on the level of governance is the paper of De Mello and Barenstein (2001). The authors utilize a cross-country analysis for 78 developed and developing countries and show that fiscal decentralization is linked with various indicators of governance, such as corruption, rule of law, and governmental effectiveness. In particular their results point in the direction that governance can be enhanced through decentralization of expenditure functions to sublevels of government. Moreover, it seems that the higher the subnational share of expenditures, the higher the index of governance. The considerable improvement of this study consists on the consciousness raising that governance is not only affected by fiscal decentralization but also by how subnational expenditures are financed. The authors however suggest the need for caution in the use of decentralization for improving governance. De Mello and Barenstein argue that for decentralization to be a catalyst of better government performance and quality of life, it is necessary to have the appropriate political and economic institutions to prevent an excessive capture of the benefits of government provision by local elites, and to ensure that the sublevels of government are operating under a hard budget constraint.

Similar results were reported by Huther and Shah (1998) who, using panel data, find that fiscal decentralization is associated with enhanced quality of governance as measured by citizen participation, political and bureaucratic accountability, social justice, improved economic management and reduced corruption. The positive correlation between all the

components of the index of governance and the composition of government expenditures is also supported econometrically.

2.6.4   Macro management and fiscal imbalance

Empirical evidence of the effect of fiscal decentralization on macro management and fiscal imbalance is still scant at present. One of the most quoted study in this area is the cross-country analysis of Ebel and Yilmaz (2002), who estimate the impact of the various measures of decentralization on economic stability and growth, and public sector size. Their main result underlines how the plurality of indicators of decentralization has markedly different effects on economic performance. Due to the fragility of estimation results Ebel and Yilmaz hence suggest to be cautious when selecting the fiscal federalism variable in an empirical application, because the implications of making the wrong choice ensue critical consequences. Therefore, the analysis of the impact of decentralization on macroeconomic indicators requires qualitative and quantitative techniques that take into account the institutional structures of countries.

A positive relationship between fiscal decentralization and macro management is found by Shah (1998). His results point in the direction that decentralized fiscal systems offer a greater potential for improved macroeconomic governance than centralized systems. The reasons for this lie in the obligation of having a greater clarity in the roles of various players and decision makers, and in the greater transparency in rules governing interactions.

2.7   Conclusions

This chapter has provided an analysis of the traditional arguments of the theory of fiscal federalism underpinning the importance of a decentralized public setting. The most important motivations for decentralization are the proximity of the local government to the preferences expressed by the local population, thus a minor information gap than a central government; the behavior of jurisdictions, which is alike to the behavior of firms in a competitive market environment and allows citizens to pick up the community they think it is best; the Leviathan hypothesis, namely tax payers are not exploited by government bureaucrats; and the possibility of experimenting specific policies in geographically delimited areas, hence delimiting the probability of a failure or spreading the chance of a success to all the other sub-layers of government. From a political viewpoint local officials act more in the interests of their citizens because they are responsible for the outcomes obtained and the chance of being re-elected depends on the results achieved.

The attention has then turned to other arguments, which support a more centralized organization of the state. Criticism on fiscal federalism can be summarized by five points: the potential existence of externalities that are not internalized by the local jurisdiction; economies of scale that are not fully exploited; the "race-to-the bottom" fear, which leads to a "destructive" and potentially dangerous behavior of sublevels of government; the lack of subnational officers to access updated and comprehensive information; and the potential for corruption that stems from the proximity of local officials to private local groups, who lobby for their own interests.

New important contributions in the fiscal federalism theory are given by the so-called second generation studies, which draw on different analytical tools of other disciplines

in order to face specific problems that were not tackled in the first generation studies, as for example why the local officials should act like "benevolent dictators" in the interests of their citizens.

The final part of the chapter has analyzed the empirical literature of fiscal decentralization in different sectors. The literature provides mixed results and some studies reach inconclusive outcomes, but there is almost a clear evidence that some potential gains derive from decentralization for economic growth and service delivery.

CHAPTER 3: DECENTRALIZATION, HEALTH POLICY, AND THE LEVEL OF HEALTH CARE EXPENDITURE

3.1   Introduction

Every country contemplating reform of its health care system faces a series of fundamental questions: what is the best way to structure the health sector? Should the health system be left to free market principles or is the government action required? How to define a national health policy? All these questions arise because health care is a good of a complex nature: political authorities strive to reach the goals of efficiency in the use of resources, effectiveness in the quality of care given the technologies at disposal, and equity in the access to health care. These objectives are substantially in conflict with each other. International comparisons throughout history show that the achievement of one of these goals threatens the fulfillment of at least one of the other two objectives. For example in the United States the level of health technologies is the highest among developed countries, insuring the maximum level of health effectiveness. Yet this comes at a price of equity because part of the population is uninsured and hence has no access to the health care system. The accomplishment of the maximum level of quality in the American system goes to the detriment of an equal access to the health care providers guaranteed to the whole population.

The goals outlined in the different health policies of national governments vary with time (Cutler, 2002). After the Second World War and up to the mid 1970s governments' primary objective was to guarantee equity of access and universal coverage to the whole population. Physicians were paid fee-for-service (FFS) on a retrospective basis and a global budget was available for all hospitals. Because the main focus for politicians was

equity, other goals such as efficiency were not taken into consideration; there existed no budget constraints, and this contributed to the growth of health expenditure.

Health policies came under severe strains at the beginning of the 1980s. There were basically two reasons for this: first, the economy slowed down (especially after the oil shocks). Second, in the political arena this period saw the birth of anti-welfare political movements, in a way symbolized by the figures of Margaret Thatcher in Britain and Ronald Reagan in the United States, who pushed for the free market ideology as the soundest basis to structure all social and economic programs, including health care (Hacker, 2004). In order to control health expenditure, which was the second most expensive area of the welfare state behind public pension programs, governments started implementing new regulatory and budgetary controls. Rationing services became one of the bedrock characteristic of all health care systems (Wilsford, 1995). There was the introduction of co-payments for patients and supply regulation became more intense (for instance in the form of capitation formulas, fixed budgets, and expenditure caps applied to hospitals).

The 1990s have been characterized by less rationing, which had caused in the former decade a decrease in the quality of services provided and long waiting lists, hence dissatisfaction of people towards their own national health care system. Competition and decentralization came to the fore as means to revamp and enhance the performance of health care systems. Funding and/or managing responsibilities started to be transferred to sub-layers of government (i.e. to regions in Italy or to the autonomous communities in Spain). The process of decentralizing funding and/or management responsibilities in the health care sector has generated considerable interest. Both the World Bank (1987) and World Health Organization (1978) have argued that decentralization can make health systems function more efficiently and can increase community involvement in oversight and locally relevant decision making. Often, health sector decentralization has been

accompanied in larger democratization processes and good governance efforts, which have helped promote greater political stability and local government responsiveness. Decentralization has also attempted to remove inefficient levels of bureaucracy, allowing for faster and more appropriate decision making for local circumstances. Through the process of decentralization countries have tried to improve their efficiency and constrain costs; in fact, the share of GDP accounted for by health spending in all OECD countries has been considerably high and structural reforms of national health policies have dominated the political agendas of advanced industrial states as never before.

This chapter is structured as follows: section 3.2 examines the market failures and the role of the state in health care. Paragraph 3.3 outlines the concept of health policy and a description of the typology of health care system is given in section 3.4. Section 3.5 will deal with the delicate topic of the allocation of health policies by level of government. Here, country cases will be analyzed in order to give a more comprehensive idea of the evolution of this sector across developed countries. The evolution of health care expenditure of OECD countries is set forth in paragraph 3.6. The issues of spending control and improvement of efficiency will be put forward in section 3.7. Conclusions will be set forth in section 3.8.

3.2   Market failures in health care

Health care is a good of a complex nature. Not only it is concerned with the goals of equity, efficiency, and effectiveness: for many analysts there is concern for equality in the distribution of resources for a particular good, rather than well-being in general. This

is what Tobin (1970) denoted as "specific egalitarianism".[26] For instance, the British NHS, along with many other health services, was founded on the proposition of equal access to treatment. Health care comprises all those services performed by health care professionals and providers (physicians, ambulatories, hospitals) for the purpose of promoting, maintaining, or restoring health. In addition to personal health care, health services include measures for health protection, health promotion, and disease prevention (World Health Organization, 1998).
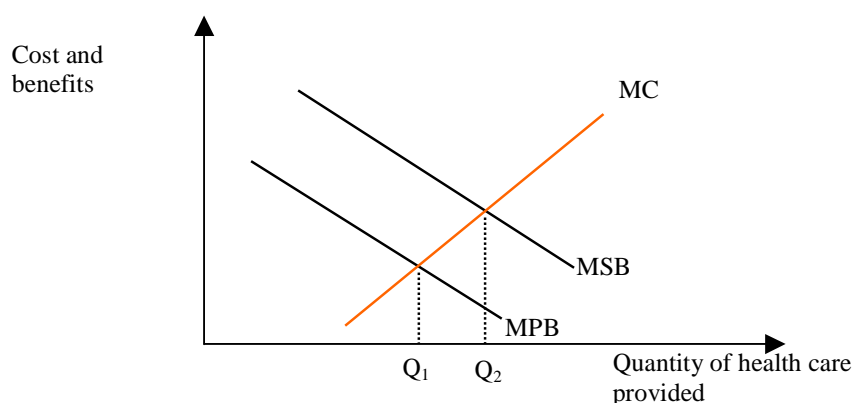
Health care is generally considered by the society a merit good. The free market principle is hence not applicable because it alone cannot perform all economic and social functions. For this reason the government has to step in and correct such market failures, which represent all those situations where markets do not efficiently organize production or allocate goods and services to consumers. If market forces are left alone, the perceived public interest is not attained, and this implies that the role of the state is needed (Stiglitz, 1999).[27] The main market failures in health care can be summarized in the following nine points:

- Health care generates externalities, both positive and negative (Arrow, 1963). Improved health provision and health care reduces absenteeism and creates a better quality of life and higher living standards.

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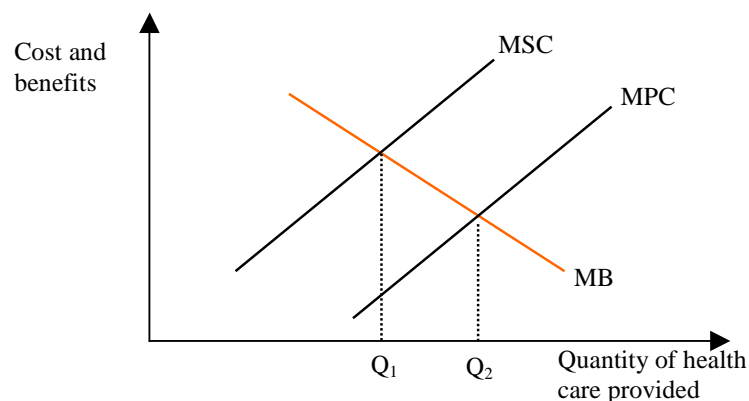
[26] Specific egalitarianism is a belief that some goods, but not necessarily all resources, should be spread equally across society.

[27] The key analysis of why the market fails when it deals with health care is that of Arrow (1963).

Figure 3: Positive externalities

Where substantial positive externalities exist, the good or service may be under consumed or under provided since the free market may fail to take into account their effects. This is because the marginal social benefits (MSB) of consuming the good are bigger than the marginal private benefits (MPB). Good quality health care brings positive spillover effects both for the recipient of the care but also their families and associates. A well functioning health care system also reduces the scale of absenteeism from work due to sickness and illness. Figure 3 depicts how the provision and consumption of health care services leads to an increase in social benefits and a reduction in social costs.

There are also examples of negative externalities arising in the health care sector. For instance the poor and unhealthy living conditions of determined layers of the population can entail negative externalities in the form of an outburst of an epidemic. In this case the marginal private cost (MPC) is less than the marginal social cost (MSC).

Figure 4: Negative externalities

- There are returns to scale and scope in hospital services, meaning that in smaller cities and rural areas the local general hospital would have a monopoly power if the provision of health care was left to the private market (Connolly and Munro, 1999).

- The asymmetry of information is a severe problem that emerges in health care (Connolly and Munro, 1999; Arrow, 1963). Patients are not in a position to value if their medical consumption is doing any good in their health status. They rely on physicians' decisions. The informational asymmetry problem is conveniently captured in the health status/health care distinction. The consumer/patient values health status per se, not health care, but health status cannot be bought. Rather the patient buys health care in the expectation that it will contribute to health status. The normal consumer sovereignty assumption is missing here and the provider/doctor is much better informed than the consumer/patient about decisions concerning health.

- Asymmetry of information is central to agency issues: there is an agency relationship between the doctor and the patient since the patient delegates decision making authority to the doctor (Arrow, 1986; Mooney and Ryan, 1993; McGuire, 2000). The reason behind such delegation is that patients recognize that they are relatively

uninformed about most appropriate decisions to be made and this problem is solved by use of an informed agent.

- The fact that physicians know more about medicine than patients can lead to supplier-induced demand, a situation where patients are encouraged to buy more medical care than it is strictly necessary (Labelle et al., 1994; Phelps, 1986; Reinhardt, 1985; Rice and Labelle, 1989). In order to maximize his profit the doctor recommends services that he would not prescribe if he was acting as a perfect agent. Normal supply and demand of services without inducement form a standard demand model, with movement along the demand curve as supply increases. Supplier-induced demand involves a shift of the demand curve, so that as supply increases, demand also increases.

- In the health insurance market the problem of moral hazard emerges (Pauly, 1968; Zweifel and Manning, 2000). It results in a change of behavior of consumers/patients in response to the existence of a health insurance. Since health insurance compensates for expenditure on health care services, the moral hazard problem refers to a tendency for such expenditures to be larger if a given individual or group is insured. Moral hazard can be manifested in two ways: ex-ante moral hazard arises prior to the sickness. Assuming that individuals can reduce the probability of falling ill through preventive measures, it can be postulated that insurance coverage, which lowers the cost of treatment at the point of consumption, renders being sick a less undesirable state, thereby weakening individuals' incentives to avoid the sick state. Conversely, ex-post moral hazard occurs once the individual has become sick. The insurance coverage renders the cost of medical cures lower at their point of use, which gives rise to greater demand from the patient than would be the case if he had

to pay all his costs out-of-pocket.[28] A further distinction is between static and dynamic moral hazard. The first one refers to the incentives of overconsumption of medical services, given the technology present on the market. The second one emerges if the insurance allows access to new medical technologies, offering an incentive to the patient to ask for access to the most recent (and thus most expensive) technologies.

- In the context of health insurance the problem of adverse selection arises from asymmetry of information between the buyer and the seller of the insurance policy (Cutler and Zeckhauser, 1997). The buyer of insurance may have better information about his risk status than the seller. In the extreme, if sellers were unable to discriminate among buyers at all, they might offer a single type of contract whose premium equaled the expected per-capita loss averaged over the community as a whole. This entails that all low-risk buyers are overcharged, paying more than an actuarially fair premium (plus appropriate load factor). They are subsidizing high-risk buyers, who pay less than their expected loss. Moreover, this makes the insurance policy too expensive for low risk customers, who therefore may choose not to buy any health insurance.[29]

- Insurance companies can tend to "select" good risks and direct bad risks to other companies. This practice is know as cream skimming or cherry picking (Newhouse, 1984; Pauly, 1984). In a system where premiums are community-rated, health insurance companies will have a greater incentive to select those population groups with minor health risks (such as young and healthy people) rather than higher risks as for example the elderly, unemployed, and chronically sick. The problem of cream

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[28] The distinction between ex-ante and ex-post moral hazard has first been made by Ehrlich and Becker (1972).
[29] Please refer to Evans (1984) for a more comprehensive analysis.

skimming also happens in a context of selective contracting: health insurers are not interested in offering costly health services for the chronically sick or those people in need of expensive medical treatments, in order to not attract such bad risks in their insurance plan.[30]

- The health insurance market has a strong propensity to create monopolies or cartels, which lead to excess profits, poor quality products, and underproduction (Hsiao, 1995).[31] Insurance operations call for sophisticated technical knowledge and ample equity capital, requirements that create barriers to entry into the industry. Consequently, insurance companies, once established, tend to adopt various monopolistic practices, including cartels, unless governments establish and enforce strong anti-trust laws.

All these afflictions call for a need to state regulation in the health care sector. The role of government intervention however, goes beyond the role of regulator, into the definition of the national health policy, which comprises both production and funding of the whole system.

3.3   What is health policy?

According to Longest's (1998) definition, "Public policies are authoritative decisions made in the legislative, executive, or judicial branches of government intended to direct or influence the actions, behaviors, or decision of the others. When public policies

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[30] Selective contracting is the practice by which health insurers enter into participation agreements only with certain providers (and not with all providers who qualify) to provide health care services to their health plan participants.

[31] The insurance market has increasing returns to scale due to the fact that it can diversify the risk by extending the number of insured people.

pertain to or influence our pursuit of health, they become health policies". Generally, health policies affect or influence groups or classes of individuals (such as physicians, the poor, the elderly, or children) or types or categories of organizations (such as medical schools, managed care organizations, integrated health care systems, medical technology producers, or employers). Thus health policy is a very large set of decisions reached through the public policy making process.

The definition of health policy of the World Health Organization (WHO, 1998) is the following: "A formal statement or procedure within institutions (notably government) which defines priorities and the parameters for action in response to health needs, available resources and other political pressures".

Both definitions highlight the importance of the government, which is one of the principal actor involved in shaping the national health policy. By government one understands any representative or part of the governing administration. It is important to note that many other actors are involved in the definition of a national health policy. First, providers of care comprise a large number of medical and non-medical personnel and services: physicians, nurses, pharmacists, lab technicians, hospitals, clinics, policlinics, as well as their professional associations or interest groups. Second, purchasers of health services, i.e. public or private health insurances, the state and/or local authorities in national health systems, households and/or patients paying out-of-pocket for their medical services, and social services institutions covering determined population groups. Third, the private sector, typically the pharmaceutical industry and the producers of medical devices. Finally, health pundits, think tanks, research institutes, and universities. All these actors contribute to formulate a national health policy.

Health policy hence refers to decisions, plans, and actions that are undertaken to achieve specific health care goals within a national society. The major aspects of health care policy involve:[32]

- Funding of services: it refers to the generation and collection of funds for health care, i.e. taxes, social insurance contributions, or co-payments, as well as their pooling and redistribution to the payers, namely sickness funds or health authorities. Through these different methods of financing the health care system, one can distinguish then between three different types of systems: the Beveridge model, the Bismarck model, and the private insurance model. Section 3.4 will highlight the main differences and peculiarities of each of these three systems.

- Remuneration of providers: it includes budgeting, diagnostic related groups (DRGs) systems, and all remuneration issues closely related to the organization of the health care system.

- Human resources training: it considers education, training, numbers and planning of medical and non-medical personnel in the health care system.

- Quality improvement: this should include tools like guidelines, evidence-based medicine, peer reviews, re-certification of physicians, measurability of outcomes, patient safety, medical errors and malpractice, public disclosure of provider performance data, benchmarks, and best practice.

- Benefit basket: this refers to the benefits covered (for instance the inclusion of dental care services), and all decisions related to (new) technologies.

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[32] A more in-depth description of health policy issues can be found in Walt's book (1994). Moreover, the Health Policy Monitor website www.healthpolicymonitor.org gives broad indications of the common features of health policies in developed countries.

- Access: it concerns the access by individual to health care, including problems such as rationing, waiting lists, strategies for reducing disparities in health care, etc.

- System organization: it includes all developments aimed at the reconfiguration of health care providers. It is also about steering functions and responsibilities in the organization of the health care system (funding, remuneration, and service delivery).

- Long term care: this is about the organization of care for the elderly. It includes nursing homes, home or institutionalized care, and specific treatment measures (mental health, geriatrics, gerontopsychiatry). All questions related to human resources in this sector, and quality management are also addressed here.

- Pharmaceutical policy: it relates to matters of drug pricing policy, generic drugs, pharmaceutical research, and drug innovations.

- Role of the private sector: this section controls developments occurred in the private sector, as for example vertical and horizontal integrations, hospital chains, etc.

- Prevention and public health: the first one comprises all initiatives or policy approaches geared towards primary and secondary prevention.[33] Public health aims at improving health, prolonging life and improving the quality of life among the whole population, through health promotion, disease prevention and other forms of health intervention.

It thus follows that health policy decisions affect all medical health care: they result in regulations affecting the quality of services provided by hospitals, the training of health

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[33] Kenkel (2000) defines three categories of prevention: primary prevention is related to the decrease in the probability of a disease occurrence; secondary prevention is related to actions that reduce the consequences of the disease once it has occurred; and tertiary prevention concerns the reduction of disabilities in chronic diseases. Preventive care includes diverse measures such as vaccination, healthy diet, regular exercises, regular check-ups for acute diseases and regular symptomatic control of chronic illnesses.

professionals, the safety and effectiveness of pharmaceutical medications, and the coverage for medical care for the elderly, disabled, and needy. They also affect many aspects of personal medical care, including access to doctors, insurance coverage of particular medical services and procedures, the confidentiality of medical records, and the ability of consumers to plan for health care after retirement.

To put in practice a health policy, key players first need to define the problem to be tackled, decide on a goal, and then look at alternative options to meet the goal. They need to take into consideration the impact of such policies on patients/consumers of care, providers of health care, and those paying for them. They also need to consider the best way to assure that goal: in some cases a new law and/or regulation is needed; in other cases it may call on professional associations to establish guidelines of clinical practice. Health policy discussions also occur within a political framework, subject to the voices of consumers, insurers, providers of care, and lobbyists. Policy makers need to work with existing laws and programs, so for example expanding or reducing the number of people who are eligible for a particular health program. Alternatively, they can try to implement more radical changes in the system, a process that may be more difficult, by taking a look at international experiences and programs and adapting such models to their needs.

3.4   Typology of health care systems: NHS versus SHI systems

The previous section has pinpointed the numerous aspects that have to be taken into consideration while formulating a national health policy. One of these points, the funding of services, needs further attention. In fact, health care systems throughout the world can be classified in three different types based on their predominant source of

funding (Hoffmeyer and McCarthey, 1994). The Beveridge model is based on taxation and is normally referred to as National Health System (NHS). The Bismarck model is mainly funded by premiums paid to social health insurers and is referred to as Social Health Insurance (SHI) system. The private insurance model is funded by premiums paid into private insurance companies. However, this latter model is found only in the United States among developed countries.

Both NHSs and SHI systems pursue the same goals, that is to provide an optimal mix of access to medical care, quality in health outcomes, and cost efficiency. However, the inner organization of the system itself is different.

In the Beveridge model, funding is mainly based on taxation and is characterized by a centrally organized national health service with services largely supplied by public health providers (hospitals, GPs, etc). The health care budget competes with other government spending priorities. Countries with a NHS widely accept the role of the public sector as the main provider of funds. Most NHSs tend to be integrated systems: this implies that the central government and public providers are a unique identity. In the integrated systems money does not follow the patient, therefore consumer choice is typically curtailed, with no choice of hospital or specialist, gatekeeping, and expenditure priorities set by providers. Physicians are normally paid through a capitation system or with salaries. Waiting lists for particular surgeries tend to be long and the level of public satisfaction towards the health care sector is lower than in SHI systems (Blendon et al., 2001). Some new developments of integrated NHS have moved towards the creation of a split between purchasers and providers of services (for example UK in the 1990s).

The main actors in countries characterized by a social insurance are the insured/patients, third-party payers (sickness funds), providers of care, and the contribution collector. These actors are all linked by a correlating set of relationship and together they shape the national health policy. SHI systems are financed by means of health premiums paid to a

social and mandatory insurance. In the Bismarck model health premiums are usually linked to a working activity. Those who work pay the health insurance, and the worker's family can benefit of the insurance policy too. Sickness funds compete with each other and are on a non-profit basis. The notion of universal coverage in SHI countries is a recent phenomenon, being health coverage voluntary for high-income earners in some countries (for example Germany and the Netherlands). Health premiums are normally related to wages, although in Switzerland premiums are community-rated.[34] Most physicians are paid fee-for-service, not giving hence that much of an incentive to slow down costs. The health care system is in most cases either a reimbursement system, a contracting system or a mix of the two. In the reimbursement system patients are charged for health services, but then reclaim their expenditure from insurers. Since sickness funds do not have any contract with providers of care, there is little incentive for these latter to control outlays. The contract system refers to a situation where providers (e.g. hospitals) enter into direct contract with purchasers (e.g. insurers) over the services they will supply. With multiple insurance funds, competition between them gives the consumers some power over the range and quality of treatment on offer. Gatekeeping does not exist (only in the Netherlands) and the insured have an ample margin of choice, because they have the ability to select among contracted providers and, in some countries, among different sickness funds. The level of citizens' satisfaction with their own health care system is higher than in NHS countries, probably due to the ample decision power of citizens.

In the private insurance model, funding of the system is based on premiums paid to private insurance companies. Competing health insurances set their premiums according to the risk characteristics of each individual, or groups of individuals, through

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[34] Note, however, that there are means-tested subsidies, provided both by the federal and cantonal (regional) authorities, that help the poor pay their health insurance premiums.

employment. Health insurance is not mandatory, and people with a low income are often unable to afford insurance. This system, in its pure form, exists in the United States, where an estimated 14% of the population (Docteur et al., 2003a) is without an insurance coverage. The US government provides and finances health care for people with low income (Medicaid) and for elderly patients (Medicare). Some recent developments in the private insurance model have gone in the direction of the creation of so-called "consumer driven health insurance plans" (sometimes also referred to as "defined contribution health plans" or "consumer-oriented health plans"), where an employer provides limited funding and a menu of benefit options from which an employee can choose. In addition, employees can generally supplement employer-provided funding in order to buy additional benefits or higher levels of coverage. In other words, those individuals opting for plans with rich benefits may have to contribute significant amounts of their own money in addition to the employer's contribution. Those who opt for bare-bones health plans contribute less out of their own pocket.

All these systems have undergone several changes in these last years as the demand for health care kept outstripping the funds available. This is partly related to ageing populations, increasing costs and demand for new (and more expensive) medical technology. Reforms basically focused on market-based incentives as a means to contain outlays and improve the allocation of resources. Other countries opted for decentralizing specific functions (financing, management and delivery of health services) to sub-layers of government or to specifically new created agencies.

3.5   Allocation of health policy by level of government

The features of the economic theory of fiscal federalism are multifaceted and opposing. As already stressed in sections 2.2 and 2.3, there exist both pro-decentralization and pro-centralization arguments that should help deciding about the allocation of some specific tasks to a defined level of government. Moreover, empirical suggestions are ambiguous and often end up with mixed results (see paragraph 2.6).

The allocation of health policy to a level of government is far from being crystal clear. In fact, if for some policy areas it is well acknowledged that these should be assigned to the national/central level (e.g. national defense, monetary and fiscal policy, industry, energy or agriculture), for other fields (health, education, social policy, and research) the optimal allocation is controversial and remains an open chapter. Different countries have opted for decentralizing specific health functions to sublevels of government, with the aimed goals of increasing the local autonomy and giving more space to local voice. In this way people experience an empowerment of their position within the system and the responsiveness to local needs should become higher, so as the quality of health care. Health decentralization is typically a process through which operating responsibilities are allocated to a lower sublevel of government, while both strategic policy making and responsibility for overall outcome remains normally a national government priority. The essence behind this process is to increase the decision space of the local level for the local level, so that health systems can be more responsive to local needs and more efficient in the provision of health services. An important dimension to be considered while decentralizing the health sector is that the nature of the social environment is a

crucial aspect and an important factor that should not be underestimated in the realization of the policy vision (Atkinson, 2002).[35]

The scope of this paragraph is threefold: first, to focus on the present studies that analyzed the allocation of health policy by level of government; second, to comprehend how decentralization has been structured; and third, to set out the implementation of decentralization, describing the criteria used for classifying the health organization of countries and dwelling on specific country cases.

3.5.1   Normative recommendations about the allocation of health policy

As outlined above, there exist some policy areas that should be assigned to the central government, while some other policy chapters cannot be assigned to one single level of government, because that would not be optimal. One such example is the environmental policy. In the context of the European Union (EU) for instance, scale effects as well as the setting of EU environmental standards require an important involvement of the Union itself, which is a supranational level of government. However, various externalities may take place and have an effect on different levels of government, what, in turns, calls for a decentralization of such a policy.

The allocation of health policy still remains controversial. On the one hand, theoretical arguments about the consideration of heterogeneous local preferences, and effects of interjurisdictional competition push for decentralization of these functions (Alesina et

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[35] Atkinson (2002) refers particularly to the roles played by the formal rules and informal norms. In her study she researches decentralization of health care in Northeast Brazil and demonstrates the importance of the informal factors and political cultures in the operationalization of policies for health system reforms. She concludes that the embedded informal norms in Brazil have not favored the aimed positive intent of decentralization but have rather increased inequalities between local districts.

al., 2001; Smekal, 2001). On the other hand, adverse effects of subnational provision of the stock of human capital (Ter-Minassian, 1997), and avoidance of R&D duplication (Hoeller et al., 1996) depict strong reasons for an assignment to the central level of government. Some unitary states have located health responsibilities to lower levels of government (e.g. Finland), while some others still lodge health care at the central level (e.g. Greece). Federal states are by definition characterized by a marked decentralization of functions to sub-layers of government (e.g. Switzerland).[36] Note that the difficulty of establishing the exact allocation of health policy by level of government persists in all these three cases. As Banting and Corbett (2002) and Hacker (2004) stress, there is one function in health care, namely the distribution function, which is almost never left to sub-layers of government but is pursued at the central level. Equity seems to be a duty of the center, because a centralized commitment manages to maintain the "social citizenship" across the whole country.

Alesina et al. (2001) construct a set of indicators to measure the policy making role of the European Union in a selected number of policy domains, including health care. Their focus is on whether a supranational body, such as the EU, should intervene in shaping health policies, or whether these latter must be left to national and subnational entities. Their main theoretical argument points out that the EU should focus there where economies of scale are large and the internalization of externalities is applicable. Functions should be delegated to national or lower levels of government, if the heterogeneity of preferences is predominant relative to the benefit of scale. For their analysis the authors use Eurobarometer data.[37] Alesina et al. calculate their own index as

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[36] Note that there is an example of a federal state (Belgium), which has a very centralized health care system. This country runs counter to the generally accepted association that federalism equals decentralization of functions.

[37] Eurobarometer is a public opinion survey conducted, twice a year, face-to-face with a representative sample of individuals in each member state of the European Union.

an average between those respondents who want health to be a shared responsibility of the state and the EU, those who want it to be a national responsibility, and those who are undecided about the right allocation of this policy area. The results point in the direction that health is perceived in all EU countries as a national matter. Note that in those countries where health decentralization is more marked (Sweden, Finland, Denmark) the population is less willing to share responsibilities for health with a supranational body. Alesina et al. subsequently report the results of a different aggregation measure of country preferences: they show how many votes a proposal to centralize a policy domain would hypothetically get, if member governments were to vote in the European Council according to the outcome of the Eurobarometer survey. Even with this different aggregate index, it appears that health would be voted to be undertaken at the national level. The researchers conclude by stating that the assignment of health policy should be given to national entities because this allows to exploit economies of scale and knowledge spillovers across jurisdictions. The support of subnational levels is also advisable because it involves local preferences and backgrounds.

Hoeller et al. (1996) review fiscal relations within the EU in the context of the theory of fiscal federalism and of the principle of subsidiarity. The authors claim that cooperation between member states of the EU would help avoiding duplication of services and overcoming imperfections. The supranational level is more appropriate when high-risk capital is involved, when R&D costs are high, and when economies of scale play an important role. For all these reasons health should then be allocated to a supranational body, with the supporting role of the central governments of each member state.

Letelier (2001) studies the impact of fiscal decentralization on education and health services. He estimates a Tobit model that regresses DEA (Data Envelopment Analysis) efficiency scores on explicative variables. He deals with cross-country data for a sample of 55 countries. The point of departure of the analysis is that a decentralized structure of

government should be of more help in improving the quality of locally provided public goods, namely school education and primary health. The main results point out that a more decentralized setting produces a significant improvement on the efficiency of both education and health services, although the quality of public health services is improved to a statistically less robust degree. Health policy issues should thus be allocated at subnational levels of government.

Shah (2002) focuses on the role of different levels of government, civil society, and the private sector in shaping the health policy, and takes into consideration developing and transition economies. Out of a sample of 33 countries health appears in the area of shared responsibility of the central government and its sublevels. Shah underlines that health policies, when more than one layer of government is involved, tend to be typically uncoordinated. The role of the center should then be to set minimum standards in regional-local services, and this for two reasons: firstly, there is an advantage to the nation as a whole from such standards as these will contribute to the free flow of goods and services, labor and capital, and reduce wasteful interjurisdictional expenditure competition, and will therefore improve the gains from trade from the internal common market. Secondly, setting standards serve national equity issues. Shah highlights that, as an alternative to centralized controls, some governments have opted for relating higher to lower jurisdictions through results-oriented lines of accountability. The example reported is the model of health decentralization developed in Brazil. Results-oriented contracts are developed between the central government that provides funds, and local clinics that provide health services. Such contract system institutionalizes greater autonomy for local governments than do other decentralization regimes, holding them accountable for their results, nonetheless not binding their processes. An overall conclusion of the paper is that citizen voice, choice and exit options are critical conditions for the success of decentralized decision making. All levels of government

should be involved in the administration and delivery of health services; however, subnational entities are the most appropriate layer to allocate health policies, while the center is more suited for a supportive role, in particular for policy standards and control.

Ter-Minassian (1997) takes a more critical position towards decentralization of health care. According to her, there can be some significant efficiency costs from decentralization in the case of adverse effects of subnational provision of the stock of human capital. The fear is that sub-layers of government may lack managerial and organizational skills. Moreover, inefficiencies can arise from duplication of health services in the case of local provision. For these reasons the national level is the more appropriate layer for allocating health responsibilities. A supranational level (such as the EU) may also play an important role in the definition of health policy standards. The author remarks that the choice of the appropriate level of administration for health care services depends crucially on the type of services: preventive and public health clearly being provided best at the local level. Others depend crucially on the administrative capabilities of the country, as well as the financing arrangements.

Table 1 reports the main conclusions of the abovementioned studies and shows the allocation of health policy to different levels of government and supranational entities.

Table 1: The allocation of health policy to different levels of government – Studies review

Authors	SUB	NAT	SUPRA
Alesina et al. (2001)	X	X	
Hoeller et al. (1996)		(X)	X
Letelier (2001)	X		
Shah (2002)	X	(X)	
Ter-Minassian (1997)	(X)	X	X

SUB: Subnational level of government (regions, provinces, cantons, etc.), NAT: National-central level, SUPRA: Supranational level (e.g. the EU). X: unreserved responsibility of the respective level, (X): supporting involvement of the respective level.

To recap there is not unanimity when deciding about which level of government is the most appropriate to allocate health policy. In the last decades different countries have taken steps in the direction of decentralizing and devolving health responsibilities to sub-layers of government. In particular, some countries have opted to decentralize only managerial and delivery functions to sublevels of government, while for other countries the process of decentralization has been more marked and has involved a shift of managerial, delivering and also financial functions downwards. The following paragraphs will pinpoint how the process of decentralization should be structured and implemented, and at the end country cases will be set forth.

3.5.2 The goals of decentralization and its structure

Health reformers pursue decentralization largely to increase health sector performance, but in many cases governance and political goals also figure importantly. The following list, drawn primarily from Bossert et al. (2000), enumerates frequently cited objectives:

- Increase service delivery effectiveness through adaptation to local conditions and targeting to local needs.

- Improve efficiency of resource utilization by incorporating local preferences into determination of service mix and expenditures.

- Increase cost-consciousness and efficiency of service production through closer links between resource allocation and utilization.

- Increase health worker motivation through local supervision and involvement of service users in oversight, performance assessment, etc.

- Improve accountability, transparency, and legitimacy by embedding health service delivery in local administrative systems.

- Increase citizen participation in health service delivery by creating systems and procedures for involvement in planning, allocation, oversight, and evaluation.

- Increase equity of service delivery by enabling marginalized and poor groups to access health care providers and to influence decisions on service mix and expenditures.

- Increase the role of the private sector in health service delivery by separating financing of health care from service provision.

Almost all decentralization strategies include several of these objectives, and in fact many of them are complementary. However, there can also be trade-offs, tensions, and conflicts. For example, deconcentrating units of a health ministry may increase the efficiency of resource allocation by allowing health facility managers to make decisions about purchasing supplies or replenishing medicine stocks, but may not empower service users and beneficiaries to have a say in allocation decisions. Local staff of the ministry may resist community input on the grounds that such participation is costly and that health professionals know best what services and medications should be provided, when, and by what level of health manpower.

In a decentralized health care context there are two or more layers of government that are responsible for governing a health care system. Therefore there is often a co-responsibility of roles. The central government applies in most cases an equalization mechanism in order to secure roughly comparable levels of services at roughly comparable levels of taxation; specific "health standards", such as for example in Italy, are fixed by the center with the requirement that they must be homogeneously guaranteed within national borders. But when the center basically retains the power to levy taxes, there are often situations of unfounded mandates, that is, when determined actions imposed by the federal or state government on lower levels of government are not accompanied by the money needed to fund the action required. This, in turns, creates possible conflicts and situations of tension between the layers of government that should be taken into consideration beforehand.

Decentralization across the health care systems of developed countries has taken place to a variety of different actors. It is possible to distinguish between territorial decentralization, namely when responsibilities are referred to local organizations that have well defined geographical boundaries; and functional decentralization, that is when authority is transferred to a specialized local office (Rondinelli, 1981). The model of

territorial units (regions, counties, municipalities) depends on the history, traditions, size of the country, social and economic factors. Some examples are Sweden, where county councils and municipalities have a long tradition of providing public services, and Switzerland, where the principle of federalism is deeply rooted in the history and traditions of the country. Functional decentralization takes place when authority is transferred to newly established units that may have separate legal status (Mills, 1994). The health care sector in Britain has been fragmented into separate organizational units, NHS trust hospitals and Crown Health Enterprises with a distinct legal identity. Ireland has created 8 Regional Health Boards that are responsible for the overall organization of health care services.

Any decision to decentralization in health care raises three major issues: to whom authority should be given, what tasks of delivery of health care systems should be decentralized, and with which regulatory controls. Starting from the seminal work of Rondinelli (1981), most literature subsequently kept identifying four standard types of decentralization (deconcentration, delegation, devolution, and privatization) based on the combination of the level of autonomy and location of accountability between local and central government (Litvack et al., 1998). When deconcentration takes place the central government disperses responsibilities for certain services to its regional branch offices, which implement decisions taken at the center. This is a weak form of decentralization because the central government keeps in effect substantial authority in decision making and management of public functions. Deconcentration has generally taken place in unitary states, although it can also exist for some functions in federal states, when the center maintains a strong interest in ensuring delivery of a particular service. Examples of deconcentration are found in the primary care trusts in Britain, which are still accountable to the Secretary of State for Health, and in Poland (Golinowska and Tymowska, 1995). The Norwegian hospital sector showed the features of

deconcentration, prior to recentralization in 2002. Portugal is another example of a country that experienced deconcentration: notwithstanding the creation of five health administrations, in practice responsibility for planning and resource allocation has remained highly centralized.

Delegation of power is present in many European health care systems and refers to a situation in which the central government transfers responsibility for decision making and administration of public functions to local governments or agencies, which executes certain tasks on behalf of the center. In this case regional authorities or agencies have a great deal of discretion in decision making. Germany's social insurance system depends heavily on self-regulating private non-profit sickness funds and professional associations. In the Netherlands, policy traditionally has been prepared and implemented by a massive neo-corporate bureaucracy, bringing together government agencies, quasi-governmental organizations (the advisory and executive agencies), the private national organizations of suppliers and providers, and the insurers. Delegation has mainly occurred in the cure-sector, that is, acute care and both specialist and general medicine.[38] Britain also experienced delegation by introducing an internal market in which purchasers and providers were separated. Austrian social insurance funds have the strongest planning and regulatory power in primary health care.

Devolution is the most profound form of decentralization because the center transfers substantial authority for decision making, finance, and management to regional governments that are accountable to their constituents. Devolution is very widespread in the Nordic region of Europe. Some examples are: Norway (prior to recentralization started at the beginning of 2002), Finland and Sweden, but also Spain (in 7 out of 17 regions till 2002), and Italy that started decentralizing health care in the year 2000 with a

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[38] See European Observatory on Health Care Systems, Health Care Systems in Transition: The Netherlands (2004).

Legislative Decree that prescribed the abolition of the National Health Fund to be replaced by various regional taxes.

Privatization implies the transfer of responsibilities, previously carried out by the center, from public to private enterprises. Privatization of service management is experienced in the hospital sector in Sweden (Görans Hospital in Stockholm). Privatization of primary health care providers and pharmacies has occurred in Czech Republic and Hungary. Poland had a process of privatization in the dental care sector, private medical practices and pharmacies. Generally, privatization has been the major means utilized for decentralization in health care in the former Soviet Union countries too.

The second major decision to be taken into account concerns the tasks to be decentralized in the service delivery of health care systems. There is a rich variety of examples across European countries. Perhaps the only function in health systems that has been rarely decentralized is the responsibility for strategic policy making, which remains lodged in the central government.[39] The range and degree of decentralization is very diverse across countries. Primary health care, nursing home services and home care providers are normally much decentralized. In some cases municipalities run these services (e.g. the nursing home sector is regulated by communes in Switzerland), while in some other cases this task is pursued by large non-profit but also for-profit organizations (as in the Netherlands). With respect to the hospital sector in Denmark, Sweden, Italy and Spain, hospitals are either owned or supervised by regional governments or counties. In Finland, these are controlled by municipalities. In countries

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[39]Chapter 5 will demonstrate that Switzerland can be considered the exception to this rule. Strategic policy making, such as the planning, operation and construction of hospitals, the elaboration of health and hygiene policies, the regulation of hospital external care, the management of medical and paramedical schools, the registration and control of drugs, activities in the field of health prevention and promotion, and regulation of patients' rights are all under the authority of cantons. As Hacker (2004) states, Switzerland has long been characterized by the most anemic government role in health policy of all European nations.

that have a social insurance system, most hospitals are private non-profit in ownership, and managed by local boards of trustees.

The central government is the institution in charge of monitoring and supervising the health care dimension even when decentralization reaches its maximum level in a particular nation. In order to ensure acceptable and equal outcomes across differently managed decentralized bodies, governments rely on a wide variety of regulatory measures. Health sector regulation encompasses areas like licensing of provider institutions and medical and health professionals; control of communicable diseases and epidemics; regulations pertaining to sera, vaccines, poisons and food quality; establishing legal malpractice and/or physician discipline systems; establishing macro-level financial expenditure controls; and more recently, in Britain and Sweden, monitoring and evaluating clinical performance (Saltman et al., 2002). Spain passed a law in 2003 that balances decentralized regional control over health funding (although this is still limited) and production with national government concerns about the quality of care and cross-regional equity.

3.5.3   Implementing decentralization: understanding health policy differences

Some relevant factors affecting the implementation of a decentralization strategy in a country are the basic structure of the state itself (federal versus unitary), and the typology of the health care system (NHS versus SHI).

The essential characteristic of federations is that they are composed of two (or more) tiers of government and operate within a constitutional structure that combines shared rule through common institutions for certain specific purposes, and regional self-rule

through the government of the constituent territorial units for certain specific purposes.[40] Thus, federal states (for example Germany or Switzerland) have a Constitution that clearly defines the separate policy and law-making responsibilities assigned to the national as against the regional governments. The national government is in no position to modify or remove those powers constitutionally assigned to the lower tiers of government. Quite differently, unitary states have Constitutions and/or operating principles (as in the case of the United Kingdom, which does not have a written Constitution) that assigns nearly all regular policy and law-making authority to the national government. Some specific policies can be handed over by the central government to the subnational units but this does not imply that such responsibilities will be located for always at the lowest tiers. On the contrary, the central state maintains its power to modify or withdraw its decision if it so decides. The most striking and recent example in the health care sector is Norway. This unitary country traditionally had a highly decentralized health care system. For more than 30 years responsibilities for providing and planning specialized care were devolved to the 19 counties. This period came to an end on January 1st, 2002 when the Norwegian central government took over responsibility and ownership of all public somatic and psychiatric hospitals. With this unexpected move Norway seems to go against the stream of decentralization in the organization of OECD health care systems.

Another pivotal characteristic that affects the implementation of decentralization is the nature of the health care system of a country. With the exception of the US, the remainder of OECD countries can be categorized as either National Health Service (NHS) or Social Health Insurance (SHI). As explained in section 3.4 there are some differences between these two health care organization models: NHS are mostly public

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[40] Please refer to Griffiths (2002).

integrated, funding is collected through general taxation, the population is entirely covered, the choice of provider is limited and GPs act as gatekeepers. SHI schemes are based on a reimbursement or contract system, are funded mainly through health insurance premiums paid to sickness funds, coverage is not 100% in all countries, and the insured are free to choose any provider.

Yet this division between NHS and SHI has become blurred in some cases. The British NHS and the Canadian insurance system are more alike than different. The financing arrangements are similar: the central government in the UK and the provinces in Canada are the main funding actors and pay for services directly. The real difference is in the ownership of medical facilities; mainly public in Britain and mostly private in Canada.[41] To mention another example, New Zealand with 77.5% public funding in 2000 for health care, is closer to the insurance-funded European health care systems such as France and the Netherlands, than the British tax-funded health system with 85% public funding (WHO, 2001). NHSs are mainly tax-based financed: they are very much decentralized in the Nordic countries of Europe, it is becoming a responsibility of regional governments in Italy and Spain, and it is highly centralized in Greece, Ireland, New Zealand, Portugal and the UK. Most tax-based health care systems rely on the single-payer characteristic.[42] Some recent trends in tax-based health care system in western Europe are the splitting of purchaser and provider (the United Kingdom), and the delegation of responsibilities from the central to the regional governments (Spain and Italy). SHI systems are financed primarily by health insurances and partly by taxation. Austria, France, Germany, Luxembourg and The Netherlands fund their

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[41] The reference is to primary health care services. Most GPs in Canada are private practitioners who work in independent or group practices and enjoy a high degree of autonomy. On the contrary, in the UK most GPs are registered as part of the NHS.

[42] A general definition of single-payer system would be the financing of health care expenditure for a nation's entire population through a single source, normally the government, with funds collected through progressive taxation of citizens and businesses.

systems mainly through social insurances. Australia and Canada fund health care principally through taxation. Generally those countries with SHI rely on the multi-payer system.[43] SHI countries normally have a contribution collector, that can be the government itself (Belgium, France and the Netherlands), a union of sickness funds (Luxembourg), or the individual sickness funds (Austria, Germany and Switzerland). Sickness funds act as third-party payers and establish contracts with providers, who are usually a public-private mix. The insured (population) have a pre-determined membership in sickness funds in some countries as Austria, France, Luxembourg, Germany (till 1995), and the Netherlands (till 1992). Such membership depends on the principle of occupation in most cases. In other states like Belgium, Switzerland, the Netherlands (since 1993), and Germany (since 1996) people can freely choose their funds, so that these latter are in competition. In fact, comparing the number of sickness funds in 1992 and 2002 in these countries one acknowledges a strong reduction in their number: from 127 to 100 in Belgium, from 191 to 93 in Switzerland, from 27 to 24 in the Netherlands, and from 1223 to 355 in Germany. The incentive to merge in competitive environments clearly becomes attractive.

To conclude the nature and type of decentralization that is possible to implement is contingent upon the basic constitutional structure of the state itself. Furthermore, decisions about decentralizing specific functions are typically first made on a general policy level, with implications for the health care sector coming afterwards. Health decentralization has occurred both in NHS and in SHI systems. However, decentralization in some NHS systems (especially Nordic countries) has occurred

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[43] A multi-payer system has more than one actor paying for health care expenditure in a country. It is based on insurance fund that pay for care within a public regulatory framework. The multi-payer systems generally create the greatest diversity of coverage across citizens and, in some cases, even exclude from statutory protection wealthier citizens, who are expected to insure themselves and are not automatically covered otherwise (the Netherlands and Germany).

entirely inside the public sector, while in SHI countries it has involved private non profit (hospitals) but also private for profit (physicians) actors.

3.5.4   Criteria for health decentralization

The classification of a country as health centralized or health decentralized is done in two steps in this analysis. The first step takes into consideration the nature of the health care organization of a nation, that is whether the system is organized as a NHS or a SHI system. If the identification of a health care system as a NHS or SHI is straightforward, the second step, which regards the level of decentralization of health care, takes into consideration two criteria:

1. The first criteria concerns the organization and overall management responsibilities. In other words the focus is on the determination of the sublevel of government that is in charge to plan, organize, deliver and manage health care services. The organization of the system implies the planning and design of the institutional features, it includes formulating policies, defining priorities and their respective implementation, monitoring and evaluation.

2. The second criteria takes into consideration the financing viewpoint, that is who provides health care organizations with the financial resources that are required to carry out a general range of health-related activities. Financing of health services can take place through taxation, public social insurance, private insurance and out-of-pocket payments. Both taxation and public social insurance can be a central or a local duty.

Some OECD countries show full territorial decentralization, so that both criteria (management and funding) are responsibilities of the local government. This is a typical

situation in Scandinavian countries and Switzerland, which show a high devolution of health responsibilities in the organization of their health care systems.[44] Other countries have opted for full decentralization of organizational and managerial skills but the central government still retains the assignment to fund the system. Some examples are Spain and Italy.[45] In other nations the central government retains the power to fund and organize the health care system (e.g. Belgium and Luxembourg). This gives birth to three possible cases that can be analyzed and they are represented in table 2.

Table 2: Possible scenarios of decentralization in health care

	CASE 1		CASE 2		CASE 3	
	Funding	**Management**	**Funding**	**Management**	**Funding**	**Management**
Centralized	✓	✓	✓			
Decentralized				✓	✓	✓

The empirical part of this study focuses on a sub-group of OECD countries, namely the former EU 15 Member States, Australia, Canada, New Zealand, Norway, and Switzerland. The descriptive analysis will also take into consideration data of the United States, which is considered separately because the country does not belong either to a NHS or a SHI classification. This set of countries was chosen for the reliability, better availability and quality of data provided by the OECD Health Data 2004. An additional

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[44] Note that Norway underwent a major reform in the organization of its health care system in 2002. Prior to this reform, Norway had a main centralized funding system and a highly decentralized management of health responsibilities, which were attributed to the counties. After the reform Norway has removed responsibilities from the counties to large health regions run by boards appointed by the Minister of Health.

[45] Italy experienced an important reform in the health sector in the late 1990s that called for decentralization of health affairs. This change is gradually moving financing responsibilities from the center to the regional governments. It is believed that by assigning financial responsibilities to regions future soft-budget constraint problems should be avoided.

reason for the choice of this sample of countries is the possibility of learning from each other's experiences, given the fact that all countries have well established and developed economic and political systems. By focusing on these selected states we analyze similar realities, where there is a relatively high per-capita income and most people have a high standard of living with access to goods and services than in developing countries.

Based on the criteria set out previously, the following matrix shows the classification of the 20 OECD countries in four clusters, for the period 1990-2000. A more in-depth description of each single national health care system is given in Annex 1.

Table 3: Classification of OECD countries, 1990-2000

	NHS	SHI
CENTRALIZED	Greece Italy New Zealand Portugal Spain[46] United Kingdom	Belgium France Luxembourg The Netherlands
DECENTRALIZED	Denmark Finland Ireland Norway Sweden	Australia[47] Austria Canada[48] Germany Switzerland

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[46] Spain is a peculiar country because the process of devolution of health responsibilities to the autonomous communities (AC) lasted about twenty years. This process has reached its end in 2002. Before 2002 Spain was characterized by an "asymmetric federalism". Some AC had complete authority over health matters; other AC did not. Spain has been catalogued as a centralized country for the period 1990-2000 because devolution was a piecemeal process and took considerable time and effort to take place. The way in which responsibilities were given to AC varied considerably and this generated high confusion in the overall system (European Observatory, 2000).

[47] Despite the fact that Australia is catalogued as a SHI country, most financial resources for health care are collected via taxation. However, most resources are levied through a specific tax (compulsory health insurance levy), which is a specific tax of the Medicare program and cannot exceed 1.5% of the disposable income. It can be considered on a par with a health insurance premium. Furthermore, Clemente et al. (2004) classify Australia as a SHI country in their study on international stability of health care expenditure. Banting and Corbett (2002) also describe Australia as a SHI system.

[48] In Canada most resources for health care are collected via taxation. However, in some Canadian provinces there is a system of health sickness funds and hence the population pays health premiums. Moreover, Clemente et al. (2004) and Banting and Corbett (2002) describe the Canadian health care system as a SHI country.

3.5.4.1   Decentralization and SHI system: country cases

Table 3 reports five SHI countries with a decentralized health care setting. All of them share the characteristic of a strong health policy decentralization; however, there exist some important differences.

Australia is a federal government divided into 6 states and 2 independent territories. Its health care system is complex and has many types of services and providers, and a range of funding and regulatory mechanisms. The Commonwealth (that is, the National Government) funds rather than provides health services, financing the bulk of the health system, and subsidizing pharmaceuticals and aged residential care. States also have a role in funding the system, although it is smaller relative to the Commonwealth. Australia has a mainly tax-funded system financed through general taxation and compulsory tax-based health insurance. The Commonwealth is the main body responsible for collecting revenues, being empowered under the Constitution to collect income taxes. The states, and to a minor extent local governments, are responsible for the bulk of outlays. The administration and management of the health care system is in the hands of the states. States' governments administer much of the health care system, particularly public hospitals and public health. They also license private hospitals, although the extent of regulation varies considerably, with the more market-oriented governments preferring lighter regulation. The states are responsible for registering and regulating health professionals too. Local governments have only limited health care functions. The Australian health care system is thus very decentralized with respect to its administration, being the states empowered to administer and deliver health services. Its funding is principally a responsibility of the Commonwealth, although states have a minor role too. In other words, fiscal and functional responsibilities are divided, leaving space to the so-called "vertical fiscal imbalance" that refers to the disparity between the

taxing capacity and the revenue needs of the two tiers of government.[49] Historical reasons have driven Australian health decentralization: the Commonwealth took over more responsibility for health and social services since federation in 1901, but left to states the planning of the health care system in order to respond better to local needs, especially of those territories with a high density of aboriginal population (who generally experience worse health status) and those states scarcely populated.[50]

Austria is a federal republic and consists of 9 states (Länder). More than two thirds of its health care system is funded through social insurance contributions and general tax revenue. Approximately one third is paid by private households directly. Health care services are delivered by public bodies, non profit organizations, for profit private organizations and individuals. The federal government delegates the tasks of public health administration to the Länder. Both layers of government have agreed to ensure health care delivery. Responsibility for enacting legislation and implementation lies with the nine Länder: with regard to hospitals, the federal government only formulates the basic law and has the sanitary supervision, while Länder are charged with its implementation. The Länder, in turn, delegate their responsibilities for emergency care and social services. The responsible Länder authorities usually delegate the provision of

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[49] Intergovernmental relations involve ongoing negotiations both over funding and respective functional responsibilities. Further, the division of intergovernmental responsibilities is not permanently fixed. Please refer to the seminal works of Bradford and Oates (1971 a,b) and Bailey (1999) for a comprehensive description of the economic theory of intergovernmental grants.

[50] People in rural and remote areas not only suffer from poorer health than their metropolitan counterparts, but they may also experience significant problems in accessing health care services due to difficulties in recruiting and retaining health professionals in rural communities. Steps have been taken in recent years to address these challenges, including the *More Doctors, Better Services* component of the 1999–2000 Federal Budget. The initiative included greater incentives for general practitioners to practice in rural areas; an increase in the level of support and education for health professionals in rural areas; and an increase in rural health services.

social services to welfare organizations.[51] In the inpatient sector territorial authorities have a great deal of planning and regulatory power, the responsibilities of the Länder being defined by the Austrian Constitution. Since insurance funds and hospital owners no longer negotiate the standard daily rates to finance the operating costs of hospital care, and since the financial resources of the social health insurers are now budgeted, the relatively small planning and regulatory authority of social insurers in the hospital sector has become marginal. But the social insurance funds are involved in health planning. If one disregards the territorial authorities' responsibilities for training, the social insurers have the greatest planning and regulatory power in the primary care sector. This also applies to drugs and pharmaceuticals, although the federal government has substantial regulatory authority in this sector as well. The strong leadership of the Länder both in the administration and funding of the system characterize Austrian health federalism. Social insurance funds also play an important role in the scenario as they plan and regulate the system.[52] The development of the Austrian health care system is strictly linked with historical reasons, namely the establishment of the welfare state within the territory of the Austro-Hungarian monarchy.

Canada has a predominantly publicly financed, privately delivered health care system that is best described as an interlocking set of 10 provincial and 2 territorial health insurance schemes. It combines elements of a "liberal" ideology – doctors are not state employees but independent actors with private relationships with their patients – and a more "social democratic" vision – through the public financing of health services and

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[51] Welfare organizations refer to the large number of different institutions that deliver services to disadvantaged or marginalized people in the society. This category comprises very small organizations as well as institutions operating on a nationwide scale (ex. Red Cross Organization).

[52] They award contracts to doctors, assess drugs, dressing materials, remedies, etc. for entry into the approval list of drugs and therapeutic products, and negotiate fees to doctors and other suppliers of medical and therapeutic services.

government oversight to ensure equal access.[53] This system fits the characteristics of a social insurance model; however, the term "national health insurance" is a misnomer that has been given because of the autonomous role of provinces in health issues. The Canadian health care system is very much decentralized and financed primarily through taxation, both provincial and federal, personal and corporate income taxes. In two provinces however there are health insurers, so citizens pay a health premium that mainly finances health care within their province. Federal funding is transferred to the provinces as a combination of cash contributions and tax points (taxing power). At a national level the system is highly devolved, with almost all responsibility for service delivery assigned to the provinces. This includes also financial responsibilities, though with some assistance from the federal government (financial transfers). The hands-on management of health services is fundamentally the responsibility of each individual province or territory. Through their respective central health ministries or departments of health, they plan, finance and evaluate the provision of hospital care, physician and allied health care services, some aspects of prescription care and public health. They also supervise responsibilities delegated to other nongovernmental agencies. The federal government's role in health care involves the setting and administering of national principles or standards for the health care system (i.e. Canada Health Act), assisting in the financing of provincial health care services through financial transfers, and fulfilling functions for which it is constitutionally responsible.[54] Canadian health federalism

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[53] See Maioni (2002).

[54] The Canada Health Act establishes the principles upon which the health system must be based in order for provincial governments to receive full federal transfers. These principles are:

- *universality* requires that the plan must entitle 100% of the insured population to insured services on uniform terms and conditions;
- *comprehensiveness* requires that all insured health services provided by hospitals and medical practitioners be covered by the plan;
- *accessibility* means that health services must be provided without barriers, including additional charges to insured patients for insured services;

exhibits the same characteristics across the country and yet also reflects provincial priorities. No two programs are exactly similar in terms of organizational structure, planning, regulation, management, financing or supplementary health service coverage. Funding and administration of health are in the hands of provinces and territories. This high decentralization of the system is due to the federal nature of the state itself and to a willingness to adjust to local preferences, being Canada a country where two different ethnical groups coexist (French- and English-speaking).

The German political system is characterized by federalism (sharing of power between 16 Länder and the federal government) and corporatism. The responsibilities for health reflect this. They are shared between the federal government, the Länder and corporatist bodies (representative bodies of the professionals, providers and the insurers). Corporatism has several important aspects. Firstly, it hands over certain rights of the state as defined by law to corporatist self-governed institutions. Secondly, the corporatist institutions have mandatory membership and the right to raise their own financial resources under the auspices of, and regulation by the state. Thirdly, the corporatist institutions have the right and obligation to negotiate and sign contracts with other corporatist institutions and to finance or deliver services to their members. The health care system is predominantly funded through social health insurance contributions. Ambulatory care is delivered by private office-based physicians (generalist and specialists) and hospital inpatient care is provided by a mix of public and private providers (only a small proportion of total beds are in for-profit hospitals). Legislative authority lies principally with the Länder, except in areas for which this authority is explicitly given to the federal level. The Länder are responsible for maintaining hospital

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- *portability* ensures health coverage for insured persons when they move within Canada or when they travel within Canada or abroad;
- *public administration* requires that the plan must be administered and operated on a nonprofit basis by an accountable public authority appointed or designated by the provincial government.

infrastructure, delivering and organizing public health services,[55] and for the education of undergraduate medical, dental and pharmaceutical schools. They also supervise the regional physicians' chamber as well as the regional physicians' association(s) and the sickness funds operating in the Land. Some Länder have established joint institutions to enable them to perform certain tasks.[56] Overall, the German health care system is characterized by strong federalism. At first sight the considerable power of the Länder might look like a case of devolution but this is not a true description as powers were never passed down from the federal level to the Länder; the latter had existed before the Federal Republic (which, in fact, was founded by them). Instead, the opposite of devolution took place in Germany: the Länder passed certain rights and responsibilities, as defined in the Constitution, to the federal level and retained others. The assignment of administrative functions (deconcentration) to other sublevels of government is not widespread due to the fact that almost all Länder administrations do not have any additional sub-layer of administrative offices, because all political units from the local level upwards have their own autonomous, elected representatives and governments.

The Swiss Confederation is a federal republic made up of 26 cantons that are sovereign in all matters that are not specifically designated the responsibility of the Swiss Confederation by the federal Constitution. The health care system is financed primarily by cantons and municipalities. The Confederation has rarely intervened in the set-up of

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[55] This is subject to certain federal laws concerning diseases that can be dangerous and harmful to public safety.

[56] For example the Länder of Berlin, Bremen, Hamburg, Hessen, Lower Saxony, North Rhine-Westphalia, and Schleswig-Holstein maintain the Academy of Public Health Services in Düsseldorf to train their public health physicians. A similar academy is run by Bavaria with the support of Baden-Württemberg, Rhineland-Palatinate, the Saarland, Saxony, and Thuringia (so that only Mecklenburg-Western Pomerania and Saxony-Anhalt run their training for public health physicians independently). A joint institution of all Länder is the Institute for Medical and Pharmaceutical Examination Questions which is responsible for preparing and evaluating written examinations in the undergraduate education of physicians, dentists and pharmacists.

the health policy and much of the responsibility for financing, organizing and delivering health care has fallen to other actors including cantons, municipalities, private insurance companies and private providers. The organization and management of the system is also a cantonal responsibility. There coexist 26 different health care systems within the country. The canton is usually the body responsible for planning, although some agreements exist between cantons for planning coordination. Nevertheless, a supraregional or even nationwide consensus about hospital planning is not present nowadays. Health insurance has become mandatory for the whole population only recently (in 1996 with the enactment of the Federal Health Insurance Law, FHIL), compared to other developed countries. Health premiums are not related to risk and income; this creates lively discussions in the civil society about equity issues, as premiums are a heavier burden on poor households. Each canton has established a system of subsidies to be given to low-income households, but they all differ from each other. Thus 26 different subsidy plans exist within the country and the conditions to be eligible for them vary considerably. Cantonal activities in the field of health care can be summed up by four categories: regulation of health matters (licensing of health professionals, authorization to open a medical practice or pharmacy, and control of medicines), provision of health care (hospitals and nursing home care, although the latter is frequently delegated to the municipalities, negotiation and agreement of fees between service providers and associations of sickness funds, organization and planning of emergency, rescue and disaster-aid services, provision of basic and specialty medical training, and regulation of training in paramedical occupations, which is then delegated to the Swiss Red Cross), disease prevention and health education, and the implementation of federal laws.

The principle of federalism in Switzerland is strongly anchored in the federal Constitution and deeply rooted in people's feelings. As Hacker (2004) affirms, the Swiss

central government is the most "anemic" among developed countries in the field of health care. Historical reasons lie behind the organization of the state and of health care as a reflex. In order to satisfy local needs and reflect ethnic differences (there are four national languages) cantons are held responsible for the organization of the majority of health services.

3.5.4.2   Discussion

This brief review of SHI countries shows that there is not a common pattern in health policy. Switzerland appears immediately as the most decentralized country, where both funding and management responsibilities are assigned to sub-layers of government. The role of the Confederation has always been very limited; the biggest move being the introduction of the FHIL that made health insurance compulsory in 1996.

Austria and Germany appear to share many similarities. Länder in both countries are responsible for the organization of the health care system and its funding. In both countries health insurances play a very important role also in terms of financing. Such role is probably more marked in Germany, being the level of corporatism higher.

The Canadian health care system has many similarities with a NHS. Most financial resources are collected through taxation, both at the central and provincial level. There is a strong decentralization when it comes to the organization, planning and delivery of health services, being the 10 provinces separate entities. In this respect, Australia is also similar. The bulk of funds is collected by the Commonwealth through taxation. Financial resources are mainly provided by the center and to a limited extent by the states. As in the Canadian example, the organization of health services has been delegated to the sub-layers of government.

3.5.4.3   *Decentralization and NHS: country cases*

Table 3 shows that Nordic European countries have a strong decentralized health care setting. Most health-related activities and services are planned and managed at the lowest level of government. Denmark, Sweden, Norway, Finland, and Ireland have historically been highly decentralized. Other countries with a NHS that started delegating health care functions to sub-layers of government in the 1990s are Italy and Spain.[57]

After the abolition of the health insurance scheme in 1973 Denmark changed to a single payer system, with counties assuming full responsibility for health care. The system is mainly tax-funded, with the exception of those services that are paid in part or full by patients (such as prescription drugs, or dental care), and by voluntary insurance. The degree of public influence at the decentralized level is high in Denmark due to direct elections for county councils. However, county councils are somewhat constrained in decision making by national framework legislation and annual budget agreements between the government and the association of county councils specifying average tax levels and to some extent also introducing new initiatives and setting targets on specific activity areas.[58] In 1970 the parliament delegated responsibility for financing and

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[57] Note that the case of Spain is more complex because some autonomous communities (ACs) were already given substantial regulatory powers during the 1980s, while other communities obtained them in the 1990s. The whole process has been completed only recently, namely in 2002.

[58] The annual national budget negotiation has been increasingly used by the central government as a means of reaching agreement on the development of the health sector, in addition to setting the overall economic framework. By highlighting priority areas such as heart surgery, cancer treatment or waiting lists, and making available earmarked grants to assist the counties and municipalities in achieving targets such as reducing waiting times for surgery, increasing the number of heart bypass operations or expanding psychiatric services, the central government is able to exert some influence over the direction of the health sector. Although these targets are not legally binding, the practice of earmarking funds reduces local autonomy to set priorities and the counties have therefore frequently expressed dissatisfaction with this

providing almost all health care in Denmark to counties and municipalities. Since then, most decisions regarding the form and content of health care activity have been taken at county and municipal level. Counties own and run hospitals and prenatal care centers. Most county councils have set up committees on health and social affairs and hospital committees to oversee their health care responsibilities. They also finance general practitioners, specialists, physiotherapists, dentists and pharmaceuticals. The responsibilities of the 275 municipalities are nursing homes, health care professionals, municipal dentists and school health services; all these activities are financed by taxes. As health is largely a county responsibility, most national legislation concerning the health sector does not specify how it should be organized or which services should be provided. Legislation concerning health care at a local level is only slightly more specific. The most specific rules pertain to preventive activities such as vaccination schemes and health check-ups for pregnant women. It is clear from the previous description that historical paths and cultural reasons lie behind the factors that have driven decentralization in Denmark. Its long tradition of public welfare provision and decentralization of welfare administration goes back to the eighteenth century. A serious fear connected to such a decentralized system that recently emerged is about the unequal access to health services in different counties. In fact, it seems that politicians have been more concerned about local self-governance than territorial equity in their decisions (European Observatory on Health Care Systems, 2001).

Decentralization is a key word when describing the Swedish health care system. The country is divided in 21 counties, which have full financial and planning responsibilities. An important role for the central government is to establish basic principles for health services through legislation and recommendations. The most important of these was the

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system, claiming that it breaks with the fundamental principle of decentralized health care in Denmark (European Observatory on Health Care Systems, 2001).

Health Care Act of 1982, which has been revised several times since then, and that cites: "Every county council shall offer good health and medical services to persons living within its boundaries. […] In other respects too, the county council shall endeavor to promote the health of all residents. […]".[59] Other laws regulate the responsibility and obligations of personnel, confidentiality, the qualifications needed to be able to practice medicine and rules on how to handle patient records. In general, county councils and local municipalities enjoy a considerable degree of autonomy in relation to central government: they are in charge of the health care delivery system from primary care to hospital care, including public health and preventive care; they have overall authority over the hospital structure and responsibility for all health care services delivered; they also regulate the private health care market, which is, however, small in Sweden because of minimal citizen interest and perceived need. County councils are in charge of controlling the establishment of new private practices and the number of patients private practitioners can see during a year and they own most health facilities. Local municipalities are responsible for delivering and financing long-term care for the elderly and the disabled and for long-term psychiatric care. They are not subordinated or accountable to the county councils, and they can impose their own taxes to finance their activities (as well as county councils). Overall historical and cultural reasons have shaped the health care system. Sweden has a long tradition of a welfare state and since the nineteenth century health matters were the county councils' and municipalities' primary duties.

Norway is a Scandinavian country constituted by 19 counties. As all other Nordic states, the decade 1990-2000 was characterized by a highly decentralized health care system,

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[59] The 1982 Health Care Act was an important landmark for several reasons. It completed the successive process of transferring responsibility for all health services provision from the national level to the county council level and made them responsible for preventive care and health promotion, and formalized the needs-based approach to health care planning.

which was, and still is, financed mostly by taxation and out-of-pocket expenditures. Broadly speaking, the division of responsibilities and duties among the three tiers of government was the following. Counties were responsible for hospitals, pharmacies, specialized outpatient medical care and treatment; municipalities dealt with primary care and treatment, health promotion, care of the elderly and of the (mentally) handicapped; finally, the central government had responsibility for law and regulation and for a few very specialized hospitals. In order to cover expenditures, municipalities and counties could draw on local taxes in addition to block grants and earmarked grants from the central government.[60] The Parliament determined counties' and municipalities' fiscal situation and annual transfers. This system, however, underwent a major reform in 2002. Norway broke with the tradition of decentralizing functions to sub-layers of government by abolishing the existence of counties and moving responsibilities to the national level and state appointed regional boards. One of the reason for this countercurrent reform has been the difficulty faced in controlling health expenses, especially because, from a formal point of view, financing responsibility was central while spending responsibility was decentralized (although counties and municipalities could also levy their own taxes). The main reasons behind this marked decentralization were historical and cultural. The philosophy behind it was that decentralization was an expression of applied democracy. It brought decision making closer to those who were affected and promoted popular participation in local political affairs. The rationale for the division of tasks between municipalities and counties was based on economies of scale and the principle of subsidiarity: services were attributed to municipalities unless it was significantly more

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[60] Block grants from the central government to municipalities and counties were not classified as financing by the state, but by local government. The reason for this is that block grants were meant to be a source of financing for local activities in general (education, local infrastructure, health, etc.). It was in the local government's own sphere of authority to prioritize among the different services. The provision of health care was among the most resource-consuming responsibility of municipalities and counties (European Observatory on Health Care Systems, 2000).

efficient for them to be provided at the county level (alternatively, the central level) because of economies of scale. This credo reached its end in 2002.

Finland is constituted by 6 provinces and 448 municipalities. These latter have the main responsibility by law for arranging basic services as education, social and health services. The Primary Health Care Act in 1972 established health centers that can be defined as a functional unit or organization providing primary curative, preventive and public health services to its population. Primary health care is thus organized fully by municipalities. With respect to secondary and tertiary health care, hospitals are the main providers. All hospitals in Finland are owned by a federation of municipalities, i.e. hospital districts. The health care system has developed gradually, and no exact point of time can be identified for the introduction of the tax-financed system. Both the central state and municipalities can levy taxes: in 1999, about 43% of total health costs were financed by the municipalities, about 18% by the central state, 15% by the National Health Insurance (NHI),[61] and about 24% by private sources, mainly households (European Observatory on Health Care Systems, 2002). State's revenues consists primarily of a progressive income tax and indirect taxes. Municipalities' taxes are a fixed proportion of income, which can vary from municipality to municipality (the average is 17.5% of the taxable income). The Finnish health decentralization is very highly marked. Municipalities are in charge of managing, organizing, planning, and financing health care services and activities. The tradition of devolving responsibility to municipalities has a long history in Finland, evolving over several centuries. Finns have always appreciated to have such a decentralized health care system because it allows

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[61] Part of the total cost of health care is financed by the statutory NHI scheme that is run by the Social Insurance Institution, with about 400 local offices all over the country. The Social Insurance Institution falls under the authority of Parliament. Although the Ministry of Social Affairs and Health (Insurance Department) prepares health insurance legislation (for example, legislation on sickness and maternity benefits that are paid through the NHI), the Social Insurance Institution is a distinct institution separate from the ministry.

local decision making, and this is valuable in a country where the population is very dispersed on a big territory. In fact, municipalities often have a very small population: 75% of them have fewer than 10,000 inhabitants and 20% have fewer than 2,000. This possibly creates problems with the assurance of sufficient managerial and medical skills for providing health care services and it can cause an economic risk, namely that one costly treatment could break the economy of a small or medium-size municipality. However, in order to face this problem, an equalization mechanism within hospital districts has been put in place.

A marked degree of decentralization in the health care sector is experienced in Ireland. The Regional Health Boards (and prior to this, the counties) are the bodies responsible for the planning, management and delivery functions of health services. The system is mainly tax-financed and the role of providing financial funds is a responsibility of the central government, while local taxation is not significant. The level of decentralization has been a key criticism of the Irish NHS. In order to reduce fragmentation, duplication of activities, promote consistency, establish clear lines of accountability and place a national focus on service delivery since 2005 the level of decentralization has been considerably reduced, by replacing the Regional Health Boards by one national Health Service Executive responsible for delivering a national service plan for the whole country.

3.5.4.4 Discussion

Decentralization has been a cornerstone of Ireland and the Nordic countries of Europe for more than 30 years. The NHS country cases show that although these states have a long experience of health decentralized models, the degree of diversification of their

organization is ample. Sweden and Denmark are the most similar health systems: in both countries there is a high financial and managerial involvement of counties, which are the principal layer of government involved in health issues. In Sweden municipalities also play an important role in elderly care services. A much higher degree of decentralization is reached in Finland, where the assignment of health (and most social services) responsibilities is given to municipalities. Being municipalities rather small in terms of number of inhabitants, many of them co-share some health services, and this possibly allows to reach economies of scale. Norway was the most diverse example of devolution among the Scandinavian countries before 2002, being health financing a responsibility of all three layers of government, although the central state had a much higher involvement. The reform in 2002 has brought a complete change of this philosophy: municipalities do not run anymore any health services and 5 larger regions have substituted tasks pursued by the 19 counties. The Norwegian situation resembles the Irish one. In Ireland there has been a long-standing tradition of assigning managerial and planning responsibilities to the regional health boards. The central state was mainly concerned with providing financial funds to the system. Also Ireland recently experienced (in 2005) a recentralization of its health care system, as the regional health boards have been replaced by a national body. From these two experiences one can infer that the split of funding and managerial tasks is difficult to maintain in the long-run. It is easy to see that this set-up creates problems related to soft budget constraint and of "blame game"; sublevels of government are unsatisfied of the amount of financial resources obtained and they tend to blame the central state for the imposed budget limitations.

3.6 Evolution of health care expenditure in OECD countries
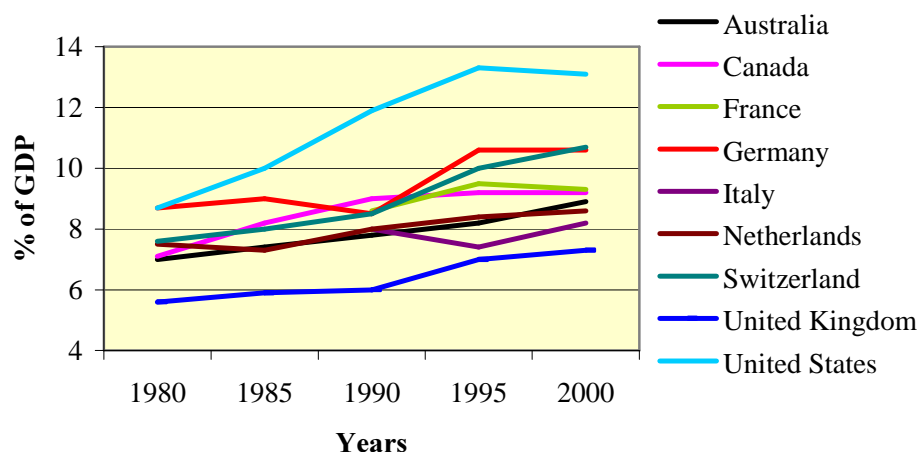
Health care costs have steadily increased in the last decades: the level of health care spending varies widely across countries, ranging from a maximum of US$ 4,869 per capita in the USA to a minimum of US$ 1,567 per capita in Spain in the year 2001.[62] With concern over increased strains for health spending, public policy has aimed at easing this constraint by achieving higher output at lower cost. To reach this end a number of policies have been introduced, most often focusing on institutional arrangements and incentives facing providers of care.

The share of GDP accounted for by health spending gives a broad indication of the resource costs of health care and of the burden on public finances. This quota has tended to rise rapidly in the post-war era. Figure 5 gives an overview of the GDP share for health of some selected OECD countries during the period 1980-2000.

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[62] See OECD Health Data 2004. In this analysis the country taken into consideration are a sub-group of OECD countries, and namely: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, and the United States. This group was selected because of better availability and quality of data.

Figure 5: Total expenditure on health as a percent of GDP, 1990-2000, selected OECD countries
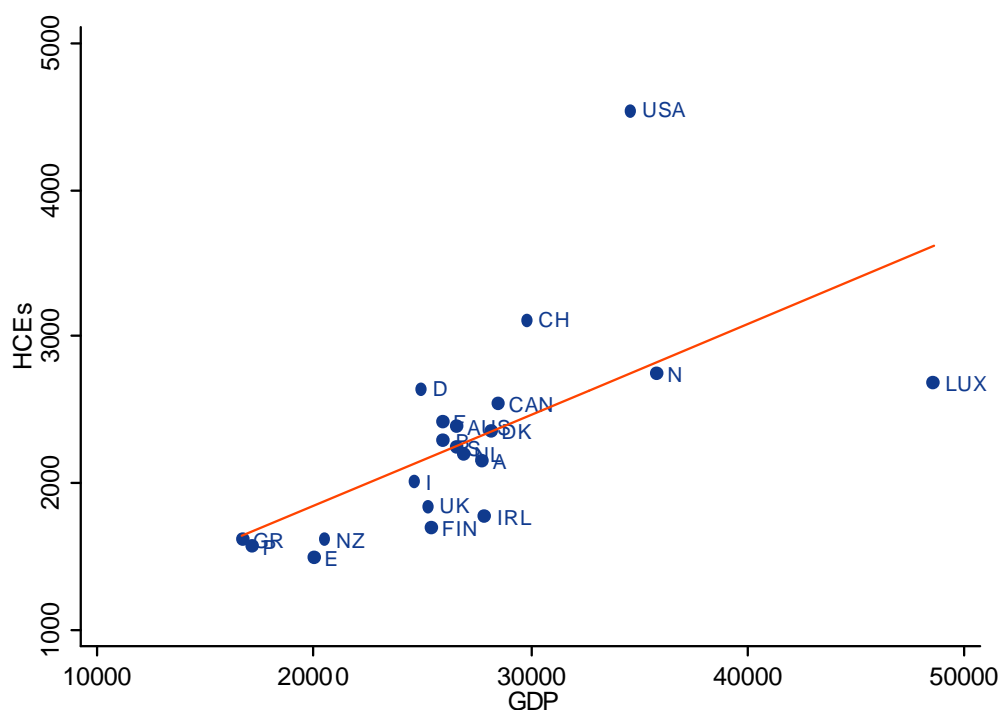
Source: OECD Health Data 2004

It can be easily depicted that the USA is the country that spends the most on health care reaching the quota of 13.1% in 2000, as compared to an estimated average of OECD countries of 8%. US health spending has been consistently higher than that of other countries since tracking began in 1960, predating the creation of Medicare and Medicaid, but the gap to the OECD average widened markedly during the 1980s and early 1990s. Thereafter, as generally abroad, spending stabilized relative to GDP so that the gap remained broadly unchanged. However, at the end of the decade, growth in health expenditure began to outpace income again, reaching almost 14.6% of GDP in 2002, according to official estimates. The next highest spending nations are Switzerland (11.1%) and Germany (10.9%).

Furthermore, it seems that there is a relationship between income per capita and health care expenditure per capita. Yet the USA is a noticeable outlier, spending far more on

health than this relationship could indicate (figure 6). Luxembourg instead seems to be spending less than this simple relationship shows.

Figure 6: Health care expenditure and GDP per capita, 2000

In table 4 the quota of GDP spent for health care is represented in the selected OECD countries during the decade 1990-2000. Countries with a NHS and a SHI system are now separated. Subsequently, they are divided according to the organization of their system (decentralized versus centralized). It can be immediately noticed that throughout the decade decentralized countries characterized by a SHI system have always tended to spend more resources on health than centralized states. This quota has always been significantly higher than those nations with a NHS. In general, NHS with centralized

funding and management of the health care system tended to spend the least at the beginning of the 1990s, but this gap diminished with the NHS decentralized countries as from the mid-1990s on. Note that if a country is spending more it does not mean that it is inefficient or that the provision of health care services is ineffective. Centralized NHS might well be spending less but concomitantly they might be offering less services and benefits than SHI decentralized countries. As outlined previously, NHS normally restrict the choice of consumers by imposing a gatekeeping system, while in most SHI states patients have more decision power and can freely choose among a multitude of providers.

The United States is represented separately; the US is a unique health care system in the OECD area. It does not have a national social insurance system and 14% of the population (according to the last estimates) is without an insurance coverage. The country spends vastly more than the average of OECD countries (13.1% of GDP in 2000) but its major critics is that Americans are at risk of being uninsured at some point in their life. The issues of incomplete insurance coverage and escalating costs continue to present fundamental challenges to US policy makers. Because of the system's diversity, decentralization and private nature, fewer policy levers exist at the national level to address these problems than in many other OECD countries. Therefore, reforms have tended to proceed incrementally and on a piecemeal basis, state by state and program by program. The private sector also plays a critical force driving change in both delivery and funding of health care (Docteur et al., 2003a).

Table 4: Total health expenditure as a percent of GDP, 1990-2000, split SHI-NHS (de)centralized
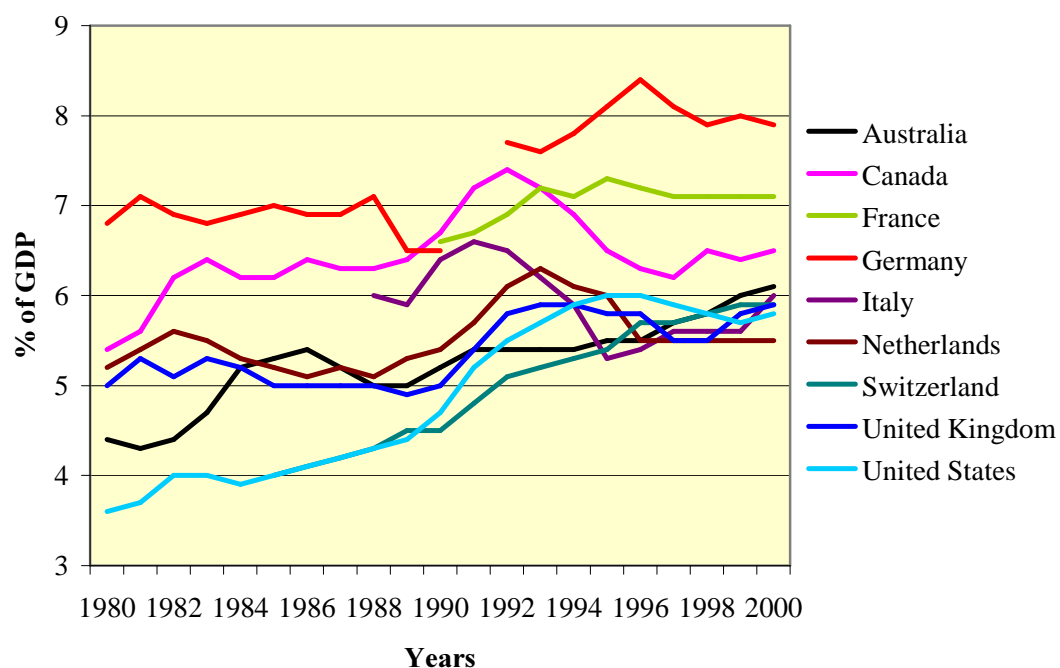
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Social Health Insurance (SHI)											
Decentralized											
Australia	7.8	8	8.1	8.2	8.2	8.2	8.4	8.5	8.6	8.7	8.9
Austria	7.1	7.1	7.5	7.9	7.9	8.6	8.7	8	8	8	8
Canada	9	9.7	10	9.9	9.5	9.2	9	8.9	9.1	9.1	9.2
Germany	8.5		9.9	9.9	10.2	10.6	10.9	10.7	10.6	10.6	10.6
Switzerland	8.5	9.2	9.6	9.6	9.8	10	10.4	10.4	10.6	10.7	10.7
Average	*8.2*	*8.5*	*9.0*	*9.1*	*9.1*	*9.3*	*9.5*	*9.3*	*9.4*	*9.4*	*9.5*
Centralized											
Belgium	7.4	7.8	8	8.1	7.9	8.7	8.9	8.5	8.5	8.7	8.7
France	8.6	8.8	9	9.4	9.4	9.5	9.5	9.4	9.3	9.3	9.3
Luxembourg	6.1	5.9	6.2	6.2	6.1	6.4	6.4	5.9	5.8	6.1	5.6
Netherlands	8	8.2	8.4	8.5	8.4	8.4	8.3	8.2	8.6	8.7	8.6
Average	*7.5*	*7.7*	*7.9*	*8.1*	*8.0*	*8.3*	*8.3*	*8.0*	*8.1*	*8.2*	*8.1*
National Health System (NHS)											
Decentralized											
Denmark	8.5	8.4	8.5	8.8	8.5	8.2	8.3	8.2	8.4	8.5	8.3
Finland	7.8	8.9	9.1	8.3	7.7	7.5	7.6	7.3	6.9	6.9	6.7
Ireland	6.1	6.5	7.1	7	7	6.8	6.6	6.4	6.2	6.2	6.4
Norway	7.7	8.1	8.2	8	7.9	7.9	7.9	7.8	8.5	8.5	7.7
Sweden	8.2	8.1	8.3	8.6	8.2	8.1	8.4	8.2	8.3	8.4	8.4
Average	*7.7*	*8.0*	*8.2*	*8.1*	*7.9*	*7.7*	*7.8*	*7.6*	*7.7*	*7.7*	*7.5*
Centralized											
Greece	7.4	7.2	7.9	8.8	9.7	9.6	9.6	9.4	9.4	9.6	9.4
Italy	8	8.3	8.4	8.1	7.8	7.4	7.5	7.7	7.7	7.8	8.2
New Zealand	6.9	7.4	7.5	7.2	7.2	7.2	7.2	7.5	8	7.9	8
Portugal	6.2	6.8	7	7.3	7.3	8.3	8.5	8.6	8.6	8.7	9
Spain	6.7	6.9	7.2	7.5	7.4	7.6	7.6	7.5	7.5	7.5	7.5
United Kingdom	6	6.5	6.9	6.9	7	7	7	6.8	6.9	7.2	7.3
Average	*6.9*	*7.2*	*7.5*	*7.6*	*7.7*	*7.9*	*7.9*	*7.9*	*8.0*	*8.1*	*8.2*
United States	11.9	12.6	13	13.3	13.2	13.3	13.2	13	13	13	13.1

Source: OECD Health Data 2004

With respect to the public share of GDP spent on total health expenditure Germany, France and Canada are among the OECD countries that spend a larger quota (Figure 7). The Netherlands, the United States and Italy belong to countries that have lower public

expenditure on health in the OECD group. Overall, there is not a marked difference between SHI and NHS countries. On the one hand, there are no particular differences between the four health care system organizations from a state/public viewpoint; on the other hand, it is plausible to think that the main differences arise when the private expenditure is taken into account. The average of public expenditure for the period 1990-2000 is 6.2% of GDP for decentralized SHI systems, while it is 6.1% for centralized SHI countries. Decentralized NHS countries have an average of 6.3% and centralized NHS have 5.4%. The US shows an average of 5.7% of public health expenditure in the decade 1990-2000. Public spending, which represents about three-quarters of total health care spending on average over the OECD area, increased more slowly than for total health spending during the 1980s and 1990s, reflecting a progressive shift of costs onto the private sector.

Figure 7: Public health expenditure as a percent of GDP, 1980-2000, selected OECD countries

Source: OECD Health Data 2004

There is general agreement about the fact that supply and demand factors have driven aggregate health care spending. With respect to production resources some significant differences are witnessed in the number of practicing physicians per 1,000 inhabitants. In particular, countries where physicians are paid fee-for-service (FFS) show a higher density of doctors: 3.9 in Belgium, 3.3 in France, 4.5 in Greece, 3.4 in Norway, and 3.6 in Switzerland. Yet the number of physicians is particularly high also in other two countries: Italy (4.4) that pays through a capitation system, and Portugal (3.2) where

doctors are mostly salaried. In particular, Italy has always shown one of the highest density of physicians among OECD countries (table 5).

Table 5: Practicing physicians per 1,000 inhabitants, selected years, split SHI-NHS (de)centralized

	1990	1995	2000	2002
Social Health Insurance (SHI)				
Decentralized				
Australia	2.2	2.4	2.5	2.5[a]
Austria	2.2	2.7	3.2	3.3
Canada	2.1	2.1	2.1	2.1
Germany	2.8[b]	3.1	3.3	3.3
Switzerland	3	3.2	3.5	3.6
Average	*2.4*	*2.7*	*2.9*	*3.0*
Centralized				
Belgium	3.3	3.5	3.9	3.9
France	3.1	3.2	3.3	3.3
Luxembourg	2.0	2.2	2.5	2.6
Netherlands	2.5	-	3.2	3.1
Average	*2.7*	*3.0*	*3.2*	*3.2*
National Health System (NHS)				
Decentralized				
Denmark	2.9	3.0	3.2	3.3
Finland	2.4	2.8	3.1	3.1
Ireland	2.0[b]	2.1	2.2	2.4
Norway	2.6[b]	2.8	2.9	3.4
Sweden	2.9	2.8	3.0	-
Average	*2.7*	*2.7*	*2.9*	*3.1*
Centralized				
Greece	3.4	3.9	4.5	4.5[a]
Italy	-	3.9	4.1	4.4
New Zealand	1.9	2.0	2.2	2.1
Portugal	2.8	2.9	3.2	3.2[a]
Spain	-	2.5	3.1	2.9
United Kingdom	1.5	1.8	2.0	2.1
Average	*2.4*	*2.8*	*3.2*	*3.2*
United States	1.8	2.0	2.2	2.4[a]

Source: OECD Health Data 2004; [a]: data from 2001; [b]: data from 1991.

Throughout 1980-2000 all OECD countries (but the UK) have experienced a strong reduction in the number of acute beds available per 1,000 inhabitants (Table 6). The cause for this must be searched in the development of infrastructures for outpatient treatments. In general, for the period 1980-2000 countries with a SHI health care system tend to have a higher density of beds; 5.9 in decentralized systems and 5.2 in centralized ones. NHS show an average equal to 3.9 (decentralized) and 4.4 (centralized). Table 6 reports some data of selected OECD countries for four years.

Table 6: Number of acute beds for 1,000 inhabitants, selected years, split SHI-NHS (de)centralized

	1990	1995	2000	2002
Social Health Insurance (SHI)				
Decentralized				
Australia	4.4[b]	4.2	3.8	3.7[a]
Austria	7.1	6.6	6.3	6.1
Canada	4	4.3	3.3	3.2[a]
Germany	10.1[b]	9.7	9.1	9[a]
Switzerland	6.5	5.5	4.1	3.9
Average	*5.9*	*6.1*	*5.3*	*5.2*
Centralized				
Belgium	4.9	4.7	-	-
France	5.2	4.6	4.1	4.0[a]
Luxembourg	6.8	6.2	5.9	5.8
Netherlands	4.3	3.8	3.5	3.3[a]
Average	*5.3*	*4.8*	*4.5*	*4.4*
National Health System (NHS)				
Decentralized				
Denmark	4.1	3.9	3.5	3.4[a]
Finland	4.3	4.0	2.4	2.3
Ireland	3.3	3.2	3.0	3.0
Norway	3.8	3.3	3.1	3.1
Sweden	4.1	3.0	2.4	-
Average	*3.9*	*3.5*	*2.9*	*3.0*
Centralized				
Greece	4.0	4.0	4.0	4.0
Italy	6.2	5.5	4.3	4.6[a]
New Zealand	8.0	6.2	6.1	-
Portugal	3.4	3.3	3.3	3.2[a]
Spain	3.3	3.0	2.8	-
United Kingdom	2.8	4.0	3.9	3.9
Average	*4.6*	*4.3*	*4.1*	*3.9*
United States	3.7	3.3	2.9	2.9

Sources: OECD Health Data 2004; [a]:data from 2001; [b]:data from 1991; and New Zealand Health Information Service.

3.7   Cost containment measures

Efforts by governments to contain costs and slow the growth of expenditure over the last two decades have relied on three sets of policies: regulation of prices, wages and health care production resources; caps on health care spending; shifts of costs onto the private sector, especially through increasing cost-sharing by patients (Docteur and Oxley, 2003b).

Most OECD countries have chosen the possibility to regulate prices and/or volumes of health care. In particular, those countries with a public-integrated system[63] have controlled wages both in the hospital and ambulatory sector (Denmark [hospitals], Finland, Ireland [hospitals], Spain, Sweden, the United Kingdom [hospitals]). Portugal and Sweden, in order to contain costs, have downsized the staff during the 1990s. In particular, Portugal has cut down the number of top management positions. A number of countries has chosen to set fees directly with health care providers (for instance Australia, Belgium, France, Japan, Luxembourg, and Canada). Reforms in the ambulatory care in Germany, the hospital sector in Austria, and in Belgium have adjusted prices as a function of the volume of care so as not to exceed a fixed budget ceiling. In particular, Belgium has adopted a growth limit restricting the annual growth of expenditure to 1.5% in real terms from 1995. Administrative price setting has been probably the most widespread means in most countries for pharmaceutical drugs. As reported by Jacobzone (2000) all of the countries covered by his report experienced

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[63] A public integrated system is characterized by compulsory or voluntary health insurance or third-party funding in which both the insurance and provision of health care is supplied by the same organization in a vertically integrated system. Before the purchaser-provider split, the UK was considered the classical example of an integrated model. (European Observatory on Health Systems and Policies)

pharmaceutical price freezes in the 1990s.[64] Most states have responded to these restrictive measures for example by increasing volumes to compensate for limiting wage (and price) increases (for instance the ambulatory care in Australia, France, Japan, and the hospital sector in Sweden); providing higher cost services (for example more expensive diagnostic tests as in France, Germany and the United States); up-rating of patients into higher cost classifications (e.g. Medicare in the USA) or shifting services in areas where there are no price controls. For instance, in the United Kingdom and Ireland hospital consultants increase their wages by "redirecting" their patients onto their private practices. This, in effect, reduces public outlays for health care, but it does not help curbing total health expenditure.

With respect to the regulation of health care production resources many countries have set a *numerus clausus* on medical faculties in order to slow down the number of physicians. The number of doctors per capita has diminished as a result but remains positive in virtually all countries. The number of practicing physicians in the ambulatory sector is also controlled by limits on the number of doctors able to bill public insurer (Denmark and the Netherlands), and by professional associations (Germany and Austria).[65] Canada and Sweden have reduced the support stuff. In making further adjustments in the medical personnel some countries should start to be cautious and not push these measures too far; the United Kingdom, Canada, and Denmark are having nowadays difficulties in increasing the supply of health care because of the limited

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[64] The countries covered by Jacobzone's analysis (2000) are: Austria, Belgium, two provinces of Canada, the Czech Republic, Denmark, France, Germany, Greece, Italy, Korea, Luxembourg, the Netherlands, Spain, Switzerland and the United Kingdom.

[65] Such constraints have not always shown to be successful. Italy has experienced an increase by approximately 25% in the number of doctors and dentists from 1987 and 1994, even though there was officially a freeze on hiring. As shown in table 5, the number of physicians still remains in Italy one of the highest in the OECD area.

number of available doctors and nurses. As a consequence, there might be some upward pressures on wages, which does not translate into an increase of services provided.

Table 7 reports some statistics over the density of total health employment.

Table 7: Total health employment per 1,000 inhabitants, 1980-2001, selected countries[66]

	1980	1985	1990	1995	2000	2001
AUS	28.0	28.8	31.6	31.8	33.6	34.2
B	16.1	18.1	20.5	-	-	-
CAN	-	-	36.8	36.3	36.9	37.0
FIN	23.9	27.9	32.3	38.6	46.4	46.9
F	-	-	-	31.2	31.2	30.9
D	-	-	-	-	29.9	30.4
GRE	9.0	11.4	13.5	14.1	-	-
IRL	-	-	19.0	21.0	25.7	29.2
I	15.1	16.7	17.7	-	-	-
LUX	-	-	-	12.4	-	-
NL	21.6	21.1	22.2	23.8	26.9	28.0
NZ	-	-	17.0	-	-	-
P	9.1	10.2	11.0	11.9	-	-
E	-	-	-	14.6	17.0	17.1
S	50.5	51.5	52.7	39.0	-	-
CH	-	42.7	-	51.5	-	-
UK	20.8	21.6	23.7	29.5	30.6	32.1
USA	23.2	26.4	31.1	34.7	36.8	37.5

Source: OECD Health Data 2004. Data unavailable for Austria, Norway and Denmark.

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[66] Number of full-time equivalent persons employed (including self-employed) in health services, including "contracted out" staff and excluding pharmaceutical and medical equipment manufacturing employees. Administrative staff, private for-profit and non-profit medical benefit insurers are included. Health professionals working outside health services are excluded (e.g. physicians employed in industry). Full-time equivalent conversions vary across countries but are taken, unless otherwise noted, to be 35 hours or more per week. (Definition taken by OECD Health Data 2004).

With respect to the hospital supply in the last two decades there has been a strong reduction in the number of available acute beds in almost all countries (table 6). As discussed above, this reduction is due to health policies that have emphasized the concentration of acute care in larger hospitals, which are able to achieve and exploit economies of scale and scope. In addition, countries are also making progress towards a better balance between long-term nursing care beds and acute care beds, and increased services aimed at encouraging the elderly to remain in their own homes as long as possible.

The second set of health policies mostly used by governments are the budgetary caps. These instruments have been widely used in order to keep an eye on health expenditure. They were first directed at the hospital sector, and only subsequently they have addressed both the ambulatory and the pharmaceutical sectors. This policy has been successful in a number of countries like Denmark, Ireland, New Zealand, Canada, and the United Kingdom, characterized by single-payer system and integrated models of health care financing and supply.[67] A few SHI countries (the Netherlands, Belgium, France, and Luxembourg) have also established indicative budgets, but these imposed limits have rarely been respected. In other states, where supply is organized at lower levels of government, the central authorities have limited the amount of inter-governmental transfers (Canada and Finland) or set limits on tax increases at lower levels of government (Denmark and Sweden).

New budget controls have moved from retrospective payments, namely paying the provider on the basis of costs, to prospective or forward-looking payments. This has simply meant that providers are given a hard-budget constraint, while being expected to

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[67] The health care system organization influences these measures. For instance, spending under capitation-based payment system in the ambulatory sector is easier to control than under fee-for-service payment arrangements. Single-payer countries also manage to control their costs greatly than multi-payer states.

continue to adjust supply to meet the increasing demand for care. However, these budget constraints may carry with themselves some undesirable effects. Where budgets are allocated independently of output, there is no financial cost if output falls or compensation for higher costs if output increases. In some cases budgets are given according to historical costs. This may favor inefficiencies and hinder the geographical distribution of scarce resources on the basis of a need. In some countries (Denmark, France, and Greece) any savings are then asked back by payers, so providers are stimulated to spend their budget up to the ceiling. In any case, most governments (Italy, Greece, Portugal, and New Zealand) have found themselves obliged to finance the cost of overruns when faced with a bankruptcy of hospitals. In general, health policies now take into account not only budget settings but also the levels of efficiency and output across hospitals and differences in needs across geographical areas.

The third measure frequently pursued by governments throughout the 1980s and 1990s has been an increase in patients' cost sharing for medical care and out-of-pocket expenditure (see table 7).[68] Yet it must be stated that greater co-payments by patients have generally affected the pharmaceutical sector, while payments for inpatient and doctors visits have been less widespread. In Australia co-payments have been increased progressively in the 1990s as a demand-side cost containment strategy; out-of-pocket expenditure (mainly for pharmaceuticals) and private insurance now account for approximately one third of revenue for Australian health care expenditure. Belgium froze the price of pharmaceuticals in 1992, 1993, and 1996-1999. Cost containment measures in Canada have also focused on an increase in co-payments and deductibles for

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[68] As signaled by Docteur and Oxley (2003b), more significant increases in cost sharing were introduced in Austria (1988, 1996, 1997), Belgium (1992-1995), Finland (1990-1995, 2002), France (1970s and 1980s), Germany (1990s), Italy (1995), the Netherlands (1997 but reversed in 1999), Portugal and Sweden (1990s). In some other countries (Australia, Belgium and the United Kingdom) patients were shifted from hospitals into nursing homes, where the share of co-payment is higher.

the insured. France has adopted different and numerous measures of cost containment in the last 25 years, both on the demand and supply sides. Such measures have not been easy to implement in a context of FFS payment for doctors, retrospective reimbursement, and unrestricted freedom of choice of patients. Measures to limit demand basically focused on increased cost sharing, although in 1993 France experienced the last increase. Germany chose to increase co-payments for inpatient care, rehabilitative care, pharmaceuticals, medical aids, and transportation to the hospital. Luxembourg extended co-payments for treatments in 1983. Consumer co-payments on pharmaceuticals were also intended to manage consumer demand and contain expenditure in New Zealand. Overall, the number of drugs not reimbursed has augmented, mainly for "comfort" drugs or those without a proven therapeutic value. In general, higher co-payments have been experienced for branded products, as a number of countries has taken pro-active policies to encourage the introduction and consumption of generics (for example Italy, Germany, Switzerland, Scandinavian countries and the Netherlands). Some other countries have introduced reference price systems, which reimburse patients on the basis of the lowest price generic substitute or the lowest priced drug in a given therapeutic class (Docteur and Oxley, 2003b).[69]

On the whole, increases in co-payments and out-of-pocket expenditure are likely to have some undesirable effects on access and may bring additional social costs. In order to attenuate these alleged drawbacks, many countries have secured access to their health care system by exempting vulnerable groups (the poor, the chronically sick, and the elderly who consume the bulk of health care services) from co-payments and out-of-pocket expenditure; by setting ceilings on annual spending for individuals or for households (Sweden); and by allowing complementary insurance to cover the increase in

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[69] This is the case in the province of British Columbia in Canada, Denmark (1993), Germany (1989), Italy and the Netherlands (1996), New Zealand (1980s) and Sweden (1993).

cost-sharing (France). However, the reverse of all these procedures is that such measures increase the administrative cost of cost-sharing schemes and this may reduce the net fiscal savings.

Table 8: Out-of-pocket payments as a percent of total health expenditure, 1990, 1995, 2000, selected countries

	1990	1995	2000
AUS	16.6	16.5	18.5
A	-	14.6	18.6
CAN	14.4	15.8	15.8
DK	16.0	16.3	15.9
FIN	15.5	20.5	20.4
F	11.4	10.8	10.4
D	11.1	10.0	10.5
IRL	16.5	15.5	13.5
I	15.3	24.4	22.6
LUX	5.5	6.2	7.7
NL	-	-	9.0
NZ	14.5	16.2	15.4
N	14.6	15.2	14.5
E	-	23.5	23.5
CH	35.7	33.0	32.9
UK	10.6	10.9	-
USA	20.1	15.0	15.2

Source: OECD Health Data 2004. Data unavailable for Belgium, Greece, Portugal and Sweden.

3.8   Conclusions

Health care is a special good in many ways, not least because of the degree of state intervention in its provision. Health care is perceived by the society as a merit good that has to be provided with the goals of equity, efficiency, and effectiveness. In all OECD countries, but the United States, the government has taken active steps in the organization, setting and delivery of health-related services. State intervention is desirable because the market mechanism does not work properly with health care and a number of market failures arise. The government sets a national health policy, which comprises important topics such as the funding and remuneration, the system overall organization (NHS vs. SHI), the pharmaceutical policy, prevention and public health, etc. Such decisions imply a precise allocation of health policy to different sub-layers of government. To date there is not a clear-cut evidence of how health tasks should be allocated. There exists no single pattern: different historical, cultural, administrative and political circumstances have led to varying practices of health care decentralization, and thus of functions to be covered by each level of government. The analysis has set out that being a federal or unitary state, having a single-payer or multi-payer system play a role in the choice of decentralizing health functions. Experiences across OECD countries show that decentralization can take on a variety of different features. The decision taken by the government to decentralize is a first step in a series of choices among complex policy options, and depends on an equally complex set of internal context, namely some necessary pre-conditions that facilitate the implementation of decentralization: the availability of an operating institutional framework and trained personnel at the lowest tiers of government, but also some historical conditions, like the fact that a specific population is used to have services delivered locally (e.g. Switzerland or the Nordic countries).

What emerges in a first descriptive analysis is that decentralized SHI countries incur higher health expenditure than the remaining three classifications (centralized SHI, decentralized NHS, and centralized NHS). It is worth to point out that one must not construe that a country is performing bad if it is spending more than others. In this preliminary descriptive analysis the focus is on the level of costs of selected OECD countries for the period 1990-2000. There is no regard for other important aspects of a health care system, such as the quantity and quality of services provided, the public's satisfaction with health services, the access to the system, etc. SHI countries are spending more because they offer greater decision power to citizens, who can select their provider and experience almost no waiting lists for accessing some specific technologies. NHS countries limit the choice of services and providers to the population, for instance through gatekeeping, and this entails more cost control (Gerdtham and Jönsson, 2000).

It is of primary importance to assess and evaluate the advantages and disadvantages connected to decentralization. Decentralizing some aspects of health care is a decision that must be kept dynamic and evolving in time. For example, recent small but noticeable trends towards re-centralization, apart from Norway (in 2002) and Ireland (in 2005), are Finland with discussions about re-centralizing specialized medical care, and Sweden with an ongoing discussion as to whether or not it is necessary to have three different levels of government in the organization of the health care system. Much of the success of health federalism depends on the development of appropriate coordination mechanisms and structures for learning the different experiences across decentralized units, and for improving the quality and performance of the overall health care system of a country.

CHAPTER 4: HEALTH CARE EXPENDITURE AND DECENTRALIZATION. EMPIRICAL ANALYSIS OF OECD COUNTRIES

4.1 Introduction

The reform of health care delivery services is an important ongoing process in many countries of the developed world. The growth of health care expenditure and the consistent and increasing share of Gross Domestic Product (GDP) devoted to health has become a topic subject to comments and discussions among policy makers, academics and people working in this field.

A common trend in different countries has been to decentralize organizational and/or financing responsibilities of the health care sector to sub-layers of government. Decentralization involves the transfer of responsibilities from a central government to lower levels of government or autonomous or semi-autonomous organizations (Rondinelli et al., 1983). It can take on a variety of forms, depending upon the nature of the functions that are decentralized, the extent of control over those functions by local governments, and the type of institution to which responsibilities are transferred. The rationales and objectives of decentralization are often varied and ambitious: the stated goals of health sector decentralization generally include improving effectively service delivery, securing a better allocation of resources according to needs, involving the community in decisions about priorities and facilitating the reduction of inequities in health. Even so, decentralization per se does not guarantee improved health sector efficiency or improved health system outcomes. Numerous conditions, often overlooked,

influence the success of decentralization processes, including local managerial and technical capacities, systems of accountability, clear and transparent legal frameworks that delineate the division of responsibilities, and sufficient funding to fulfill mandates and to meet local priorities. All these conditions are necessary for a successful health decentralization.

The goal of this chapter is to shed light on the effect of multi-level governance on the level of health expenditure.[70] The main determinants of health care expenditure will be investigated through an empirical application. In particular, the focus will be on 20 OECD countries for the decade 1990-2000. Those countries partaking in the analysis are a sub-sample of the OECD group. The selected countries have been chosen because the data availability and accuracy is more detailed and shows no break in series; moreover, all nations belong to either a NHS or a SHI system, and have well established economic and political systems that make them more comparable.[71]

Both centralized and decentralized health care settings have experienced steady increases in the share of economic and financial resources given to health, and the level of costs has grown regardless of the system organization (OECD Health Data, 2004). However, an interesting aspect is that some scholars believe decentralization to enhance cost control and hence meet budgetary goals more easily (Mills et al., 1990). A different strand of analysis considers decentralization a possible way to shift costs from one governmental level to the other (Banting and Corbett, 2002; Crivelli et al., 2003).

The arguments supporting decentralization as a means to control costs rely on the assumption that a multi-level governance system makes cost containment more precise

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[70] An interesting contribution relating to this topic is the paper of Wilson (2004) that reports the Canadian experience.

[71] Note that the 20 OECD countries are the following: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

for different reasons (Mills et al., 1990). First, programs are more targeted to the needs of the local population, thus any kind of financial waste should be avoided. Second, in a local context the community can mimic the role of a supervisor, "punishing" local politicians by not re-electing them, if they perform badly, or alternatively "rewarding" them, if they fulfill their commitments. If constituents perceive that the local government is wasting resources they will probably feel uncomfortable about it. Third, the presence of two (or more) tiers of government makes control more efficient, through stronger supervision by the upper levels.

However, other authors claim that a decentralized setting inherently causes cost shifting problems between layers of government.[72] A recent analysis of Banting and Corbett (2002) on health policy and federalism reveals that federal institutions[73] add an additional layer of complexity to cost containment. Their point of departure is that federal states have faced more serious difficulties in containing cost pressures in the last four decades than unitary states. One of the main conclusions is that attempts to contain health spending in one area simply shifts the pressures elsewhere in the system. According to the researchers, federal settings are more prone to cost shifting because the private sector plays a bigger role in federations, and the participation of two levels of government in shaping public health programs increases the chances that cost containment will involve cost shifting between governments. This, in turns, can become a sort of "blame game" between the governmental tiers: in fact, no one takes its responsibilities for excessive spending but rather "blames" the other layers of overspending financial resources. Crivelli et al. (2003) support the view of the cost shifting problem with decentralization. By examining the health care system

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[72] An interesting contribution of cost shifting in health care is given by Meyer and Johnson (1983).

[73] Federal institutions must be understood as countries where there are two (or more) different tiers of government.

organization in Switzerland, the researchers point out that a multiplicity of third-party payers in the system and a high level of decentralization make it extremely complex to follow internal financial flows, which in turns create greater difficulties in establishing the role of each single component, creating a cost shifting problem. They claim that since nobody is entirely responsible for the health care budget, it is easier sometimes to obtain a reduction in a single body's financial share, rather than committing oneself to a more rational use of financial resources. This encourages a shifting of costs at the expense of another payer and discourages an effective rationalization of health expenditure.

The goal of this chapter is to give some answers via an empirical analysis to a series of positive questions: Is the level of health care expenditure higher in a centralized or decentralized setting? Does the overall organization of the health care system, NHS versus SHI, have an effect on the level of health costs?

This chapter is organized as follows: section 4.2 will briefly reckon the criteria used for classifying the 20 OECD countries. The international literature on the determinants of health care expenditure will be set forth in section 4.3. The econometric model will be specified in section 4.4 and the different techniques to analyze pooled cross-section time-series data will be presented in section 4.5. Data and estimation results will follow in section 4.6 and conclusions will be drawn in section 4.7.

4.2   Level of decentralization of health care systems

The scope of this analysis is to study the main determinants of health care expenditure for 20 OECD countries and consider the impact of the organization of the system

(decentralized vs. centralized, NHS vs. SHI) on the level of costs for a determined time period (1990-2000).

In order to test this hypothesis, through the use of econometric techniques, the first step is to identify the characteristics of the health care system of each OECD country partaking in the analysis. As outlined in paragraph 3.5.4 this study will use two criteria to classify health decentralization, and they are briefly reported here:

1. The organization and overall management responsibilities. Who actually manages the system? To which level of government is given the responsibility to plan and regulate the health care system and deliver health care services?

2. The funding of the system. Are sub-layers of government in charge of collecting financial resources to be spent on health, or is this a central duty?

Overall three different categories can be identified to which countries can belong: the first category is characterized by the presence of a central management and funding of the health care system; the second category describes a situation where the system financing is centralized but the delivery and management of care is decentralized; finally, the third category represents the case of decentralized management and funding. For the purposes of this study, a health care system has been considered to be centralized if it belonged to the first category; decentralized if it belonged either to the second or third category. The reason for this choice lies in the fact that even if a country has the features of a decentralized management and centralized funding, there is anyway an important aspect of decentralization of competences that has taken place within its boundaries and on which it is interesting to pursue empirical analyses. In the sample of OECD countries there are four states (Australia, Canada, Ireland, and Norway) that have such characteristics. Although in all of them the center is basically involved in funding health care, local governments are then in charge of organizing and delivering health

services, and they enjoy a rather ample margin of maneuver in the allocation of funds in the different health activities.

Note that the level of health decentralization has been associated to the overall health care system organization (that is, NHS or SHI). Hence it follows that these two concepts have been linked together. One might question how it is possible to separate the effect of a NHS or SHI system, and the effect of (de)centralization, when these two concepts are merged. My belief is that these concepts are intrinsically inseparable: decentralization happens necessarily in a NHS or SHI setting. It is true that there are some exceptions to this rule, as for example Denmark. The Danish health care system has always been highly decentralized and underwent an administrative reform in 1973, which changed the whole system from a SHI to a NHS, but notwithstanding this fact decentralization has always been on the top of the political agenda. Hence in this specific case decentralization was already present before the set-up of the health system. However, in all other countries of analysis the decision of decentralizing health care functions has come after the system was already built. The interesting aspect of this study is thus to consider the level of health care expenditure of the four emerging typologies of health care systems.

The resulting four country clusters are the following:

- **NHS centralized**: Greece, Italy, New Zealand, Portugal, Spain,[74] United Kingdom.

- **SHI centralized**: Belgium, France, Luxembourg, the Netherlands.

- **NHS decentralized**: Denmark, Finland, Ireland, Norway, Sweden.

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[74] As explained in the previous chapter, Spain has been clustered as a NHS with a centralized set-up for the decade 1990-2000. However, it is worth to point out that in the estimations of the econometric model for OECD countries, when the dummy for Spain has been changed into a NHS decentralized health care system, the results were similar.

- **SHI decentralized**: Australia, Austria, Canada, Germany, Switzerland.

For a comprehensive description of the health care system of each of the 20 countries please refer to Annex 1. The main sources of information are the European Observatory on Health Care Systems (Brussels), national web sites of the Department/Ministry of Health, and personal communications with experts in this field.

4.3   The literature

In the last decades all OECD countries have experienced a steady increase in the health care expenditure and in the share of GDP spent on this sector. This trend has affected the bulk of countries and caused some alert in health economics. A body of literature started to examine the main determinants of health care expenditure and, thanks to the use of econometric methods, suggestions on variables that have an impact on health costs have been given.

International studies on health care expenditure can be divided in two main approaches: cross-section with bivariate or multivariate regressions using a single year or several years (Newhouse, 1977; Leu, 1986; Parkin et al., 1987; Gerdtham, 1992a,b) and panel data regressions covering a large number of countries over long time periods (Hitiris and Posnett, 1992; Hitiris, 1997; Gerdtham et al., 1998). These latter studies benefit from a much larger sample size, permitting the inclusion of a wider range of variables. Most studies have estimated the relation between per-capita health care expenditure and its determinants, namely: the proportion of population over 65 and under 5, per-capita GDP, the public finance share of health care spending, urbanization, and the number of practicing physicians per capita.

The first generation of studies at the international level has focused mainly on the estimation of the elasticity of health care expenditure with respect to per-capita GDP. Newhouse (1977) regresses per-capita medical expenditure on per-capita GDP on 13 OECD countries and finds income elasticity for health care spending greater than one, thus leading to the conclusion that medical care is a luxury good. On the basis of these results the author made two strong inferences: the first one was that other factors but income (for instance, the method for reimbursing the physician) need not be included since they are of marginal significance. The second strong assumption was that health care is a luxury good (since its elasticity is above one) and this could be explained by the fact that, at the margin, the demand for health care may relate more to caring, namely the subjective components of health, than to curing or physiological health.

Because of the bias caused by possible omitted explicative variables, some other researchers have introduced a larger set of factors that may have any significant impact on national health expenditure. Newhouse's finding has been later confirmed by Leu (1986), who finds income elasticity higher than one, using cross-sectional data for 19 OECD countries. However, the author introduces in his analysis a set of important variables (dummy variables) for countries with a national health system and countries based on a public insurance scheme, dummy variables where there is direct democracy, and variables that reflect the public offer of health services. Gerdtham et al. (1992a) used a single cross-section of 19 OECD countries in 1987 and reported per-capita income, urbanization, and the share of public financing to total health expenditure as positive and significant variables, with a reported income elasticity of 1.33. Thus, the result of health being a luxury good was confirmed again.

The second generation studies use panel data combining cross-country and time-series data on a sample of OECD countries. A main feature of the studies belonging to this generation is the introduction of variables describing the regulatory settings and the

production capacity of health services. Hitiris and Posnett (1992) used panel data observations from 20 OECD countries over the period 1960-1987 and found a strong and positive correlation between per-capita health spending and GDP with income elasticity at about unity. Other variables were included in the model and the share of over 65 in the population was found to be positive and significant. Hitiris (1997) focuses his analysis on the determinants of health care expenditure for a sample of 10 member states of the EU for 32 years. He applies two different methods of estimation, both of which take account and correct different aspects of econometric problems arising from the nature of statistical observations originating from markedly different countries. In particular, he first uses a cross-sectionally heteroskedastic and time-wise autoregressive model, and subsequently implement the model allowing for cross-sectional units interdependence, correlated and time-wise autoregressive disturbance terms. His results shed light on the existing divergence of health care expenditure between European countries because of differences in the level of GDP per head and demographic factors. According to Hitiris, health care convergence can occur only in the longer run when "a harmonious and balanced development of economic activities, … the raising of the standard of living and life, and economic and social cohesion and solidarity among the Member States" are realized. Gerdtham et al. (1998) used a panel data set for 22 OECD countries over the period 1970-1991, including in the model variables such as the per-capita number of physicians and the regulatory set-ups of each single country. Amongst the non institutional factors, only GDP and tobacco consumption generally have a significant impact on health expenditure: the elasticity on tobacco consumption indicates that health expenditure would increase by about 1.3% if tobacco consumption increased by 10%. Countries with primary physicians as gatekeepers for inpatient care have consistently lower health expenditure (costs drop by 16%). Public reimbursement systems tend to be less expensive than public contract systems. Countries that reimburse their physicians by capitation appear to experience lower health expenditure; the

proportion of inpatient care expenditure tends to be positively related to health expenditure; the public sector is relatively more important than the private sector and helps lowering costs. Furthermore, it seems that the number of doctors swells health expenditure in systems that reimburse their physicians by fee-for-service. In contrast with other studies, the estimated income elasticity is lower than one (0.74). This is the most complete study at the international level.

Barros (1998) focuses his study on the determinants of growth of aggregate health expenditure. The study has its starting point in previous literature but looks at differences across countries in growth, and not in levels, of health expenditure. Barros basically uses the same explanatory variables, but obtains different results. Health system characteristics usually believed to influence health expenditure growth, like population ageing, the type of health system and existence of gatekeepers, are not significant. The only exception is income, with elasticity below but close to one.

It is important to stress that the econometric studies on international comparisons of per-capita health care expenditure face some methodological problems.[75] One of them relates to the assembling of all data, which is a daunting task and can be accomplished with errors of observation. Moreover, some data are difficult to compare because they are normally collected for operational reasons rather than research purposes. The rigorous assessment of the quality (accuracy and reliability) of cross-national data is difficult. There is thus an ample scope for imperfect reliability of data with respect to international comparisons due to different classifications and definitions.

Another problem concerning the cross-national dataset is that spending data in national currencies have to be translated into PPPs (Purchasing Power Parities) expressed in US dollars. However, one should bear in mind that the PPP exchange rates are much more

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[75] An interesting insight in this issue is given by Gerdtham and Jönsson (2000).

stable than the highly variable spot exchange rates used by accountants to aggregate the financial reports of international companies.[76]

The third problem of international comparisons, as underlined by Gerdtham and Jönsson (2000), is the weak theoretical base for the determinants of aggregate health expenditure, which provides little guidance as to the possible explanatory variables and the casual mechanisms involved. There is thus a lack of theory and an "atheoretical" basis of macroeconomic analysis of health expenditure. The bulk of models have been developed on microeconomic concepts but they have been employing macrodata, which gave rise to the problem of aggregation and misspecification arising from omitted variables or inadequate functional form.

Several variables may appear at first sight to be closely related to one another. The problem of multicollinearity may thus be severe and can tend to confound the measurement of separate effects of individual regressors on expenditure and it can make it harder to obtain significant estimates. Furthermore, the coefficient obtained by the regression may be highly sensitive to the deletion or the addition of other regressors in the model.

It is worth noting that the classical distinction between supply and demand in health care is not so clear as it is in other markets. The role of the physician can be perceived as the patient's agent who advises on health care needs and treatments, and as a key supplier of health services. The goal of being healthy is then an argument of the utility function both for the patient and for the physician. Another element that makes the distinction between supply and demand complicated is that health services are usually provided on the base of needs and not on willingness to pay, given the fact that health is a merit good and the

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[76] A spot exchange rate is determined every moment through international trade in goods, services and securities. A PPP exchange rate is an analytic construct formed by pricing out the given basket of goods and services in two countries' currencies.

welfare states are concerned with the goal of equal access to medical services for every citizen. The public provision of most health services is coupled with some forms of non-price rationing, such as the waiting lists.

Another problem on which Roberts (1999) sheds light on, is that cross-sectional comparisons implicitly impose the assumption of homogeneous relationship across countries, which may appear unrealistic because preferences can be heterogeneous as well as the production functions. Moreover, different authors in these last years have investigated the issue of non-stationarity of variables (Roberts, 2000), unit root and cointegration tests (Okunade and Karakus, 2001; Herwartz and Theilen, 2003) in the context of the determinants of health care expenditure at the international level.[77]

Of course all these methodological limitations should be taken into consideration in the analysis; however, the use of panel data undoubtedly gives some more advantages than simple cross-section or time-series data (see paragraph 4.5). Notwithstanding the presence of these problems, the results obtained so far by international studies give important insights on the determinants of health care expenditure and can be a useful tool for analyzing the surge of health costs.

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[77] A stationary time-series is one whose mean and variance do not change over time. If variables in a regression are non-stationary, then the implication is that the regression may be spurious. If the error term is stationary, then the two variables are co-integrated with the error term representing short term deviations from test relationship. Tests for stationarity exist but their power is limited by both the quality and the time span of the data (Mills, 2004; Hendry, 1986; Davidson and Mackinnon, 1993; and Muscatelli and Hurn, 1992). Recent research suggests that stationarity may not be a serious problem in panel data, when panel level tests are employed (Roberts, 1997; McKoskey and Seldon, 1998; Di Matteo, 2005).

4.4   Model specification

In this study a single equation approach is used to model per-capita total health care expenditure. The model takes into consideration economic, demographic, and structural factors as determinants of the level of costs. Note that the novelty of this research is the inclusion in the model specification of dummy variables that describe two features: first, whether a country is based on a NHS or a SHI scheme; second, whether the health care system organization is centralized or decentralized following the two criteria previously set out.[78] This analysis covers the period 1990-2000 and is carried out on a group of 20 OECD countries, which has been selected for the quality and accuracy of available data. Hence panel data will be used.

Following previous model specifications and taking into consideration the availability and quality of data, the following parsimonious health expenditure model is specified:

$$THE_{it} = f(GDP_{it}, PHY_{it}, BEDS_{it}, A19_{it}, A80_{it}, UN_{it}, PYLL_{it}, NHSc, NHSd, SHId, SHIc, T)$$

[1]

where subscript *i* stands for the country and *t* for the year. Moreover,

$THE_{it} =$ Total per-capita health expenditure;

$GDP_{it} =$ Per-capita GDP;

$PHY_{it} =$ Density of physicians per 1,000 inhabitants;

$BEDS_{it} =$ Density of acute beds per 1,000 inhabitants;

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[78] Leu (1986) introduced in his model specification a dummy variable for countries with a national health system and the results pointed in the direction that these latter tend to have lower expenditure than non-national health systems.

A19$_{it}$ =   Percentage of population aged below 19 years;[79]

A80$_{it}$ =   Percentage of population aged over 80 years;[80]

UN$_{it}$ =   Unemployment rate;

PYLL$_{it}$ =   Potential years of life lost - all causes related to health per 100,000 inhabitants below 70 years. It is an important variable because it can be considered as a proxy for the outcome/quality of a health care system. It is a summary measure of premature mortality that provides an explicit way of weighing deaths occurring at younger ages, which are, a priori, preventable. Such deaths should thus not occur in the presence of timely and effective health care. A negative sign from estimations is expected, since if PYLL increases then THE decreases.[81]

NHSc =   Dummy variable that takes the value 1 if the country has a National Health System (NHS) and a centralized structure of its health care system, 0 otherwise. However, note that this category will be taken as the reference group and therefore it cannot be included in the econometric specification.

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[79] The OECD Health Data 2004 collects data of people aged under 14 and under 19 years. A19 was chosen in order to identify the effect of teenagers on total health care expenditure.

[80] The OECD Health Data 2004 collects data of people aged over 65 and over 80 years. A80 was chosen in order to identify the effect of old-old adults on total health care expenditure.

[81] The calculation of PYLL involves adding up deaths occurring at each stage and multiplying this with the number of remaining years to live until a selected age limit (70 years). In order to assure cross-country and trend comparison, the PYLL are standardized, for each country i and each year t as follows:

$$\sum_{a=0}^{l-1}(l-a)(d_{at}-p_{at})(P_a/P_n)*100,000$$

where a stands for age, l is the upper age limit chosen for the measure (70 in the OECD Health Data), d_{at} is the number of deaths at age a, p_{at} refers to the number of persons aged a in a country i at a time t, P_a refers to the number of persons aged a in the reference population, and P_n is the total number of persons aged 0 to l-1 in the reference population (OECD Health Data 2004).

NHSd =   Dummy variable that takes the value 1 if the country has a National Health System (NHS) and a decentralized structure of its health care system, 0 otherwise;

SHId =   Dummy variable that takes the value 1 if the country has a Social Health Insurance system (SHI) and a decentralized structure of its health care system, 0 otherwise;

SHIc =   Dummy variable that takes the value 1 if the country has a Social Health Insurance system (SHI) and a centralized structure of its health care system, 0 otherwise;

T =   Time variable that should capture the cost differences over time owing to changes in medical technology or to other factors that may influence the development of health costs at the national level.

The functional form chosen to estimate model [1] is the log-log or Cobb Douglas form. Such a choice allows to answer questions about elasticities and has been used in previous studies (e.g. Gerdtham et al., 1998). By applying the double log functional form, expression [1] can be written as:

$\ln \text{THE}_{it} = \beta_0 + \beta_1 \ln \text{GDP}_{it} + \beta_2 \ln \text{PHY}_{it} + \beta_3 \ln \text{BEDS}_{it} + \beta_4 \ln \text{A19}_{it} + \beta_5 \ln \text{A80}_{it} + \beta_6 \ln \text{UN}_{it} + \beta_7 \ln \text{PYLL}_{it} + \beta_8 \text{NHSd} + \beta_9 \text{SHId} + \beta_{10} \text{SHIc} + \beta_{11} T + \varepsilon_{it}$

[2]

4.5   Analysis of panel data

The empirical analysis of the econometric model [2] will use panel data. A panel data set contains repeated observations over the same units (individuals, households, firms),

collected over a number of periods. The availability of repeated observations on the same units allows economists to specify and estimate more complicated and more realistic models than a single cross-section or a single time series would do. With additional, and more informative data (one has a large number of data points), one can obtain more reliable estimates, an improved efficiency of econometric results and can test for more sophisticated behavioral models (Hsiao, 2003).

Another advantage of panel data sets is their ability to control for individual heterogeneity (Baltagi, 1999); they make it possible to analyze changes on an individual level. For example, if one considers a situation in which the average consumption level rises with 2% from one year to the other, panel data can identify whether this rise is the result of, for example, an increase of 2% for all individuals or an increase of 4% for approximately one half of the individuals and no change for the other half. Panel data are thus suitable to explain not only why individual units behave differently, but also to model why a given unit behaves differently at different time periods.

Panel data enables to control for omitted variables that are persistent over time. "By utilizing information on both the inter-temporal dynamics and the individuality of the entities being investigated, one is better able to control in a more natural way for the effects of missing or unobserved variables" (Hsiao, 2003). Thanks to panel data it is possible to implement country-specific effects that allow to take into consideration unobservable differences that are systematically related across individuals and are fairly constant over time. The inclusion of these effects is not only an optional tool in order to get more information about individual- or time-specific characteristics of the panel, it is a way to check and control the presence of mismeasured or/and unobserved variables that are correlated with the explanatory variables.

Panel data are better able to study complex issues of dynamic behavior (Baltagi, 1999). For example, cross-sectional observations permit to estimate the rate of unemployment

at a particular point in time. Repeated cross-sections show how this proportion changes over time. But it is only with a panel data set that one can estimate what proportion of those who are unemployed in one period remain unemployed in another period. Thus, panel data develop a full and reliable life history (e.g. family formation, employment patterns, etc.).

Drawbacks related to panel data are more of practical nature: the data collection tends to be more complex and often panel data sets may suffer from missing observations. Furthermore, the time-series dimension may tend to be short, especially when dealing with macro-economic level, since definitions of variables may differ substantially from one state to the other. For example, heterogeneous definitions exist about some issues even in Nordic countries of Europe, which have similar GDP, social systems, and cultural background. The definition of, say health expenditure, may also change over time within a single country. Differences in definitions of specific issues can hence take place both among countries and within a country over a determined period of time. Thus, many variables cannot be utilized because of lack of data. Another problem concerning the cross-sectional dataset at the macro level is that spending data in national currencies have to be translated in PPPs (Purchasing Power Parities) expressed in US dollars. Furthermore, the choice of the monetary conversion factor critically influences the results one can obtain with estimations (Huber, 1999).

Panel data methods are appropriate when data are for a number of countries over a number of years because it is possible to estimate both the effects of inputs, such as health expenditure, and the country-specific effects of unobserved factors that differ across panels (Gravelle et al., 2003). There are two sources of variation in panel data that provide different information: the *within variation*, which considers the variation within panels (countries) over time; and the *between variation*, which considers the variation across panels (countries). An important preliminary analysis before estimating

parameters is to calculate the within and between variation of all variables in the data set. In fact, if the within variation is sufficiently high, then one can choose to use the Fixed Effects estimator (also called the within group – or LSDV – estimator), since this latter only takes account of the within variation of variables.[82] As noted by Baltagi and Griffin (1984), if the between variation for the relevant explanatory variables in the model greatly exceeds the within variation, then OLS becomes a preferred estimator. In fact, the relatively small within variation leads to feasible GLS estimates that are very different from the LSDV estimates. Because the precision of the LSDV estimator is proportional to the within variation, such estimates where the data set contains relatively small within variation, will have large standard errors. Under these circumstances estimates will lack precision and the statistical tests that are conventionally used to discriminate between models may be misleading (Deaton, 1997).

There are mainly four popular approaches for analyzing panel data: Ordinary Least Squares (OLS) and the panel data models – fixed effects (FEM) and random effects (REM), and the Kmenta approach, also known as the Parks-Kmenta approach. The first three approaches are more oriented to panel data where the number of observations is bigger than the number of temporal dimension (N>T); the last approach is more convenient to use when T>N. Note that the main limit of OLS is that the constant is assumed to be constant across all units, and that the effect of any given regressor on the dependent variable is constant across observations. These two restrictions are likely to be a problem in panel data analysis because one observes heterogeneity across units and over time. Of course it is possible to test for the presence or absence of an error component (either fixed or random), and this helps the researcher to choose the

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[82] Note, however, that the choice of the Fixed Effects Model does not only depend on the within variation of variables. Contrary to the Random Effects Model for example it does not impose any restrictions upon the relationship between the individual effects and the regressors.

appropriate econometric technique. The following sections will explain the advantages and disadvantages of static linear models in a panel data setting.

4.5.1   The Fixed Effects Model (FEM) and the Random Effects Model (REM)

The FEM is a linear regression model in which the intercept terms vary cross-sectionally (over the individual units). Thus, the common formulation of the model assumes that differences across units can be captured in differences in the constant terms. In the REM it is assumed that the individual term of the regression is a random factor, which is independently and identically distributed over individuals. Both models present some advantages and limitations in their use: very often it is convenient to think about the application of the econometric method on a specific data set, and this holds particularly for FEM versus REM, where the nature of data retrievement (random or fixed) is of crucial relevance.

Table 9 reports the main advantages and limitations of using FEM and REM respectively.

Table 9: Advantages and disadvantages of FEM and REM

	ADVANTAGES	LIMITATIONS
FEM	• The major advantage of a fixed effects analysis is that it controls for any unmeasured time invariant differences between units (for example, when analyzing individuals it controls for constant preferences or personality traits because it only uses the within person – over time – variation). • In this model the possible correlations between the individual effects and regressors are neutralized. This implies that it is unnecessary to specify that the individual effects are uncorrelated with the x_{it}. • Investigators make inferences conditional on the effects that are in the sample (Hsiao, 1986).	• The major limitation is that it is not possible to include regressors in the model that do not vary over time. In fact, the transformation (from each observation the average of the observations for that individual is subtracted) wipes out all explanatory variable that do not vary over time. • The dummy variable approach is costly in terms of degrees of freedom lost. If there was a way to limit such loss, a more efficient estimate could be produced. • The FEM only uses the within variation of variables: if the within variation is low than this method should not be used.
REM	• By saving on degrees of freedom, the REM produces a more efficient estimator of the slope coefficients than the FEM. Moreover, time-invariant variables are not wiped out. • The major advantage is the ability to estimate the effects of unit-level characteristics and the parsimony and efficiency of the model. • Investigators make unconditional inferences with respect to the population of all effects (Hsiao, 1986).	• One of the most important assumption in the REM is that the individual effects are uncorrelated with the regressors. If there is correlation the consequence is biased and inconsistent estimates of β for REM.

4.5.2 The Kmenta (or Parks-Kmenta) model

The cross-sectionally heteroskedastic and timewise autoregressive model (i.e. Kmenta, or Parks-Kmenta model) takes into consideration assumptions usually made when

dealing with time-series and cross-sectional data. Concerning time-series data, for example, one can possibly assume that disturbances can be autoregressive, though not necessarily heteroskedastic. With respect to cross-sectional data it is frequently assumed that the regression disturbances are mutually independent but heteroskedastic. Kmenta (1986) has suggested four possible ways of handling pooled time-series of cross-sections that are heteroskedastic and autocorrelated: (1) the common autocorrelation term, (2) the varying autocorrelation term, (3) cross-sectionally heteroskedasticity, (4) cross-sectionally correlated term. Note that since cross-sectional correlation must be estimated in this model, panels must be balanced and the number of time periods should be bigger than the number of panels, that is $T>N$. The Kmenta model is estimated using a Feasible Generalized Least Squares (FGLS) estimator.

The FGLS correction for panel studies proceeds, as usual, by a first round of OLS and a second round of weighted OLS (WOLS), with weights being inversely proportional to the estimated variances for each panel. It is well known that corrections for autocorrelation usually lead to increased standard errors of coefficients, while the results for heteroskedasticity can go in both directions. Any kind of WOLS procedure tends to downweight observations with large residuals and to emphasize observations with good fit. Thus, those countries with a "bad" fit, namely with large variance estimates, incur an even worse fit in the Parks-Kmenta model, while the fit for good countries even improves.

Beck and Katz (1995) state that the Parks-Kmenta approach shows inaccurate standard errors, and they therefore suggest another method of estimation, which corrects for standard errors. They show, through Monte Carlo simulations, that the OLS with Panel Corrected Standard Errors (PCSE) produces more accurate standard errors and performs well even in the presence of complicated panel data structures. It should be reminded,

however, that Beck and Katz's analysis is limited to temporal-dominant panel data sets.[83]

4.5.3 Choosing between the OLS, FEM and REM models

There are generally two purpose tests to decide which model is best to be used in a context of panel data analysis.

First, the question to be answered is whether a group specific error component actually exists. To do this, one computes the **Lagrange Multiplier (LM) test** for the presence or absence of an error component (either fixed or random). For a one component model specifying a unit-level error the LM tests

$$H_0: \alpha_i = 0 \quad LM \sim \chi^2(1) \tag{19}$$

If the null hypothesis is accepted the error component is zero and one should choose OLS over either FEM or REM. If the null hypothesis is not accepted the error component are not zero and one should choose either the REM or the FEM over the OLS model. It must be stated, however, that the OLS is normally rejected in a context of panel data analysis, as it does not capture any heterogeneity among individuals and across time. Moreover, OLS yields estimates of the parameter standard errors that are incorrect.

How to choose between REM and FEM? The test to be applied is the so-called **Hausman test** (HT). Hausman (1978) has suggested this test for the null hypothesis that

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[83] In particular Beck and Katz (1995) claim that the FGLS formula for standard errors assumes that the error process is known, not estimated. In many applications this is not a problem but it is in a context of time-series cross-sectional data because the error process has a large number of parameters to be estimated.

x_{it} and α_i are uncorrelated. The general idea of a HT is that two estimators are compared: one which is consistent under both the null and alternative hypothesis and one which is consistent (and typically efficient) under the null hypothesis only. A significant difference between the two estimators indicates that the null hypothesis is unlikely to hold.

$$H_0: REM\ correct \quad HT\sim\chi^2(k') \quad k'= \text{number of predictors} \quad\quad [20]$$

$$HT= (\beta_{FEM} - \beta_{REM})'[Var(\beta_{FEM}) - Var(\beta_{REM})]^{-1}(\beta_{FEM} - \beta_{REM}) \quad\quad [21]$$

If the null hypothesis is not accepted the option is for the FEM in the econometric analysis; if it is accepted the REM is more appropriate.

4.5.4   Choosing between an error component and the Parks-Kmenta model

Baltagi (1986) suggests two different tests to allow to distinguish between an error component model and the Parks-Kmenta model. Recall that the error component disturbances are homoskedastic, while the Kmenta type disturbances are heteroskedastic (such that they might have different variances across ranges or subsets of nations). Therefore an easy way to understand which model is best to use is to implement a Bartlett's test for homoskedasticity applied to OLS residuals. Baltagi argues that such test performs well, given that the right decision (not rejecting homoskedasticity) for the error components structure is right between 96 and 100% of the time. On the other hand, if the true disturbances are of the Kmenta type, the test rejects homoskedasticity 73 to 100% of the time.

Similarly, one can distinguish between the two models through the use of a test for serial correlation (when errors are not independent from one period to the other). Note that

providing that serial correlation exists is not enough, since both error structures admit its existence. However, for Kmenta the serial correlation decays over time, while for the error component disturbances it is constant over time. A well performing test that distinguishes between the two models is a Durbin-Watson statistics on the within residuals.

As outlined previously, the Kmenta model is principally used with pooled time-series cross-sectional model (TSCS).[84] This implies that such model should best be used when the number of time periods exceeds the number of panels. Alternatively, if N>T the error component models should be applied. Moreover, one should also look at the within variation of the regressors (Filippini et al., 2005). If there is a reasonable percentage for that, then FEM or REM might be more appropriate.

4.5.5 Goodness of fit

As Verbeek (2004) states, the computation of the goodness of fit in a panel data context is unusual and uncommon. One reason is that one can give a different meaning to the explanation of the within and between variation in the data. A second reason is that the R^2 (or adjusted R^2) makes sense only when the model is estimated through the OLS technique. In fact, the R^2 statistics is an OLS concept that it is useful because of the unique way it breaks down the total sum of squares into the sum of the model sum of squares and the residual sum of squares. When the model is estimated with GLS and/or FGLS, the total sum of squares cannot be broken down in the same way, making thus the R^2 statistics less useful as a diagnostic tool for GLS-FGLS regressions. Specifically,

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[84] Note that TSCS is the term used for indicating that T>N, or "temporal dominant pool". When N>T, that is the pool is "cross-sectional dominant", the term utilized is panel data (Stimson, 1985).

an R^2 statistics need not be bounded between 0 and 1 and does not represent the percentage of total variation in the dependent variable that is accounted for by the model. Additionally, eliminating or adding variables in a model does not always increase or decrease the computed R^2 value.[85] This is the reason why the R^2 statistics is not reported in the software Stata 8.0 when the Kmenta model is performed.

When modeling a FEM and/or a GLS Stata 8.0 reports three different values for the R^2 statistics:

1. The R^2 overall: this is the standard R^2 from regressing Y on X. It is the proportion of the variation in, say, health care expenditure, explained by the model.

2. The R^2 between: it is the R^2 from the regression of the means of Y on the means of X (the between estimator).[86] It is the proportion of the variation in health expenditure across countries explained by the variation (across countries) in the independent variable.

3. The R^2 within: it amounts to the R^2 from the following prediction equation $(\hat{y}_{it} - \bar{y}_i) - (x_{it} - \bar{x}_i)\beta$. It is the proportion of the variation in health expenditure within countries across years explained by the variation (within countries) in the independent variable.

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[85] Please refer to the Stata web site: www.stata.com

[86] The between estimator exploits the between dimension of the data (differences between panels), and is determined as the OLS estimator in a regression of individual averages of *y* on individual averages of *x* (and a constant). Its expression is given by: $\beta_{BET} = [\sum_{i=1}^{N}(\bar{x}_i - x)(\bar{x}_i - x)]^{-1}\sum_{i=1}^{N}(\bar{x}_i - x)(\bar{y}_i - y)$

4.6   Data and estimation results

The econometric model specified in equation [2] is a combination of cross-section and time-series data for 20 OECD countries covering the period 1990-2000 (11 years), thus resulting in 220 total number of observations.[87] Data were collected primarily through the OECD Health Database 2004. Where missing they have been integrated with contacts established with National Statistical Departments of different countries. For the conversion of monetary variables, i.e. per-capita health expenditure and income, national GDP price indexes (100=1995) have first been used as deflators, and then Purchasing Power Parities (PPPs) for the base year (1995). Because monetary variables are expressed in PPPs they provide more complete and meaningful cross country and time-series comparisons (Kravis et al., 1982).

The time-invariant variables in model [2] are the dummy variables describing the general setting of the health care system (either NHS or SHI) and its degree of (de)centralization (NHSd, SHId, SHIc). It is worth to point out that some variables show a high within variation, in particular potential years of life lost (36%), unemployment rate (23%), and GDP per capita (16%). The other variables in the model all show a within variation equal to or lower than 15%, and namely: percentage of people aged below 19 in the total population (15%), density of acute beds (11%), percentage of old-old adults (10%), and physician density (8%). Table 10 provides a descriptive statistics of the variables in model [2].

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[87] The reader should be reminded that the sample of OECD countries includes: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, The Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.
The total number of observations drops off to 217 since for Belgium there exists no data on the potential years of life lost (PYLL) for the period 1990-2000.

Table 10: Descriptive statistics of the international analysis

Variables	Unit of measurement	Minimum	Median	Maximum
Total Health Expenditure per capita (THE)	US $ PPP/inhabitant	912.3	1732.8	3050.0
GDP per capita (Y)	GDP US $ PPP/inhabitant	12616	21148	42763
Physician density (PHY)	Physicians/1'000 inhabitants	1.5	2.8	4.5
Density of acute beds (BEDS)	Beds/1'000 inhabitants	2.4	4.1	10.1
Under 19 (A19)	Under 19/population	0.197	0.247	0.365
Over 80 (A80)	Over 80/population	0.022	0.035	0.050
Unemployment rate (UN)	Unemployed/working population	0.005	0.085	0.314
Potential Years of Life Lost (PYLL)	Preventable deaths occurring before 70 years, all health causes	2936	4323	6925

The econometric softwares used for the estimation of model [2] are Limdep NLOGIT version 3.0 and Stata/SE 8.0. Table 11 reports the results obtained with the OLS model, FEM, REM, and Kmenta model.

Table 11: Econometric results of the international analysis

Coefficient	OLS	FEM	REM	KMENTA
Constant	3.228***	1.487	1.567	1.313*
	(0.829)	(1.248)	(1.152)	(0.744)
GDP	0.603***	0.625***	0.642***	0.641***
	(0.053)	(0.062)	(0.056)	(0.048)
Physicians (PHY)	0.201***	- 0.135	0.013	0.152***
	(0.037)	(0.093)	(0.070)	(0.029)
Acute beds (BEDS)	0.051**	0.162***	0.150***	0.026
	(0.025)	(0.036)	(0.034)	(0.026)
Under 19 (A19)	0.025	- 0.114	- 0.149	- 0.481***
	(0.095)	(0.113)	(0.105)	(0.079)
Over 80 (A80)	0.215***	0.021	0.086	0.118***
	(0.050)	(0.072)	(0.064)	(0.039)
Unemployment (UN)	0.009	0.011	0.012	0.021**
	(0.012)	(0.014)	(0.013)	(0.008)
Potential Years of Life Lost (PYLL)	- 0.171***	- 0.063	- 0.097	- 0.098**
	(0.059)	(0.106)	(0.095)	(0.050)
National Health System, decentralized (NHSd)	0.087***	-	0.115*	0.113***
	(0.020)		(0.062)	(0.021)
Social Health Insurance, decentralized (SHId)	0.268***	-	0.222***	0.264***
	(0.020)		(0.064)	(0.026)
Social Health Insurance, centralized (SHIc)	0.140***	-	0.124*	0.123***
	(0.023)		(0.068)	(0.027)
Time (T)	0.003	0.014***	0.009***	0.005***
	(0.002)	(0.004)	(0.003)	(0.002)
Adj. R^2	**0.893**			
Within R^2		**0.780**	**0.776**	
Between R^2		**0.673**	**0.871**	
Overall R^2		**0.684**	**0.858**	

*, **, ***: significantly different from zero at the 90, 95 and 99% confidence level.

The null hypothesis of the Lagrange Multiplier test is not accepted, thus implying the presence of an error component, hence that REM/FEM should be preferred to OLS.

Subsequently the Hausman test result shows that the REM is to be preferred to the FEM, implying that the regressors are exogeneous and that the individual error term (α_i) is uncorrelated with X. Furthermore, the REM is more interesting because it is possible to observe the impact of the three dummy variables characterizing the overall organization of the health care system and its degree of (de)centralization on total health expenditure per capita. Being these dummies time-invariant, the FEM does not allow to estimate their coefficients. Moreover, the within variation of some parameters in equation [2] is very low and this is reflected in the low efficiency of the parameters estimated with FEM.

In order to verify if heteroskedasticity and autocorrelation are present two statistical tests have been performed: a likelihood-ratio test for panel-level heteroskedasticity, and a Wooldridge test for autocorrelation in panel data set.[88] The result of the likelihood-ratio test shows that the hypothesis of homoskedasticity is not accepted at the 95% confidence level, thus implying that there is panel-level heteroskedasticity.[89] Furthermore, the Woolridge test for autocorrelation shows that there is first order autocorrelation. However, the reader should be reminded of the fact that it is not easy to choose between a REM and a Kmenta model, because the REM also partly considers heteroskedasticity (through the individual effect, α_i), and serial correlation (in the REM it decays over time, while in Kmenta it is constant over time). As Filippini et al. (2005) suggest, it is important to consider the within variation of the variables. If there is a considerable

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[88] Note that the commands for performing the Bartlett's test for homoskedasticity and the Durbin-Watson test for autocorrelation, as suggested by Baltagi (1986), work in Stata 8.0 only with time-series models and not in a context of panel data analysis. Therefore, these other two tests, suitable for panel data and the econometrical software Stata, have been implemented. A more comprehensive discussion of the Wooldridge test can be found in Wooldridge (2002). Moreover, Drukker (2003) presents simulation evidence that this test has good size and power properties.

[89] As a complement to the likelihood-ratio test for panel-level heteroskedasticity, I applied a modified Wald test for groupwise heteroskedasticity in cross-sectional time-series FGLS regression model, and the results obtained confirm that there is heteroskedasticity.

percentage of it, then FEM or REM may be more appropriate. Given the low within variation of many covariates in the model, more importance has been given to the Kmenta results, which confirm the ones of the REM.

For these reasons, the following comments are based on the estimations obtained with the Parks-Kmenta model. However, note that all models presented in table 11 support these results. Being model [2] a log-log model coefficients amount to elasticities.

Per-capita GDP has a positive impact on total health expenditure. In particular, the elasticity of GDP is set below one, thus confirming that health is not a luxury but a necessity good. The GDP coefficient is positive and highly significant at the 99% confidence level. A 10% increase in the Gross Domestic Product implies a rise in total health expenditure of 6.4%. Other international studies have shown that GDP is the main driving force among the determinants of health costs; however, there is little consensus regarding the elasticity with respect to per-capita health expenditure. The estimated elasticity seems to have decreased since the beginning of the 1980s, possibly reflecting cost-containment policies (Herwartz and Theilen, 2003). In general, earlier studies using cross-sectional data found elasticities greater than one (Newhouse, 1977 with elasticity ranging from 1.13 to 1.31; Leu, 1986 with 1.21; Gerdtham et al., 1992a with 1.33). More recent studies using panel data and a wider range of explanatory variables suggest elasticities near to or less than unity (Gerdtham et al. 1998 with 0.74).

The second socio-economic variable, namely unemployment rate, is also a positive determinant of health expenditure. When unemployment increases of 10%, health expenditure is likely to increase of 0.2%. Labor market variables, such as unemployment or female labor market participation (used as a proxy for informal care) are usually not significant in the literature studies. These results, however, show that unemployment is a constraint for the improvement of the public sector and by extension the health care sector. It is directly linked to health status (psychological distress, anxiety and

depressive symptoms, disability, major activity limitations, alcoholism, and drinking-related problems), and hence influences health expenditure (EU, 1995).

The structure of the population contributes to total health expenditure; an ageing population is often linked to augmenting health costs (OECD, 1996): the percentage of old-old people (aged above 80) has a positive sign and shows a high significance. A 10% increase in the over 80 causes 1.2% rise in health expenditure. The under 19 population contributes to keep health costs down. The coefficient is statistically significant and negative. Probably the reasons for this negative coefficient are that a younger population is normally healthier, with a lower risk factor, and with no need of expensive treatments. The effects of population age structure are insignificant in most studies, although Blomqvist and Carter (1997) find the number of persons over 65 to be significant.

With respect to supply-related variables, the physician density is significant at the 99% confidence level and shows that the higher the density of doctors in a country, the higher the total per-capita health costs. In more detail, a 10% increase of physician density causes 1.5% increase of costs. The supply of doctors appears to be associated with higher outlays also in other studies (Gerdtham et al., 1992a and b). This may be especially the case for countries where doctors are paid on a FFS basis. The variable of the density of acute beds does not turn out to be statistically significant.

The variable measuring the Potential Years of Life Lost is a proxy for the ability of a health care system to prevent deaths that should be avoidable below a specific age. It is thus a determinant that implicitly gives information about the outcome and efficiency of a health care system. It turns out to be negative and statistically significant at the 95% confidence level. The idea is that when the mortality amenable to health care increases then health expenditure tends to diminish. In other words, it is assumed that when deaths

that are, a priori, preventable, rise it is because less money is spent in the health care system to forestall such events.

The dummy variables representing the overall organization of the health care system are very interesting. Note that the dummy NHSc (National Health System, centralized) is not included in the model, because it is taken as the reference group. They are all significant at the 99% confidence level and positive. What is immediately striking is that, in general terms, SHI countries tend to experience higher health expenditure. When looked at their level of decentralization, decentralized SHI countries reveal a higher level of health costs. The dummy for SHI centralized countries is also positive but the coefficient is lower than the decentralized counterparts. The dummy for NHS decentralized states is positive and its coefficient is the lowest and implies that, controlling for all other factors, decentralized national health systems can reduce expenditure. Of course, this does not imply that NHS are preferable to SHI. As stressed several times in this work, the focus of the analysis is on the determinants of the level of health expenditure per capita. Hence NHS may well be cheaper but at the same time they might be offering less in terms of consumer choice and quality of care (these characteristics are not captured by the model). These results, however, confirm Leu's (1986), who also found that NHSs can reduce health expenditure. SHI countries may experience more costs because the specific relationship between the population, the contribution collector, the third-party payer and the providers distinguish them from the other typologies. Sickness funds in social health insurance countries, for example, are often self-governed and the government has limited control over them; the population has usually a rather free access to providers; etc. These features can be summarized around the four principles of solidarity, pluralism, participation, and choice. States with a SHI scheme are characterized by a multiple presence of actors and stakeholders that all have a decision power within the system. Having a decentralized setting can add another

layer of complexity to the whole system, augmenting transaction costs and costs related to the set-up of contracts. NHSs avoid such complexity in their structure: their usual framework consists of being single-payer, planned and integrated systems. The choice of provider is normally restricted through gatekeeping. Even when NHS are decentralized they evidently succeed in spending less resources than SHI countries. Hence, the econometric results confirm the descriptive analysis pursued in Chapter 3. When the features of health care systems of different countries are put together with other determinants in an econometric model, the results obtained are similar.

The time variable is positive and statistically significant at the 99% confidence level. One can imply thus that there is a tendency in all countries towards higher health expenditure, and one of the factors leading to this is the presence of medical technology growth on the health care market (OECD, 1996).

4.7   Conclusions

This chapter has shed light on the determinants of health care expenditure for the decade 1990-2000 in 20 OECD countries. After having analyzed the level of decentralization of the health care system for all the countries in the sample, they have been clustered in four different groups: NHSc, NHSd, SHId, and SHIc.

The empirical part has highlighted the main determinants of health expenditure and has taken into consideration socio-economic factors (GDP and unemployment), demographic factors (the age structure of the population), health supply-related factors (density of acute beds and physicians), the Potential Years of Life Lost viewed as a means measuring the outcome of the system, and three dummy variables specifying the overall organization of the health care system and its degree of (de)centralization. The

question investigated was whether decentralized countries have been capable to spend less financial resources on health care than centralized health care systems. As the theory of fiscal federalism states, it is presumed that decentralization of public services and goods allows for more efficiency, so that financial resources are managed according to the real needs of the population and wastes are contained. However, as previously explained in this study, the concept of decentralization has been linked to the concept of a NHS or a SHI system.

The econometric results show that SHI decentralized countries have a higher level of health care expenditure compared with the other countries. One possible reason is that SHI states tend to have a health care system with many stakeholders and actors involved. Relationships between the state and providers are all regulated through the use of contracts. Adding decentralization to a SHI set-up implicitly augments the difficulties connected to the establishment of such contracts, so that transaction costs tend to be higher. Furthermore, there might be problems with the coordination of all actors involved in health care and it is plausible to think that with marked decentralization one experiences duplication of specific health technologies that would presumably not happen in a context of centralization.

The estimations report that the level of costs in SHI centralized countries has a minor tone than decentralized SHI states. Having a centralized funding and management of the health care systems probably avoids problems connected to cost shifting between different sub-layers of government.

NHS decentralized nations appear to be better in containing health costs. Although they also experienced a rise in their expenditure, this latter has been consistently lower than SHI countries. It must not be forgotten that NHS are vertically integrated and single-payers; this simplifies financial fluxes between different actors.

The other principal results are the following:

- Socio-economic variables influence positively health expenditure. A higher GDP and unemployment rate swell health expenditure.

- The structure of the population impacts on health expenditure. The increasing percentage of old-old people is a challenge affecting all developed countries and is one of the main reason that cause health costs explosion (OECD, 1996).

- Supply-related factors make health costs grow. A higher density of physicians increases health expenditure. More doctors may cause problems related to supply-induced demand, especially in those countries where the payment system is per fee-for-service (Gerdtham et al., 1998).

CHAPTER 5: HEALTH CARE EXPENDITURE AND DECENTRALIZATION. EMPIRICAL ANALYSIS OF THE SWISS CASE

5.1 Introduction

The Swiss Confederation is a federal republic composed of 23 cantons, three of which are divided into semi-cantons. Thus, Switzerland is nowadays made up of 26 entities that are sovereign in all matters that are not specifically designated the responsibility of the Swiss Confederation by the Constitution. Each canton has its own Constitution and a comprehensive body of legislation stemming from it. The precept of the Swiss decentralization is that public policies and their implementation should be allocated to the lowest possible tier of government capable of achieving the designated targets.

The two main characteristics of the Swiss political system are liberalism and federalism (Linder, 1994) and these principles also manifest themselves in the Swiss health care system, resulting in complicated structures and processes involving public as well as private health care provision and financing (European Observatory on Health Care Systems, 2000). The most striking change in the recent decades that has come about is the enactment of the Federal Health Insurance Law (FHIL) that entered into force on January 1st, 1996. Since then, health insurance is mandatory for all residents, premiums are community-rated, and the package of health care benefits is defined by law. Notwithstanding the fact that compulsory health insurance (CHI) covers a broad and well-defined range of services, there exist significant differences in the regional health care expenditure. These differences partly emerge because the organization of the health

care system is under the responsibility and control of the cantons. Decentralization of competences and of expenditure responsibility has caused significant differences among cantons with respect to per-capita public spending, the regulatory settings, the role of private versus public sector, and the level of production capacity.

The high degree of federalism, which assigns health affairs to local governments, has caused consistent differences in the level of public expenditure and health insurance costs between cantons. As we shall see in this chapter, the level of per-capita socialized health expenditure (SHE) varies widely in Swiss cantons: the percentage of SHE of the canton with minimum costs is equal to 37% of the health expenditure of the most expensive canton. The same differences apply in the policy of subsidies. In order to reduce the social impact of per-capita health insurance premiums, both the Confederation and cantons intervene with means-tested subsidies. However, the conditions of eligibility to be a subsidy recipient vary greatly between the 26 cantons. This is another consequence of the marked level of federalism in the country: cantons have autonomy over the definition of principles on which premium subsidies are based, and they are also free to fix the cantonal (and federal) budget available for premium subsidy.

Two interesting aspects emerge for research: first, to perform an econometric analysis on the determinants of SHE; and second, to understand whether the above mentioned differences can somehow reflect local preferences. To test this latter hypothesis of local tastes two explanatory variables are introduced in the econometric model: first, an index of direct democracy, which represents a direct expression of citizens wherein all inhabitants can directly participate in the political decision making process. Second, a dummy variable for French- and Italian-speaking cantons is introduced and should capture differences owing to cultural specificities.

This chapter aims at analyzing the determinants that lead to differences in the per-capita socialized health expenditure among the Swiss cantons. In particular, the chapter will develop as follows: section 5.2 will put forward the major characteristics of the Swiss health care system as it emerged after the 1996 reform; section 5.3 will review the present literature on intra-national analyses of health expenditure determinants in order to place these results into proper context. The model specification and comments to the results will be outlined in sections 5.4 and 5.5. Section 5.6 concludes and provides some considerations of the impact of federalism on the organization of the health sector.

5.2   The Swiss health care system

In 2002 health care costs amounted to SFr 48 billion (US$ PPP 25 billion). This value corresponds to 11.2% of Gross Domestic Product (GDP). Switzerland still continues to rank first among European countries with respect to per-capita health expenditure (US$ PPP 3445)[90]. Outside Europe, the United States of America is the only developed country that spends more per capita, reaching an amount of US$ PPP 5267. Since 1996 all permanent residents on the territory have to take out a compulsory health insurance (CHI) from one of the officially acknowledged health insurance companies, which premiums are community-rated (that is, a premium is the same for each person that buys an insurance policy with a particular company within a canton or sub-region of a canton regardless of individual risk rating)[91]. In addition, citizens are offered a supplementary health insurance (SUHI) policy.[92]

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[90] Data are taken from OECD Health Data 2004.
[91] It is important to note that the FHIL introduced the obligation to take out an insurance policy. Prior to the 1996 reform, individuals were responsible for purchasing statutory health insurance from accredited

The following paragraphs will outline the organizational structure and management of the system, its financing model and allocation of competences between the Confederation and the cantons, and the consequences of federalism on the system itself.

5.2.1   Organizational structure and management of the system

The Swiss health care system was constituted in 1911 and underwent a major reform in 1996 through the enactment of the FHIL. The following six points introduce the principal features of the system:

1. It is the responsibility of cantons to organize the provision of health care within a defined geographic area with a population that varies from 35,000 to 1.2 million inhabitants. The cantonal law on health and health related matters regulates the organization of the health care system of the canton in question. Each canton has then a Department of Public Health that manages and coordinates its health care system. The cantonal responsibilities encompass the elaboration of health and hygiene policy; the setting of fee schedules negotiated and agreed between service providers and associations of health insurance funds in each canton; the planning, operation and construction of hospitals; the regulation of hospital external care; the management of medical and paramedical schools; the registration and control of drugs; activities in the field of health prevention and promotion; and regulation of patients' rights. The cantonal health laws confer the

insurance companies (as many as 98% of the population did have cover under this voluntary system) and premiums were risk related. However, rising health care costs and lack of solidarity between insurance companies made reform necessary.

[92] The supplementary health insurance policies known as "private" and "semi-private" cover additional benefits that are left out by compulsory health insurance, i.e. free choice of hospital doctor and superior level of hospital accommodation (in private rooms or rooms shared just with another patient).

responsibility for health policy on the municipalities, too. Usually the task of providing nursing home care for certain vulnerable groups is delegated to the municipalities, with a special emphasis on home care, residential and nursing homes for elderly people and community-based mental health services.[93] Due to the political and legal system that gives cantons such broad responsibilities in health matters, there is little space of maneuver for the Confederation and little power of influence or coordination. There is no national Ministry of Health, and several governmental offices within different departments are concerned with health and matters related to health services. The most important one, the Federal Office of Public Health, has regulatory and supervisory functions. Its responsibilities are directed towards the control of communicable diseases and epidemics, and regulations pertaining to sera and vaccines, poisons and food quality. Another important office is the Federal Office of Social Insurance, which officially recognizes the health insurers and regulates and controls their activities. In general, federal authorities lack the formal competence to adopt national health strategies (Wyss and Lorenz, 2000). Notwithstanding the fact that the Confederation plays a more active role in the health care sector since 1996, there has not been a formal devolution of competences from the cantons to the upper level, which would have required a change in the Constitution, nor a redistribution of public health expenditure for a greater engagement of the Confederation (Crivelli and Filippini, 2003).

2. The overall number of insurance companies has decreased massively over the last decades, from 1100 in 1960 to 93 in 2002. Since not all of these companies

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[93] Many municipalities have subsequently delegated responsibility for nursing home care to independent organizations. Larger municipalities and associations of municipalities often run their own residential and nursing homes for elderly people.

were active in all cantons consumers can choose between 51 to 72 companies in each canton. Only those insurance providers who comply with the requirements set out by the FHIL and are registered with the Federal Office of Social Insurance may provide CHI. There is free competition among the health insurance companies on the level of the premium but not on the services provided; these are defined by law. The main requirements are that no profit should be made from CHI activities, they all have to offer the same mandatory and uniform health insurance policy (i.e. covering the same package of benefits), and they are not allowed for any reason to refuse an individual's application for CHI coverage. The health insurance companies have banded together to form cantonal and intercantonal associations that negotiate fees with service providers and the cantonal government. All health insurance companies are members of Santésuisse (the Swiss Association of Health Insurance Companies). Since 1996 all the registered insurance companies established a joint organization, known as Foundation 18. Its responsibilities are to meet the financial obligations of insurance companies in financial difficulty, to be responsible for risk adjustment between the registered insurance companies and to meet international obligations for reimbursing health care services.[94]

3. To reduce the social impact of per-capita premiums, both the Confederation and cantons subsidize entirely CHI premiums through tax-financed allocations. These public transfers are used to provide a means-tested subsidy, which varies according to the income and wealth of the insured person. The financing of these

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[94] This is the case for example of a German citizen insured by a sickness fund in Germany but who uses health services in Switzerland. The joint organization pays the service provider and is later reimbursed by the German sickness fund. For people insured in Switzerland and using health care services in Germany, the joint organization reimburses the German funds based on a special agreement between the two countries. This procedure is nowadays valid with all members of the EU (since the bilateral agreements CH-EU came into force in 1999).

subsidies is ensured to the extent of two-thirds by the Confederation and one-third by cantons, through general taxation. Fund from the Confederation are subsequently distributed to cantons via a specific matching grant.[95] Each canton's financial participation is established on the basis of an equalizing allocation system, in consideration of its financial strength (Dafflon, 2004). Finally, the task of implementing the subsidy distribution system lies solely within the single cantons. Prior to the FHIL in 1996, these subsidies were directly given to sickness funds, with the result that the level of premiums for all subscribers was reduced, but these subsidies were not targeted on the needy people. Now subsidies are given to people with low or medium income to help them pay their CHI premiums. In some cantons the percentage of the population that is subsidized in this way is over 40%. Cantons have some autonomy to define the principles on which premium subsidies are based. They are also free to choose the level at which to fix the cantonal (and federal) budget available for premium subsidy. The consequence of this is that there is a high variation in the subsidy policy among the 26 cantons, and people who are eligible to get financial aid in one canton, may not be able to get it in another one.

4. CHI policies cover well defined benefits, in particular they cover outpatient care, including a wide variety of providers, hospital care (100% coverage on general ward of a public or publicly subsidized hospital in the enrollees' canton, except for a co-payment of Sfr. 10, US$ PPP5.15, per day), prescription drugs listed, preventive vaccinations, prescribed treatments in health resorts, and alternative

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[95] Bailey (1999) offers a comprehensive discussion on the different types of grants. Note that as from 2008 the specific matching grants should be replaced by a lump-sum general grant. In the future the budget of the Confederation for the program of premium reductions will total "25% of the compulsory health insurance expenditure for 30% of the population" and will be allocated to the cantons without regard to their own contribution.

medicine. In addition, there are also some contributions to certain preventive tests, home care, glasses and medical devices, as well as transportation and salvage expenses. The insured can freely choose the service provider (general practitioner, specialist) because of compulsory contracting. CHI policies can be freely changed by customers up to twice a year. There is a wide variety of compulsory policies. Most insurance policies require customers pay a fixed amount of the costs covered by the CHI in the form of a deductible. The individual may then choose the level of deductible that (s)he wishes to pay but her/his premium will clearly be less if a higher level of deductible is chosen. By contrast, there is no deductible for HMO plans that closely manage access to providers.[96] A further possibility is to choose a "bonus" plan, a five-year policy that rewards enrollees who do not use insurance with substantial reductions in premiums. Supplementary health insurance (SUHI) covers additional treatments and check-ups, all drugs, extended home care, provides generally higher benefits and up to 100% universal coverage worldwide. Its most important feature is that it provides customers with access to the private ward of all public and private hospitals in a one or two-bedroom and free choice of physician in the hospital. SUHI premiums are normally risk-related and currently there is no tax incentive to take out such an insurance policy. The number of people with SUHI is actually declining due to the rising level of premiums charged and the expansion of the

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[96] Note that managed care policies in Switzerland were not so widespread as, for example, in the USA. German- speaking cantons have tended to opt for managed care plans more often than French- and Italian-speaking cantons (Federal Office of Public Health, 2004). Managed care plans offered nowadays in Switzerland are a somewhat weaker version of managed care programs normally provided in other countries (for instance, in the US). For example, the selected physicians of managed care plans are remunerated with a fee-for-service scheme, not much of an incentive for a family doctor to reduce his services, and hence costs.

CHI package that makes the supplementary insurance less attractive (European Observatory on Health Care Systems, 2000).

5. Both public and private hospitals, as well as nursing homes, offer inpatient care that is reimbursed in the bulk of cases on a per diem basis (some cantons started introducing AP-DRG, all patient diagnosis-related groups, payments as from 2000 on). Hospitals and nursing homes can only be reimbursed for services under CHI if they are included in the canton's official list of hospitals and nursing homes. These lists are drawn up as part of the canton's planning exercise. In most cantons the criteria used as the basis for planning are limited to bed requirements, but the basic objectives of the planning process are not always explicit and may vary between cantons. Planning goals might include maximizing efficiency, containing inpatient expenditure, providing sufficient high quality inpatient health care, or meeting the needs of patients. The canton is responsible for planning, but some cantons collaborate on this issue. Nevertheless, a supraregional or even nationwide consensus about hospital planning does not exist at present (European Observatory on Health Care Systems, 2000). Moreover, only public and selected private hospitals are eligible to have financial support by the canton.[97] On the contrary, private hospitals must finance their costs totally through health insurers' reimbursements.

6. Ambulatory health care services are provided by independent general practitioners and specialists, and are reimbursed according to a fee-for-service (FFS) scheme. Licensed physicians are free to choose their location for

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[97] Cantons are mainly involved in the financing of capital costs. The capital investment costs for public hospitals are usually fully financed by cantonal tax revenues. The capital investment, education and research costs for public and publicly-subsidized hospitals are usually fully financed by cantonal tax revenues. The cantons also finance at least 50% of the running costs of these hospitals. Since 1996, cantons can impose fixed budgets on public or publicly-subsidized hospitals.

outpatient care. Government is restricted to control the formal educational requirements for licensing. However, the lack of regulation governing where doctors can set up their practice results in large variation in the density of doctors per inhabitant. Physicians' fees for CHI in the FFS sector are negotiated between their union and Santésuisse on the cantonal level and are overviewed by the government. By contrast, fees are not regulated with respect to the SUHI. Physicians can bill only for services covered by the insurer and may not supplement their bills for compulsory enrollees. In the FFS sector every licensed physician can bill every compulsory insurance policy (enforced contracting)[98], i.e. the insurer cannot choose preferred providers except in the context of managed care, while providers cannot refuse treatment to any patient with a CHI policy.

5.2.2   The financing model

The funding model of the Swiss health care system is considered particularly regressive.[99] By taking a look at table 12 one observes that overall, only one-third of the financing is collected in an income-dependent way. This concerns public financing (28% of total health expenditure) and social insurance contributions (6.1%). Furthermore, it must be highlighted that public contribution is predominantly provided by cantons and municipalities, whereas the Confederation contributes only 20% to public health care budget.

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[98] In other words the enforced contracting principle states that all medical practitioners, who are authorized to practice as independent professionals in Switzerland have the right to be party to a framework contract with any of the sickness funds.

[99] For a comprehensive review of equity issues in health care please refer to Wagstaff et al. (1999).

The other two-thirds of financing are collected in an income-independent way. In particular, this concerns: CHI premiums (26.3%), SUHI premiums (9.6), co-payment for insured services (5.3), and out-of-pocket expenditure (23.7%).

It is worth to note that the proportion of costs borne by citizens is considerable. By summing up the quota for co-payment of insured services and of out-of-pocket expenditure one reaches the threshold of 29% of total health expenditure.

Table 12: Health care financing in Switzerland, 2002

	Sfr. million	In %
Public financing of direct costs (in particular subsidies to public hospitals)	8596.9	17.9
Public subsidies to CHI premiums and nursing homes' daily	2848.4	5.9
Other public subsidies to social insurance	1968.7	4.1
Total expenditure financed through GENERAL TAXATION	*13414*	*28.0*
Accident insurance	1413.6	2.9
Other social insurances	1533.6	3.2
Total expenditure financed through PAYROLL TAXES	*2947.2*	*6.1*
CHI premiums	12634.9	26.3
SUHI premiums	4615.5	9.6
Co-payment for insured services	2541	5.3
Out-of-pocket payments	11351.1	23.7
Other private financing	477.7	1.0
Total expenditure PRIVATELY FINANCED	*31620.2*	*65.9*
TOTAL HEALTH EXPENDITURE	*47981.4*	*100.0*

Source: Federal Office of Statistics (2004a)

The Swiss health care system is in sharp contrast with all the other European countries, where health care expenditure covered by income-dependent levies vary between 65% and 80%. Two conclusions can be drawn from this:

1. The Swiss health care system does not attach much importance to the principle of equity of financing.[100] The fact that CHI premiums are community-rated and that

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[100] According to the World Bank Institute (2000), vertical equity means that "those who are in different circumstances with respect to a characteristic of concern for equity should, correspondingly, be treated

citizens finance directly (or through SUHI) 39.6%[101] of the total health expenditure, leads to a highly regressive financing model.[102] Above we mentioned that, in order to ease the financial hardship associated with per-capita health premiums, the government provides means-tested subsidies to low-income residents. It is estimated that about one-third of the Swiss population benefits from these subsidies. On account of federalism, subsidy policies vary from one canton to another, creating large regional differences.[103]

2. The presence of a large number of third-party payers makes it extremely complex to follow the financial flows among the stakeholders in health policy, which in turn makes it more difficult to manage health care expenditure in general, and can lead to a cost-shifting problem. Since nobody is entirely responsible for the global health care budget, it is sometimes easier for a single financing body to obtain a reduction in its own financial share, rather than to engage in a more rational use of total health care spending. This encourages shifting costs at the expense of another payer, rather than looking for solutions allowing for an effective rationalization of expenditure.

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differently". Vertical equity implies that citizens with greater economic means have to pay more. Therefore, the larger the share of progressive (or at least income-proportional) financing, the greater the vertical equity of the financing of a health care system.

[101] This percentage results from the sum of SUHI premiums, co-payment for insured services, out-of-pocket financing and other private funding.

[102] It has to be noted that a popular initiative ("Health must be affordable") was called in December 2002 and subsequently rejected by voters in May 2003. The goal of the initiative was to replace the current per-capita contributions for health care coverage, mainly by linking the contributions for the CHI to income. The initiators argued that almost 80% of the population would have benefited through lower net payments. They also envisaged a better cost control through more coordination and centralization at the federal level. The reform was overwhelmingly rejected because the new financing via income-linked contributions was deemed to be an effective tax increase and thereby posing an obstacle to economic growth.

[103] For example in 2002, a household with two children with an annual gross income of SFr 70,000 (US$ PPP 36,082), had a medium health premium incidence of 8.2% of the disposable income across the country, with a minimum of 1.2% in canton Valais and a maximum of 13.8% in Canton Geneva.

5.2.3   Federalism and its impact on the health care system

The independence of each canton has led to a situation where 26 comprehensive health care delivery systems are operating, all more or less self-governing (Wyss and Lorenz, 2000). Decentralization of competences has created a series of significant inter-cantonal differences with respect to public financing, regulatory settings, and production capacity.

Socialized health expenditure, which covers both public expenditure and CHI outlays, in 2002 ranged from US$ PPP 2952 in Geneva to US$ PPP 1104 in Appenzell-Innerrhoden. It is important to stress that public health expenditure is given by the sum of the following two elements:
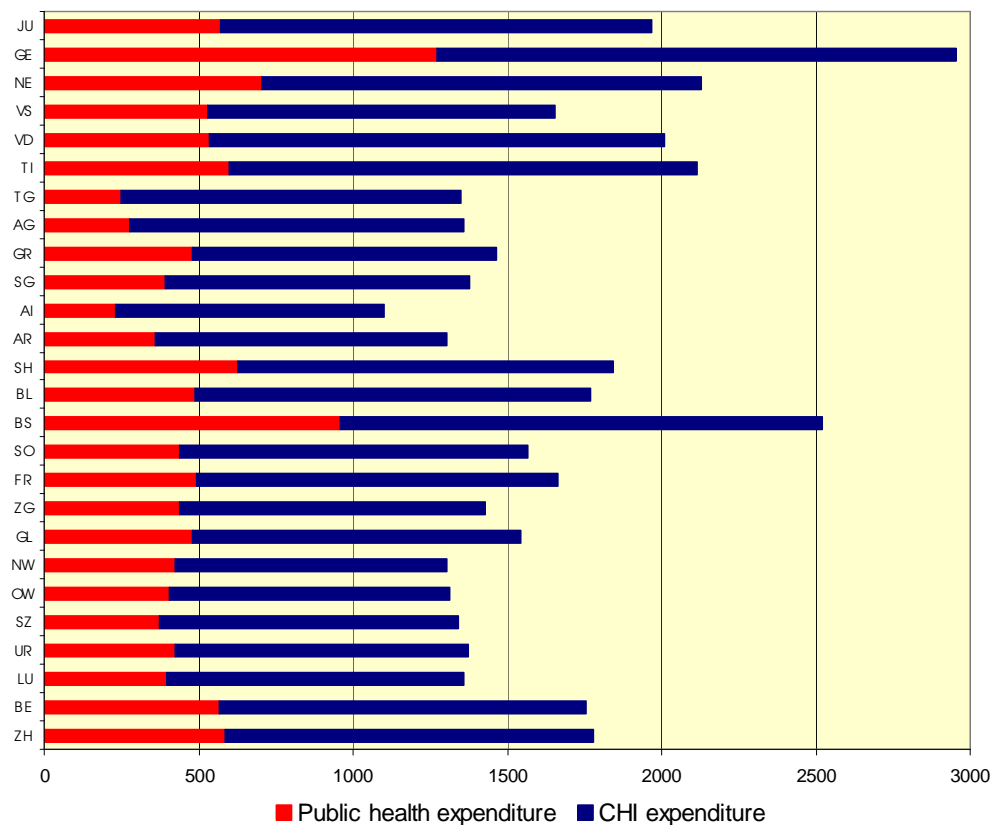
1. Cantonal and local direct financing for the provision of health care services to the population. In particular subsidies to public and private hospitals, subsidies to nursing homes and home care services, and participation in hospitalizations outside the home canton.

2. Means-tested subsidies as a financial support for needy citizens.[104]

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[104] With the enactment of the FHIL in 1996 Switzerland tried to establish a social goal: the purpose of state subsidies is to keep the ratio between net premiums and taxable income below 8% for the poorest citizens. In general, the burden of premiums has increased considerably in the last few years and fewer and fewer cantons achieve this social goal.

Figure 8: Per-capita socialized health expenditure in Swiss cantons (2002), US$ PPP
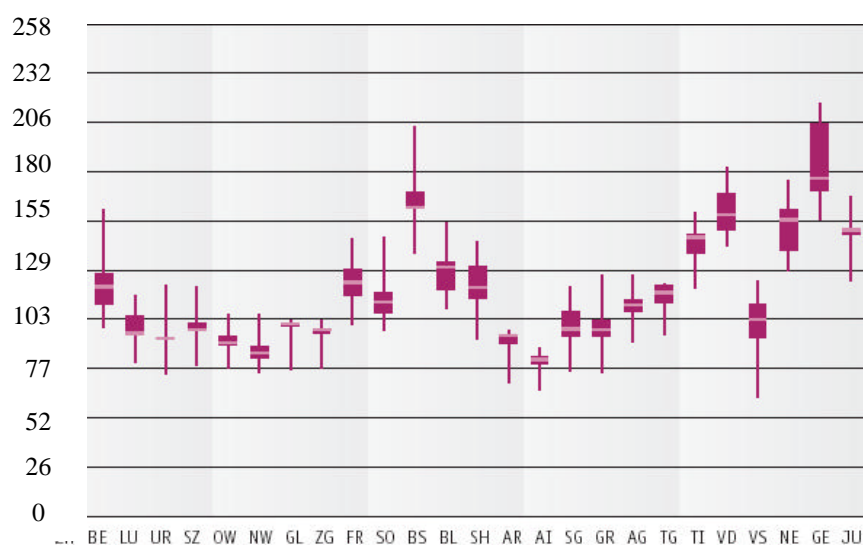

Source: Federal Office of Statistics (2004b) and Federal Office of Social Insurance (2004)

Considerable differences are acknowledged in the overall level of CHI premiums both among and within cantons. Figure 9 represents inter-cantonal and intra-cantonal differences in adult premiums in 2002 and this is explained through box-plots. Box-plots show the median, maximum and minimum premium values for each canton and the concentration of the distribution of premiums paid by 50% of the cantonal population; the box-plot rectangle shows the dispersion between the first and the third quartile.

The highest premium was paid in Canton Geneva (more than US$ PPP 216 per month), the lowest was paid in Valais (less than US$ PPP 67). The highest cantonal average premium (US$ PPP 187) is found in Geneva, whereas the lowest average premium (US$ PPP 82) can be found in Appenzell-Innerrhoden.

Figure 9: Inter- and intra-cantonal differences in adult premiums (2002), US$ PPP

Source: Federal Office of Social Insurance (2002)

There is also some variation between cantons with respect to the frequency of institutional forms in the hospital sector. Some cantons (Ticino, Thurgau, Geneva and Appenzell-Ausserrhoden) exhibit a higher number of private hospitals, which cannot rely on cantonal subsidies and must finance themselves by means of health insurance

premiums.[105] Therefore, the higher the presence on the territory of private hospitals, the less the financial involvement of cantonal governments.

The distribution of health resources is also very much diverse across the country. In Switzerland, there are no direct regulations at either federal or cantonal level for manpower and structural inputs into cantonal health care systems. So it is not surprising that cantons show considerable differences with respect to the number of practicing physicians and acute beds. As table 13 clearly shows there is a real gap with respect to the density of medical practices. The data range from more than 300 medical practices per 100,000 inhabitants in Basel-City and Geneva to 100-110 practices per 100,000 inhabitants in Obwalden, Nidwalden, and Appenzell-Innerrhoden, whereas the national average is 173.[106]

The density of acute beds is also unequally dispersed. The national average is 359 acute beds per 100,000 inhabitants, but three cantons exceed this average by over 35% (Ticino: 523 beds; Appenzell-Innerrhoden: 544 beds and Basel-City: 717 beds), and 1 canton has a density over 35% lower than the national average [Zug: 206 beds].

The same is true also for the density of paramedical staff per inhabitant or of pharmacists, where similar inequalities are observed between cantons. This unequal distribution of human resources and health facilities across the country is to some extent

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[105] For further knowledge please see Federal Office of Statistics (2002a).
[106] All doctors who have obtained a Swiss university degree in medicine and have at least two years' hospital experience are automatically entitled to practice independently and to invoice for their services at the expense of the CHI, according to a fee-for-service scheme. The health insurance companies are obliged to cooperate with all the medical practitioners entitled to practice independently within the framework of the coverage provided for by the FHIL. Service providers can be excluded from the reimbursement of the CHI only in the case of citizens who have voluntarily joined a managed care insurance program. Of course this payment system could easily lead to a phenomenon of supply-induced demand. Note that since 2004 the same reimbursement system applies to all cantons, thanks to the introduction of "Tarmed". With Tarmed each medical performance has the same value in all cantons in terms of points. The value of the point can then change from one canton to another; in this way medical fees are still different among cantons. The goal of Tarmed was to be neutral from a cost viewpoint.

the result of arrangements and agreements between cantons for providing specialized services in the hospital sector.

Table 13: Density of medical practices and acute beds per 100,000 inhabitants (2002)
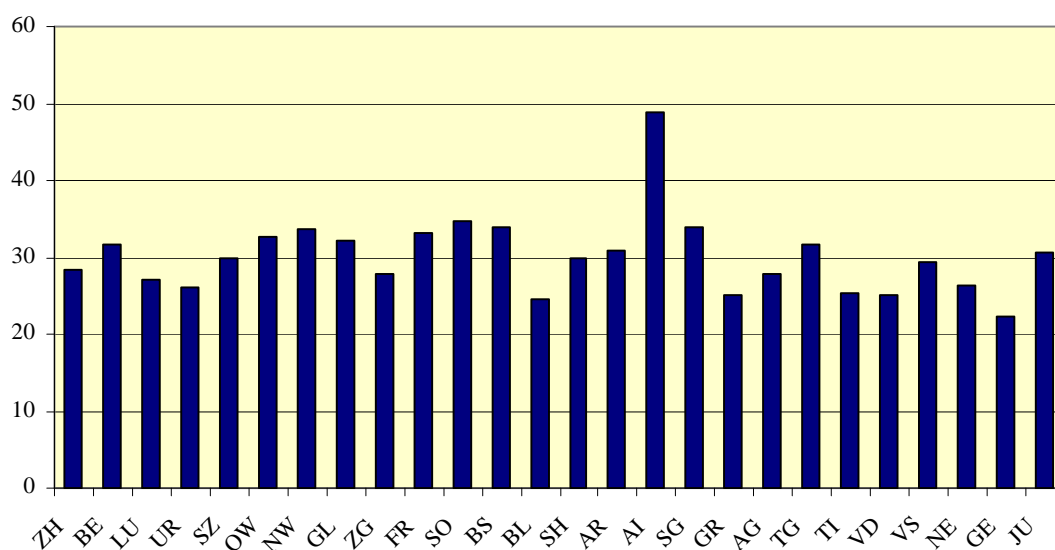
	AG	AI	AR	BE	BL	BS	FR	GE	GL	GR	JU	LU	NE
Acute beds	347	544	237	391	352	717	323	392	339	359	419	291	396
Medical practices	141	109	150	200	192	353	145	332	126	166	149	147	203

	NW	OW	SG	SH	SO	SZ	TG	TI	UR	VD	VS	ZG	ZH
Acute beds	258	274	330	296	330	236	236	523	418	449	284	206	374
Medical practices	116	107	155	186	156	120	126	193	132	236	166	160	225

Source: Federal Office of Statistics (2002a)

Swiss cantons also show differences with respect to the mortality rate amenable to health care, defined by Nolte and McKee (2003) as deaths from certain causes that should not occur in the presence of timely and effective health care. These differences are depicted in figure 10.

Figure 10: Mortality rate amenable to health care for the Swiss cantons, 1995-1999[107]

Source: Department of Public Health of Canton Ticino (2003)

It is straightforward that federalism has created marked differences between local governments and what is probably really missing today in Switzerland is more central coordination and power. The strong independence of cantons has brought to a situation where 26 almost self-governing entities coexist. Nevertheless, one acknowledges that the strong cantonal competencies have promoted some bi- or multilateral agreements among cantons. These agreements seek to bring more coordination in the system and more organization in the different procedures. With respect to multilateral agreements

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[107] The mortality rate represented here is the rate calculated without ischemic heart disease for people with less than 75 years.

for example there are three main fields where cantons have renounced their authority and delegated it to inter-cantonal bodies. This is the case of the Conference of Health Directors, the Inter-cantonal Agency for the Control of Drugs, and the training of the labor force pursued by the Swiss Red Cross.[108]

Some cantons (as for example Basel-City and Basel-Land; Geneva and Vaud) have established bilateral agreements in order to develop coordination in planning and management. These models mainly aim at the integration of the available hospital resources in neighboring cantons, and potential referral possibilities, so to achieve efficiency and efficacy in the allocation of increasingly scarce financial resources.

5.2.4   Discussion

The Swiss health care system is facing nowadays serious challenges such as increasing health care costs, a surplus in medical facilities, and rising levels of demand due to an ageing population, expectations and advancements of new technology available (OECD, 2004). In comparison to other highly developed countries like Germany, the United Kingdom, and the United States, the Swiss population generally has more health care resources available (OECD Health Data 2004). However, because of lack of central coordination and the existence of 26 different health care systems, there are situations

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[108] The Conference of Health Directors coordinates and obtains national agreements mainly on technical issues (such as inter-cantonal compatibility of the health care systems); the Inter-cantonal Agency for the Control of Drugs is mainly concerned with registering medicines and controlling manufacturing and distributing policies of drug companies. However, it is not in such a position to initiate health policies, as for example the promotion of generics or essential drugs. The Swiss Red Cross trains the labor force in the health care sector, elaborates a list with the different types of medical professions, sets standards and defines requirements. Despite these tasks, each canton still maintains its own regulations for some paramedical activities and auxiliary professions, and thus recognizes the professions according to its own standards.

where sophisticated and expensive hospital infrastructure is available in two places only a few kilometers apart, but in different cantons or covering only a relatively small population of some thousand people (Wyss and Lorenz, 2000). The level of service provision is thus in some areas inefficiently high. If the positive side of this is that queuing is not a major problem in Switzerland, that shortages of care do not happen even in rural areas, and that the quality of care is generally considered high, the negative side is that from an economic point of view there is a waste of resources, which are inefficiently used, especially at the hospital level.[109]

As stated by Hacker (2004) Switzerland, with its strong federalism and tradition of the use of popular referendums by organized groups, has long been characterized by the most anemic government role in health policy of all European nations. The Swiss case shows that in a complete decentralized system, reforms may be particularly hard to take place. Not surprisingly, the whole health care system underwent only two major changes in its organization in the last century; one in 1911 that established a system of health insurance (based on the German model), and the other one in 1996 (FHIL), which introduced fundamental objectives to strengthen solidarity and to tackle the problem of rising health care costs. Federal authorities thus lack the formal competence to adopt a national health strategy. Cantons are not only constitutionally independent, but tend to guard their political and legal rights jealously (Wyss and Lorenz, 2000). Such a decentralized health care system can block any attempt of reform because the cantons themselves are too strong and independent, and any change of the system at the national level is hard (if almost impossible) to achieve because this would mean that all 26 independently operating units agree.

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[109] For an interesting discussion about hospital efficiency, see Filippini and Farsi (2003).

Those countries that are going through a decentralization process in their health care system (or have just taken this route) should bear in mind that such an extreme decentralization, such as the one experienced in Switzerland, may give rise to two problems: first, difficulties in establishing national priorities through coordination of its autonomous sub-units as these latter often follow their specific interests (Darras, 1997), and second, regional disparities. Yet it must be underlined that there are some advantages connected to a highly decentralized health care system. There are more health care resources available and more proximity to the needs expressed by the population; the system experiences no implicit rationing (such as waiting lists); there are no shortages of care since the supply of health services is ample; the access to the health system has no barriers and the patient is empowered because (s)he has free choice over providers; finally, if all these previous conditions are fulfilled, it is likely that the public satisfaction over the health care system will be high.[110]

5.3   The literature

A body of literature has recently started to examine the determinants of health care expenditure within the same country. Of course, such a research allows to eliminate a number of acknowledged problems that are typical in international comparison studies. Among them there are, in fact, the different definitions existing on what constitutes health care expenditure, even if it must be stated that these differences have tended to vanish in these very last years because of a better harmonization of data collection (especially among OECD countries). Another avoided difficulty in intra-national

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[110] Kocher and Oggier (2001) offer an interesting insight on the level of public satisfaction over the health care system in a sample of 15 countries.

analyses is the problem connected to the construction of exchange rate conversions for data.

The pioneer work in this field is Di Matteo and Di Matteo's (1998), who carry out an interesting study on the determinants of health care expenditure in the ten provinces of Canada for the period 1965-1991, thus using pooled time-series cross-section data.[111] Their model is estimated with the pooling technique of Kmenta (1986), or cross-sectionally heteroskedastic and timewise autoregressive model. The income elasticity of real per-capita provincial government health expenditure is lower than one at 0.77. Hence, this result suggests that health care expenditure is indeed more a necessity than a luxury good. The proportion of provincial population aged over 65 is significant and has a large impact, as well as federal transfers.[112]

Giannoni and Hitiris (2002) pursue an intra-national analysis where the regional impact of health care expenditure in Italy is taken into consideration. The authors particularly shed light on the fact that the central government's policies for rationalization and cost containment of the growth of health care expenditure in combination with decentralization in the administration and provision of health care have resulted in interregional inequality, aggravating the existing regional divergence. The econometric model has been estimated with pooled time-series and cross-section data over the period 1980-1995 for 20 Italian regions. The parsimonious empirical model, in which real per-capita public health expenditure is regressed against, includes the following explanatory variables: per-capita real GDP, the ageing population, number of beds per hospital, and

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[111] Di Matteo and Di Matteo decided to analyze the Canadian regional differences in health care expenditure mainly because of the fact that it is the provinces that deliver health care to people.
[112] It is worth to remind the reader that in Canada, both the federal and the provincial governments finance public expenditure on health. The federal government's contribution to provincial health care funding has declined over the years as the mechanisms for transferring money to the provinces were modified.

the number of medical and non-medical personnel per hospital.[113] The results highlight that the main factors influencing per-capita public health expenditure is income, the ageing population, and the structural characteristics of health care supply.

Rüefli and Vatter (2001) analyze the differences in health care expenditure among the cantons of Switzerland over the period 1994-1999. An Ordinary Least Squares (OLS) model is used, and the results obtained show that city cantons tend to experience higher health care expenditure than rural ones; both supply and demand factors, such as the density of hospital beds and of doctors, an over-the-average unemployment rate, and a feeble cantonal social network tend to increase costs as well. Rüefli and Vatter (2003) later present an empirical investigation of differences in health care expenditure between the 26 cantons of Switzerland from 1994 to 1999. In their work they take into consideration not only the classical demand and supply-related determinants of health care expenditure, but they also include political factors such as strength of left and right-wing parties in each canton, index of direct democracy, total number of popular referendums, and an index of local autonomy. The empirical part calculates bivariate correlation and OLS model. The major driving forces of health care expenditure on the demand side are the level of cantonal income, high unemployment rates, and the proportion of senior citizens. With respect to supply side cost-driving factors Rüefli and Vatter find that the number of practitioners (GPs and specialists) as well as the overall level of medical service provision increase expenditure. Finally, as regards the political factors, general state interventionism is decisive, although only so far as public spending is concerned (i.e. health insurance costs are left out). Cantons with a general tendency towards interventionism rather than market-oriented problem-solving in politics stick to

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[113] The number of beds per hospital is taken as a measure of economies of scale: other things being equal, the more beds per hospital, the larger the hospital, and the lower the expenditure. The number of medical and non-medical personnel per hospital is taken as a measure of productivity improvement: the more the staff per hospital, the higher the expenditure, and vice versa.

this pattern in health care policy, too. As a result, public health care expenditure is rather high.

Crivelli, Filippini and Mosca (2003) investigate differences in health care expenditure between Swiss cantons using a panel data set. Data cover 26 cantons over the years 1996-2000, and the methods used for estimation are the OLS model and the Random Effects Model (REM). The income elasticity is not significant, but the other major variables carry the expected sign and are statistically significant: the most important factors explaining health care expenditure are the density of physicians and acute beds, the age structure of the population, and the unemployment rate. The main differences between the study of Rüefli and Vatter (2003) and Crivelli et al. (2003) regard the time period analysis and the usage of econometric models. Crivelli et al. examine subnational health care expenditure from 1996, when the implementation of the FHIL started in the whole country.[114] Moreover, the public health expenditure and the health insurance costs are summed and analyzed as a single independent variable. The research is more "empirically-oriented" as it makes use of two econometric techniques for panel data (OLS and REM). Rüefli and Vatter instead keep the values for public spending and insurance costs separated, they calculate bivariate correlations, and subsequently isolate those variables with the highest explicative power and run OLS regression analyses. Note that political factors in Rüefli and Vatter analysis turn out to be statistically not significant for insurance costs, and only partly significant for public expenditure, hence implying that they cannot be regarded as the sole source of explanation.

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[114] There was a change in the accounting of health insurance costs in 1994, and since 1996 the Federal Law on Health Insurance (FLHI) effectively took place. Hence the period of analysis comprised between 1996 and 2000 makes data more reliable and comparable, given the fact that all health insurers adapted their accountancy systems.

Di Matteo (2005) analyzes the macro determinants of health expenditure in the United States and Canada. The study focuses on the assessment of the impact of age distribution, income, and time using American state-level and Canadian province-level data. The method of estimation used is OLS. Ageing population distributions and income explain a relatively small portion of health expenditure when the impact of time effects, which is a partial proxy for technological change, is controlled for. The estimated size of the time indicator variables effects imply that aggregate health expenditures will continue to surge quite independently of an ageing population and rising incomes.

Spycher et al. (2003) also make an interesting analysis of intra-national variation in the field of accident insurance annuities. They perform their study on the 26 Swiss cantons for the period 1990-2000, using a panel data set. The variables employed are: cantonal index of financial power, unemployment rate, share of over 60 in the population, number of doctors and psychiatrists, degree of urbanization, quota of foreigners in the canton, strength of left-wing parties, linguistic region, and the ratio of government expenditure to gross national product. The results show that the elderly, high unemployment and urbanization rate increase the accident insurance annuities; while a higher index of cantonal financial power and less government expenditure favors minor accident insurance annuities.

It is clear from the previous description that subnational studies avoid a number of difficulties typically present in international comparison researches. For example, the inherent differences in the definitions of what actually constitutes health care expenditure is eliminated; the construction of exchange rate conversions for the data disappears; the analysis is exclusively focused on a particular country that shows the same or similar features, thereby allowing us to deal with a single health care system

that permits to compare subnational units more easily.[115] Yet there are also some general problems in this ad-hoc approach: the weak theoretical base for the determinants of health care expenditure, as underlined by Gerdtham and Jönsson (2000), still persists; the distinction between supply and demand factors in health care still remains unclear; and the assembling of data, especially about non-medical determinants of health (such as food, alcohol, and tobacco consumption, body mass index, and air quality) is in most cases hard to find at the subnational level. Consequently these factors must be left out of the analysis.

5.4   Model specification

An important stage in the model specification is choosing the proper set of explanatory variables to include in the model as well as formulating the hypothesis concerning the direction of their impact on the dependent variable. In this study a single equation approach is used to model the per-capita cantonal expenditure on health care services. Per-capita health expenditure depends on some economic, demographic and structural factors. Following the model specifications used in previous studies and taking into account the availability and quality of data for the Swiss cantons, the following parsimonious cantonal health care expenditure model is specified:

$$\text{SHE}_{it} = f\,(\text{Y}_{it},\ \text{UN}_{it},\ \text{PO}_{it},\ \text{A75}_{it},\ \text{A05}_{it},\ \text{MO}_{it},\ \text{DP}_{it},\ \text{DDI}_{it},\ \text{PHY}_{it},\ \text{BEDS}_{it},\ \text{DLAT}_{it},\ \text{T}) \qquad [1]$$

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[115] In international comparison studies countries show differences in the overall organization of the health care system, and not only in those demand- and supply-related factors that drive health care expenditure. By focusing on a national level, such difficulty is wiped off.

where subscript *i* stands for the canton and *t* for the year. Moreover,

SHE_{it} =   Socialized per-capita health expenditure (that is obtained by the sum of the per-capita public health expenditure and expenses covered by the compulsory health insurance);

Y_{it} =   Per-capita income;[116]

UN_{it} =   Unemployment rate, calculated as the ratio of the unemployed over the working population;

PO_{it} =   Poverty rate, calculated as the percentage of households with an income below 50% of the average cantonal income;[117]

$A75_{it}$ =   Percentage of population older than 75; [118]

$A05_{it}$ =   Percentage of population aged under 5;

MO_{it} =   Mortality rate amenable to health care. This rate is based on the concept that deaths from certain causes should not occur in the presence of timely and effective health care. It represents a variable that partly captures the quality of the system;[119]

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[116] Cantonal incomes represent a regionalization of the Swiss national income. The components of this aggregate figure are split with various keys. All values used refer to the national concept. Territorial delimitation of incomes is thus based on the canton of residency of the owners of the factors of production. Cantonal incomes include all incomes accruing to the resident economic agents in exchange for their participation in a process of production, be it inside and outside of the canton. For more information please visit the website:
http://www.bfs.admin.ch/bfs/portal/en/index/themen/volkswirtschaft/volkseinkommen_der_kantone/blank/kennzahlen/pro-kopf-einkommen.html

[117] See Connolly and Munro (1999) for a discussion on different measures of poverty, and Crémieux et al. (1999).

[118] The percentage of population over 75 years is utilized in order to analyze the effect of old-old adults on socialized health care expenditure. Furthermore, this variable was previously used in Gerdtham et al. (1998).

[119] See Nolte and McKee (2003) for a more detailed discussion on this issue.

DP_{it} = Population density, calculated as the ratio of the population to the canton's area;

DDI_{it} = Cantonal index for direct democracy. Direct democracy is defined in terms of individual political participation possibilities. In Switzerland, institutions for the direct political participation of citizens are present both at the federal and cantonal level. However, the direct democratic rights on the level of cantons are very heterogeneous. Therefore the index, calculated by Frey and Stutzer (2000), measures the different barriers to citizens entering the political process. These difficulties in accessing the political system are then evaluated on a six-point scale: 'one' indicates a high barrier thus "less democracy", 'six' a low barrier thus "more democracy". Hence, reaching a score close to six signifies that citizens in that particular canton manage to express in a greater way their preferences over public issues;[120]

PHY_{it} = Density of physicians per 100,000 inhabitants;

$BEDS_{it}$ = Density of hospital acute beds per 100,000 inhabitants;

$DLAT_{it}$ = Dummy variable that takes the value 1 if the canton is French- and Italian-speaking (Latin languages), 0 otherwise;

T = Time variable that should capture the cost differences over time owing to changes in medical technology or to other factors that may influence the development of health costs at the national level.

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[120] The four main legal instruments having a direct effect on the political processes in Switzerland are: 1) popular initiatives to change the canton's Constitution 2) popular initiatives to change the canton's law 3) compulsory and optional referendums to prevent new law or change one 4) compulsory and optional referendums to prevent new state expenditure. Barriers are in terms of: 1) the necessary number of signatures to launch a popular initiative or referendum 2) the legally allowed time span to collect signatures 3) the level of new expenditure per head allowing a financial referendum. Please refer also to Trechsel and Serdült (1999) for additional reading.

Estimation of equation [1] requires the specification of a functional form. The log-log form offers an appropriate functional form for answering questions about the elasticities of health expenditure, besides being one of the most used in the literature.[121] The major advantage, of course, is that the estimated coefficients amount to elasticities, which are therefore assumed to be constant.

By applying the log-log functional form, expression [1] can be written as

$$\ln SHE_{it} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln UN_{it} + \beta_3 \ln PO_{it} + \beta_4 \ln A75_{it} + \beta_5 \ln A05_{it} + \beta_6 \ln MO_{it} + \beta_7 \ln DP_{it} + \beta_8 \ln DDI_{it} + \beta_9 \ln PHY_{it} + \beta_{10} \ln BEDS_{it} + \beta_{11} DLAT_{it} + \beta_{12} T + \varepsilon_{it}$$

[2]

5.5   Data and estimation results

The econometric model outlined in equation [2] is composed of a combination of time-series and cross-section data for 26 cantons and covers the period 1996-2002.[122] These data were obtained from annual publications of the Swiss Federal Office of Statistics and Santésuisse, an umbrella association of all health insurance companies in the country.[123] Data regarding the mortality rate amenable to health care were obtained by the Department of Public Health of Canton Ticino, and the direct democracy index was

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[121] See for example Gerdtham et al. (1998) and Di Matteo and Di Matteo (1998).

[122] It is worth pointing out that some variables of the model show a high within variation while some others a low within variation. In particular, SHE has a within variation of 14%, Y of 8%, UN of 45%, A75 of 5%, A05 of 20%, DP of 0%, PHY of 2%, and BEDS of 40%.

[123] For more information please refer to their websites:
http://www.bfs.admin.ch/bfs/portal/de/index.html (Federal Office of Statistics)
http://www.santesuisse.ch/de/index.html (Santésuisse).

taken by the empirical work of Frey and Stutzer (2000). For the conversion of socialized health expenditure and income the annual consumer price index (CPI) of Switzerland was used.

Some variables included in model [2] are time-invariant; this means that only one value is available for the whole period analyzed. Such variables are: poverty rate, mortality rate, index of direct democracy, and dummy variable DLAT. Table 14 provides statistical details of the variables employed in the estimation of model [2].

Table 14: Descriptive statistics of the intra-national analysis

Variables	Unit of measurement	Minimum	Median	Maximum
Socialized Health Expenditure per capita (SHE)	SFr/inhabitant	1526.8	2591.3	5727.0
Income per capita (Y)	SFr/inhabitant	30191	43479	82804
Unemployment rate (UN)	Unemployed/working population	0.003	0.024	0.078
Poverty rate (PO)	% of households with an income below 50% of the average income	0.127	0.173	0.237
Over 75 (A75)	Over 75/population	0.049	0.069	0.107
Under 5 (A05)	Under 5/population	0.042	0.058	0.080
Mortality rate (MO)	Rate of mortality amenable to health care	22.39	29.84	48.76
Density of Population (DP)	Population/canton's area	26.10	206.10	5267.9
Direct Democracy Index (DDI)	Index from 1 (minimum) to 6 (maximum)	1.75	4.45	5.69
Physician density (PHY)	Physicians/100'000 inhabitants	76.20	152.35	357.15
Density of acute beds (BEDS)	Beds/100'000 inhabitants	109	369	1098

As paragraph 4.5 clearly described, there are different econometric techniques for modeling panel data. Here the same approaches will be applied to model Swiss per-capita health expenditure. The most widely used approaches are: the Ordinary Least Squares (OLS) model, the fixed effects model (FEM), the random effects model (REM), and the Parks-Kmenta approach, technically known as the "cross-sectionally heteroskedastic and timewise autoregressive model" (Kmenta, 1986). The Swiss model

has also been estimated with the instrumental variable two-stage least squares random effects (IV) technique in order to tackle the possible problem of endogeneity of the physician density. In fact, the physician density might be endogeneous in the sense that doctors might decide to set up their own practices there where medical needs are higher. The model IV uses as instruments the following three variables: the logarithm of the number of students enrolled at the faculty of medicine according to their canton of residency, the logarithm of the number of students according to the canton where the faculty of medicine is present[124], and the logarithm of the average of the density of cantonal physicians for the period 1991-1995. The IV estimator uses the Balestra and Varadharajan-Krishnakumar (1987) implementation, because it is computationally less expensive, and thus more attractive, than Baltagi's. The results confirm the ones of the other models, and the coefficient of the physician density is positive and statistically significant, thus reinforcing the conclusion that physicians can swell health care expenditure.[125]

The econometric softwares used for the estimations are Limdep NLOGIT version 3.0 and Stata/SE 8.0. Table 15 reports the results obtained with the four models.

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[124] Faculties of medicine are present in the following cantons: Basel City, Bern, Fribourg, Geneva, Vaud, Neuchâtel, and Zurich.

[125] Considering the difficulty of analyzing the problem of endogeneity the Swiss model has also been checked with the method of estimation put forward by Hausman and Taylor (1981), which allows some covariates to be correlated with the unobserved individual random effect. The model specified with the Amemiya-MaCurdy (1986) estimator confirms the results obtained with the other models. The econometric results are reported in Annex 5.

Table 15: Econometric results of the intra-national analysis

Coefficient	OLS	FEM	REM	IV	KMENTA
Constant	4.828*** (0.746)	7.522*** (1.213)	8.425*** (0.941)	7.792*** (1.031)	6.427*** (0.614)
Income (Y)	0.187*** (0.052)	- 0.115* (0.069)	- 0.082 (0.061)	- 0.131* (0.069)	0.053 (0.041)
Unemployment (UN)	- 0.011 (0.018)	0.008 (0.012)	0.011 (0.011)	0.014 (0.012)	0.008 (0.008)
Poverty (PO)	- 0.069 (0.061)	- -	0.056 (0.134)	0.078 (0.137)	0.095* (0.057)
Over 75 (A75)	0.354*** (0.069)	0.227* (0.121)	0.351*** (0.093)	0.276*** (0.105)	0.422*** (0.050)
Under 5 (A05)	- 0.503*** (0.106)	- 0.097 (0.144)	- 0.231* (0.127)	- 0.101 (0.152)	- 0.558*** (0.096)
Mortality (MO)	- 0.199*** (0.061)	- -	- 0.240* (0.133)	- 0.128 (0.152)	- 0.168*** (0.043)
Density of Population (DP)	0.040*** (0.010)	0.209 (0.138)	0.071*** (0.021)	0.048* (0.026)	0.041*** (0.007)
Direct Democracy Index (DDI)	0.036 (0.043)	- -	0.100 (0.110)	0.153 (0.116)	0.128*** (0.044)
Physicians (PHY)	0.139** (0.061)	0.159 (0.111)	0.179** (0.090)	0.393** (0.160)	0.147*** (0.056)
Acute beds (BEDS)	- 0.010 (0.026)	- 0.018 (0.015)	- 0.010 (0.015)	- 0.016 (0.016)	- 0.018* (0.011)
French- and Italian-speaking cantons (DLAT)	0.319*** (0.031)	- -	0.275*** (0.079)	0.254*** (0.081)	0.295*** (0.038)
Time (T)	0.019*** (0.006)	0.037*** (0.004)	0.032*** (0.004)	0.033*** (0.004)	0.020*** (0.003)
Adj. R^2 *Within R^2* *Between R^2* *Overall R^2*	**0.895**	**0.860** **0.453** **0.488**	**0.857** **0.879** **0.876**	**0.853** **0.868** **0.866**	

*, **, ***: significantly different from zero at the 90, 95 and 99% confidence level.

In order to screen for individual effects one uses the test of the Lagrange multiplier for the presence of an error component. The test result suggests that there is an error component and that as such the random effects model or fixed effects model are to be

preferred to the ordinary least squares model (OLS). Furthermore, the Hausman test for all coefficients was applied to verify the superiority of the REM with respect to the FEM. The test statistics favored the random effects model. The Hausman test checks the null hypothesis that x_{it} and α_i (the individual specific error term) are uncorrelated. The difference vector $\beta_{FEM} - \beta_{REM}$ reveals that the difference in coefficients is not systematic, thus implying that the REM is to be preferred and that $E(\alpha_i \mid X) = 0$, namely the exogeneity of the regressors. Moreover, the within variation of several variables in the model is not high and this turns out in a quite low efficiency of the parameters estimated with the FEM.

The likelihood ratio test that checks the panel-level heteroskedasticity point in the direction of a heteroskedastic structures of errors, thereby suggesting the error disturbances of the Parks-Kmenta model.[126] The Wooldridge test for autocorrelation in panel data does not accept the hypothesis of no first order autocorrelation. On the basis of these results the Parks-Kmenta model is preferred to the REM. Therefore the following comments are based on the Kmenta approach. Note however that the results reported by the REM and Kmenta are similar. Most of the results reported in table 15 are satisfactory. The bulk of coefficients is statistically significantly different from zero and carry the expected sign. The log-log transformation allows to consider the estimated coefficients as elasticities.

The estimation with Kmenta points out that the income elasticity is negative and is not significantly different from zero. The negative sign of the coefficient for income can be explained by the fact that SUHI expenditure is not taken into consideration in the dependent variable of the model (SHE). SUHI contracts are normally taken out by

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[126] This result is confirmed when applying the modified Wald test for groupwise heteroskedasticity in time-series cross-sectional FGLS regression model.

wealthier people because such insurance policies tend to be rather expensive, and as such it is likely that SUHI payments are positively correlated with income. However, such an effect is not captured in the model because SHE is composed by two elements, public and CHI expenditure, that cover together about two thirds of total health expenditure. One can thus plausibly presume that the higher the average income of a canton, the lower the SHE, because individuals opt for SUHI.[127]

The unemployment rate is not statistically significant. Because unemployment is a larger phenomenon in French- and Italian-speaking cantons, it is possible that this effect has been captured by the dummy variable DLAT. The coefficient for the cantonal poverty rate is significantly different from zero at the 90% confidence level.[128] The relatively low significance of this coefficient can be explained by the fact that the poverty rate in Switzerland, measured with this indicator, is lower than in other European countries, and thus this influences with a minor tone health expenses. In those cantons where the poverty rate is higher, health expenditure are influenced positively.

The coefficient for the percentage of population over 75 is positive and significantly different from zero at the 99% confidence level. This result confirms the hypothesis that an older population tends to cause higher health expenditure, because of the increased incidence of illnesses as insanity or other chronic diseases, as well as proximity to the time of death of the elderly.[129] A 10% increase in people aged over 75 would cause a 4.2% increase in health costs. The percentage of population under 5 also turns out to be statistically significant. The negative sign of the coefficient implies that a younger

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[127] Note that the system has changed since 2001. This implies that from 2002 private insurances do not have to cover anymore part of the basic services.
[128] For a more detailed discussion of this issue please refer to Federal Office of Statistics (2002b).
[129] See Zweifel at al. (1999).

population tends to cause lower health costs because young people are healthier and have less chronic diseases, which are thus less expensive to cure, than the elderly.

The level of health expenditure is also conditioned on the mortality rate amenable to health care. This is an important variable because it can be considered as a proxy for the outcome of a health care sector. As expected, it has a negative sign and is statistically different from zero in both models. If the canton's mortality rate amenable to health care decreases by 10%, then health expenditure increases by 1.7%. This result shows that cantons with low mortality rate have higher per-capita health expenditure, that is, more financial resources are spent in the system to forestall such preventable events.

Another important factor explaining the model is the cantonal population density. This variable has been used as a proxy for the urbanization level in each region of Switzerland. It is highly significant and carries a positive sign. The reason for this is that the supply of medical services is higher in populated areas than in rural zones, and this causes lower transaction costs for people to access the medical infrastructure. This, in turn, might increase the probability of success of supply induced demand strategies. So the more populated is a specific region, the higher its per-capita health expenditure.

As the previous section should have made clear, the direct democracy index represents a variable introduced in the model to test an hypothesis of the local public choice theory. Preferences expressed by citizens are captured. In the public choice literature it is argued that the more citizens can express their preferences, the more public goods will be fashioned according to their tastes (see Oates, 1972 and 1999; Leu, 1986; Frey, 1994).[130]

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[130] The local public choice theory indicates voice as one of the means through which individuals can and do express their preferences over public issues, especially in a decentralized context. Note that, in order to capture the federal dimension, other variables have been previously tested and introduced in the model (dummy variables for cantons, dummy variables for cantons with universities, dummy variable for cantons with university hospitals, and dummy variables for cantons exporting and importing patients respectively) but they all turned out statistically not significant and therefore were not included in the final model.

The coefficient of this variable is statistically different from zero at the 99% confidence level and carries a positive sign. A positive sign implies that in those cantons where direct democracy is stronger, health care expenditure is generally higher: it thus seems that citizens influence political decisions but this is not translated in gained efficiency for cost control.[131] It is possible that people act in a "not-so-wise" way and that, for instance, decide to have specific health structures that are maybe available in another canton just a few kilometers away.

The elasticity of physician density has a positive value. In other words, an increase in the number of physicians causes an increase in the per-capita cantonal health care expenditure. A 10% increase in physician density is linked with a 1.5% increase in health costs. This latter result is also confirmed by previous studies (Gerdtham et al., 1998) that show a positive and significant relationship between health care expenditure and the density of doctors when paid FFS. This result may thus highlight the supplier-induced demand problem. In fact, doctors in Switzerland are paid through a fee-for-service scheme; not much of an incentive to contain the number of services given to patients.[132]

The density of acute beds is statistically significant at the 90% confidence level and has a negative sign. The dummy DLAT is significant at the 99% confidence level. It shows that French- and Italian-speaking cantons exhibit higher per-capita socialized health care expenditure than German cantons, and this result confirms previous findings of Rüefli and Vatter (2001). Various studies show that health care-related behavior, such as the demand for tobacco, medicaments and pharmaceuticals, eating habits or the extent of

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[131] It is interesting to bring to the fore the fact that in Switzerland popular initiatives and referendums are a central part of the democratic life of the country, and they are very frequently used. Citizens can also call a referendum on issues like cantonal hospital planning.

[132] For further details on the supplier-induced demand theory see McGuire (2000) and Domenighetti et al. (1997).

physical exercise vary between the different cultural regions (Federal Office of Statistics, 2000). Moreover, regions also differ in the perception of the social policy. Whereas most German-speaking areas prefer a liberal, subsidiary state that incorporates self-responsibility, the French-speaking part of the country rather follows a state-centered model of welfare, placing more responsibility of the state as far as the provision of public services, such as health care, is concerned (Freitag, 2000).

The time variable is positive and significantly different from zero. Hence, there is a tendency in all cantons toward higher per-capita health expenditure. This phenomenon might be explained by the presence on the market of new and more expensive technologies, and by the fact that the package of health care benefits covered by the FHIL has expanded in the 1990s.

5.6   Conclusions

This chapter has shed light on the most important characteristics of the Swiss health care system, which is highly decentralized and assigns responsibilities for health matters to the 26 regional entities. The descriptive analysis has pointed out that in Switzerland, where the principle of federalism is historically very deep-rooted and an integral part of the set-up of the democracy, such decentralization of the health care sector has given rise to significant differences between cantons in terms of per-capita health care expenditure, equity of financing, and structure of the supply. The current system has many complexities: first, it is a social health insurance system with a multiplicity of health insurers that compete with each other but offer the same health benefits package (defined by the FHIL). Competition is not working properly: such a homogeneous good (health coverage) should be on the market with a unique price. Notwithstanding the

existence of the FHIL, health premiums vary widely between and within cantons. Second, the Swiss case shows that a decentralized system is by no means able to guarantee an equitable system when looked at from a national viewpoint. Health premiums are community-rated and thus do not reflect the personal income of the insured. In order to correct this inequity of financing there exists important financial flows among the principal stakeholders. This involves the presence of a large number of third-party payers, such as the Confederation (that intervenes with subsidies), cantons, municipalities, social insurances (accident insurance, invalidity insurance, and others), and the supplementary health insurance. As a consequence the system becomes heavy, complex and not transparent. Third, on account of federalism the situation is characterized by a federal/national health insurance (it is, in fact, defined by the FHIL that was passed by the Confederation) managed with different approaches by the 26 cantons. The consequence of this strong decentralization is the presence of territorial disparities in the public financing, regulatory settings, and production capacity. And it is in this context that it would be desirable to have more coordination among cantons, in order to establish national priorities. And in particular a more active intervention of the Confederation could help toning down these current marked regional differences and finding the adequate instruments to control effectively the growth of health care expenditure.

In order to better understand the regional differences in public health expenditure and CHI premiums an econometric analysis was performed with the estimation of a double logarithmic linear model of per-capita cantonal health care expenditure over the years 1996-2002. The goal is to highlight the determinants that explain such territorial differences. The model determines the responsiveness of per-capita expenditure to cultural, demographic and structural characteristics of cantons. The results demonstrate that:

- Demographic factors matter. The percentage of the elderly and of young people in the population cannot obviously be influenced by health policies. However, it is my belief that, faced with an ageing population exhibiting regional differences, a more active financial intervention by the central state would be highly desirable in order to avoid future fiscal distress at the cantonal level.

- The French- and Italian-speaking cantons of Switzerland show higher per-capita socialized health expenditure. This implicitly suggests that there are different patterns of consumption of health care services between the linguistic areas of the country.

- Physicians, when matched with a fee-for-service scheme, can balloon health care expenditure. A central, and thus more credible, control over physician density might help reduce the increase in expenditure. Alternatively, the Confederation could eliminate the enforced contracting rule, a federal regulation that forces sickness funds to contract with every physician. By so doing, the level of competition would augment and this would both reduce FFS remuneration and regional disparities in physician density.

- The higher the population density in one area, the higher per-capita health outlays. Where the availability of health care infrastructure is high and barriers to access health services are practically non-existent, it is possible that supply induced demand strategies influence people's behavior.

The higher the citizens' participation in the political decision making process, the higher the socialized health care expenditure. It thus seems that in those cantons where citizens are given a bigger chance to express their preferences, they presumably ask for more health services that, in turn, increase the level of health expenditure.

CHAPTER 6: CONCLUSIONS

6.1   Lessons learnt from decentralization

A single word "decentralization" has emerged to be a catch-all term in these very last years when one refers to changes applied to the organization of the health care system. Both from a theoretical and empirical viewpoint there is not a clear evidence that decentralizing some functions to sub-layers of government brings with itself a better outcome. Meaningful tensions are created by the basic trade-off of decentralization, namely the realization of economies of scale and the internalization of externalities, on the one hand, and the consideration of local and heterogeneous preferences, on the other hand. Such a trade-off clearly hampers the set-up of defined recommendations whether a country should better centralize or decentralize health policies. This involves that such decision should be taken case-by-case, namely country-by-country, and implicitly suggests that decentralization is not a panacea equal for all countries.

The main stated arguments in favor of decentralization are the capacities of local governments to shape policies according to the needs of their population, the idea that jurisdictions would act like private entities and enter into competition, and that citizens are protected by the danger of the Leviathan. Critics of fiscal federalism point their finger at the non-exploitation of economies of scale and scope if jurisdictions are too small, at the "race-to-the-bottom" possibilities, at the lack of managerial skills and the possible danger of lobbying in such a small environment. The empirical evidence is also mixed and sometimes inconclusive. What emerges is that decentralization of specific policies and programs should be accompanied by a consciousness raising of some

criteria and preconditions, the absence of which may maintain the status quo, that lead to its intended beneficial outcomes.

As reviewed in Chapter 3 different historical, cultural, administrative and political circumstances have led to varying practices of decentralization in the health care sector across OECD countries. Here a short list of decentralization preconditions and considerations, gleaned from country experiences, is given:

- Decentralization of health competencies should be accompanied by a clear delineation of responsibilities among the different stakeholders, with these responsibilities formally codified in legislation, regulations, or other binding instruments (Rondinelli 1999).

- Changes in the roles and responsibilities for the different actors in the health care sector, particularly those for local government health officials, should be accompanied by training and plans for building capacity (LaFond and Brown 2003; Pokharel 2001).

- In some countries management and planning health responsibilities are assigned to local governments but these latter have limited revenue-generating capacity. This is a weak form of decentralization because the sub-layers of government are likely to remain reliant on intergovernmental transfers from the center. Problems related to soft budget constraint can possibly arise. Local financing should be linked to managerial and planning health responsibilities so that "local politicians can deliver on their promises and bear the costs of their decisions"(Rondinelli, 1999: Pokharel, 2001).

- The degree of decentralization varies considerably among the OECD countries analyzed. However, although health federalism implies a diminished role of the center, certain functions (health regulations, standards and accreditation) are

likely to be most efficiently undertaken by the central government, which has better capabilities to monitor and enforce such tasks.

- Rondinelli (1999) points out that information relating to the costs of services provided, delivery options, and available resources should be known to local communities so that decision making can be informed and meaningful. By having such information at disposal the local population is aware of the public sector performance and this allows people to react properly, if necessary.

- Much of the success of health federalism depends on the development of coordination mechanisms and structures for learning the different experiences from each other, and improving the quality and performance of the overall health care system.

It is thus clear from the previous description that decentralization per se cannot clearly be a cure for all the ills of a poorly functioning health care sector. Its success or failure depends on a number of conditions that need to be fulfilled.

6.2   Main results on the determinants of health care expenditure

One of the goals of this study was to highlight the main determinants of health care expenditure. Two different econometric models have been estimated with panel data techniques, which allow to observe the same country over time and several states at the same time point. Note that the main focus of the thesis has been the empirical part; a more theoretical model of federalism in the health care sector has not been considered here. Therefore, I believe that the development of a theoretical relationship between

decentralization and level of health care outlays could be an interesting topic for future research in this field.

The first analysis has focused on a sample of OECD countries for the period 1990-2000. Besides testing for the classical regressors that impact on health care expenditure, namely demographic, socio-economic, and production capacity factors, a set of dummy variables relating to the organizational set-up of the health care system has been introduced in the model. The scope was to understand the impact of the cluster of countries (NHSd, SHId, SHIc) on the level of per-capita health care expenditure. The research highlights that per-capita income is a very important determinant of health expenses. The richer is a country, the higher its health costs. The result of health not being a luxury but a necessity good (Gerdtham et al., 1998) was confirmed here. The unemployment rate is another variable that increases health costs. Unemployment is a constraint for the development and the improvement of the public sector and has negative repercussions on the health status of a population. It is acknowledged that a bad health status causes higher costs to the individual and the society. The age structure of the population matters as well. On the one hand, an ageing population tends to swell costs, because of the major incidence of chronic and incurable diseases. On the other hand, a young population helps to keep low per-capita expenditure. With respect to the production capacity factors, the Kmenta model shows that it is the density of physicians that balloons health outlays. Moreover, in this study a new variable measuring the degree of effectiveness of a health care system (PYLL) has been introduced. The result suggests that whenever preventable deaths increase, it is because less money is spent on health issues. The three dummies characterizing the organizational set-up of health care sectors are all statistically significant and positive. The policy implications of this result are very interesting: SHI decentralized systems appear to be the most expensive throughout the decade of investigation. NHS decentralized nations have been more

capable than SHI centralized and decentralized countries to hold down the level of health care expenditure. Policy makers should then approach the decentralization process with caution when it comes to apply it in a context of SHI scheme. The higher number of stakeholders involved in the decision process, the complex financial fluxes between health insurances, state, citizens, and contribution collector are typical features of SHI countries. Furthermore, when the degree of decentralization of health policy is extremely marked, coordination problems might arise among health actors, thus adding another layer of complexity to the overall system. All this might result into an absence of central control over health issues and increasing intra-national differences in terms of per-capita costs and service delivery.

The result of this thesis is in line with other major studies in this field (Saltman et al., 2004) that show that SHI systems are more costly than NHSs; however, Saltman et al. (2004) find that SHI schemes succeed in reaching a higher level of satisfaction among the population, although this comes "at a price". When a country has a SHI system it seems thus more suited to have a centralized organization if the major goal of politicians is to contain costs. NHSs have experienced lower expenditure throughout the decade. One motive is that these countries are characterized by a single-payer system and citizens normally have a restriction in the access to specialist care.

The reader should be reminded that the analysis has exclusively pinpointed the issue relating to the determinants affecting the level of health care costs. This research points out that decentralized SHI systems incur higher costs level; but concomitantly these countries might well be spending more but also offer more in terms of supply of medical services, patient choice, and quality of care. These aspects are not "captured" by the econometric model presented in this study. For future research, it would be interesting to collect data for more years and check whether these differences of per-capita health care expenditure among the four country groups tend to widen, narrow, or to remain stable.

Moreover, it would be interesting to capture the relationship and trade-off between the level of outlays and the quality of the system.

The second empirical part of the research has drawn the attention to an intra-national analysis of health care expenditure determinants in Switzerland. The Swiss fiscal federalism is characterized by the strong principle of subsidiarity. Responsibilities are shared among the three levels of government in almost all fields of public intervention; however, health care is a cantonal policy and this has caused increasing disparities in the per-capita health expenditure. This actually raises a doubt on the real gain in efficiency of the Swiss decentralized health care sector. A trade-off is emerging between the commitment to social citizenship of the central government and the provision of services that are tailored to the preferences of the local population. Switzerland is a SHI decentralized country and it spends a vast amount of resources in health, being second only to the USA. The ample autonomy granted to cantons has exasperated diversities among them. Both public outlays and health insurance premiums vary considerably between cantons, and there are differences in the production structure and capacity. The Confederation does not play an important role yet in the definition of a national health policy, although in these last years its position in such sector has increased, mainly through rendering health insurance compulsory to the whole population. In my opinion the Confederation should step in and actively intervene to town down such marked regional differences. The creation of a coordination mechanism could be a first move by the central state; this would smooth out the current differences and would set up a normative framework equal to all cantons. A higher fraction of financial involvement should also be borne by the center in order to avoid future cantonal financial distress. The main econometric results show that an ageing population augment health outlays and that costs are also swelled where the density of population is high. The mortality rate amenable to health care has a negative sign and this implies that when this rate

increases less resources are spent in health, de facto worsening the outcomes of the health sector. The density of physicians is another regressor that increases the level of health expenditure and it possibly points out a supplier-induced demand problem in a system characterized by FFS payments for its providers of care. An interesting result concerns the French- and Italian-speaking cantons. The coefficient for these cantons exhibit a positive sign, thus implying that the level of per-capita socialized health expenditure is higher than in German areas. Therefore there are different patterns of health care consumption in the linguistic regions of Switzerland. The public choice variable (index of direct democracy) highlights an interesting aspect; in those cantons where citizens are granted a bigger involvement in shaping political decision making processes, health outlays are higher. It can be inferred that citizens are probably "myopic" when voting for specific issues, in the sense that they might be well taking into consideration the avowed advantages of having more goods and services at the local level, but they concomitantly ignore the costs associated to them.

The empirical results of this thesis point out that when decentralization is linked to a SHI set-up, there might be problems in containing the level of health expenditure in the long-run, and it is possible that regional disparities arise (as in the Swiss case). Several factors have, of course, an impact on the level of outlays (demographic, socio-economic, cultural, and structural) but the institutional framework of the health care sector also matters. If the goal of politicians is to maintain expenditure at a relatively stable level and avoid future cost explosions, then one should question whether it is useful to decentralize in a context of SHI scheme. It is clear that the situation varies from country to country: in Switzerland, for example, there are nowadays rudimentary discussions about changing the health care delivery system and giving more power to the center, since health federalism is deeply ingrained in the democracy of the country. However, for those nations aiming at devolving health responsibilities to sublevels of government

it should be kept in mind that decentralization does not necessarily mean better cost control in the long-term, and this could give rise to additional constraints to the availability of financial resources in the public sector in general.

ANNEX 1: LEVEL OF DECENTRALIZATION OF HEALTH CARE SYSTEMS IN OECD COUNTRIES, 1990-2000

AUSTRALIA : 6 states and 2 independent territories.
TYPE OF HEALTH CARE SYSTEM: SHI
GENERAL DESCRIPTION: The system is mainly tax-funded and there is an ample role of the private sector.
CATEGORY: Decentralized.
MANAGEMENT: The states administer and deliver many health services (principally public health and public hospital services), while local government has only limited health care functions.
FUNDING: The national government (Commonwealth) funds the bulk of the health system, and subsidizes pharmaceuticals and aged residential care. It does not provide health services. States also fund the health care sector, but their role is much smaller than the Commonwealth. The Commonwealth collects the bulk of revenue, being empowered under the Constitution to collect income taxes. The states, and to a minor extent local governments, are responsible for most of outlays.

AUSTRIA : 9 Länder.
TYPE OF HEALTH CARE SYSTEM: SHI
GENERAL DESCRIPTION: The system is based on a national and compulsory SHI that covers the whole population and is supplemented by private health insurance. Affiliation to health insurers is on occupation.
CATEGORY: Decentralized.
MANAGEMENT: Strong leadership by the Länder. They are responsible for carrying out federal directives and implementing laws and policies. The federal government delegates the task of public health administration to the Länder.
FUNDING: Roughly half of health expenditure is financed through SHI contributions. One fifth is raised through general taxation. More than a quarter is financed through private households.The federal government funds slightly less than 2% of all health spending. Länder and communities finance around 16% of Austria's health care expenditure.

BELGIUM : 10 provinces.
TYPE OF HEALTH CARE SYSTEM: SHI
GENERAL DESCRIPTION: The health care system is based on compulsory health insurance covering the whole population. There is the possibility to take out a private health insurance, which still remains very small in terms of market volume. People have free choice of health insurance. Patients have freedom of choice between a wide range of independent providers.
CATEGORY: Centralized.
MANAGEMENT: The system is characterized by a strong leadership of the central government. Health insurance is part of the social security system, so it has remained under the responsibility of the federal government.
FUNDING: The federal government fixes the overall budget for health care services and deals with the allocation of resources to different levels (regions and communities).

CANADA : 10 provinces and 2 territories.

TYPE OF HEALTH CARE SYSTEM: SHI

GENERAL DESCRIPTION: Health care is financed primarily through taxation, both provincial and federal. All eligible residents are covered by their provincial health insurance plans. The universality principle requires that provincial plans cover 100% of eligible residents. Supplementary health coverage is also offered.

CATEGORY: Decentralized.

MANAGEMENT: The hands-on management of health services is fundamentally the responsibility of each individual province or territory. Through their respective central health ministries or departments of health, they plan, finance, and evaluate the provision of hospital care, physician and allied health care services, some aspects of prescription care and public health. They also supervise those specific responsibilities delegated to other non-governmental agencies. The Canadian framework has ensured a health care system which, while composed of ten provincial and two territorial health insurance programs, exhibits the same fundamental characteristics across the country and yet also reflects provincial priorities. No two provincial programs are exactly alike in terms of organizational structure, planning, regulation, management, financing or supplementary health service.

FUNDING: The federal government assists in the financing of provincial health care services through financial transfers. However, the federal government's contribution to provincial health care funding has declined over the years as the mechanisms for transferring money to the provinces were modified. Federal funding is transferred to the provinces as a combination of cash contributions and tax points (taxing power). To receive federal funds, however, provincial insurance programs must adhere to the principles stated in the Canada Health Act.[133]

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[133] Please refer to footnote 54 in Chapter 3.

DENMARK : 13 counties.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: After the abolition of the health insurance scheme in 1973 Denmark changed to a single-payer system, predominantly tax-based. The whole population is covered.
CATEGORY: Decentralized.
MANAGEMENT: Counties have full responsibilities for running and planning hospitals and primary health care services.
FUNDING: The main sources of financing come from state, counties and municipal taxation. Counties and municipal taxes vary from region to region. The central government thus intervenes for redistribution and financial equalization.
Counties financed 87% of total health expenditure through local taxes. The central government financed the remaining 13% (Polton, 2003).

FINLAND : 6 provinces.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: The system is predominantly tax-based. All people are covered. Health care is mainly organized as a public service at the three different levels of government (state, provinces and municipalities).
CATEGORY: Decentralized.
MANAGEMENT: These latter have by law the duty to organize, deliver and plan the health care services (in general they are in charge of organizing basic services, such as education and social services).
FUNDING: Health care is funded out of national and local taxes. In 1999 about 43% of total health care costs were financed by the municipalities, about 18% by the state, 15% by the National Health Insurance[134] and about 24% by households.

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[134] The NHI is a scheme introduced in the 1960s that partly reimburses the costs of drugs, private medical care, and other services.

FRANCE : 26 regions.
TYPE OF HEALTH CARE SYSTEM: SHI
GENERAL DESCRIPTION: The health care system is based on a national universal and compulsory health insurance system, which is linked to occupation and place of residence. About 98% of the population is covered by health insurance. There is no gatekeeping, patients have free choice of practitioner, who is paid FFS, and waiting lists are rare.
CATEGORY: Centralized.
MANAGEMENT: Legislation, management, the control over the health care system and of development programs, the creation of new medical posts and the budget are all set centrally.
FUNDING: The main sources of financing come from health insurance schemes. Taxes used to fund health care are collected nationally. There is no funding of health care by local taxes.

GERMANY: 16 Länder.
TYPE OF HEALTH CARE SYSTEM: SHI
GENERAL DESCRIPTION: The health care system is a social insurance based model financed through decentralized, self-administered non-profit sickness funds. Since 1996 citizens have free choice of fund. Before this reform, citizens were traditionally affiliated to sickness funds according to geographical and/or job characteristics. Approximately 75% of the population is covered by compulsory health insurance. 14% of citizens (high income earners) have to take out an insurance policy themselves. There is also the possibility to take out a private insurance policy.
CATEGORY: Decentralized.
MANAGEMENT: The Länder are responsible for providing health care services. In each Land the regional associations of health insurers negotiate with the regional associations of doctors to determine aggregate payments to primary health care, general practitioners, specialists, and hospitals.
FUNDING: Social health insurance contributions account for the bulk of funding in the German health care system. Taxes do not play an important role; however, they are raised through Länder payroll taxes, and are augmented by federal matching funds for certain costs.

GREECE: 13 regions.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: In 1983 Greece changed from a SHI system to a NHS, which is nowadays still financed by a mix of tax- and insurance-based statutory financing. Greece is thus still experiencing a transition period, moving from a Bismarck to a Beveridge model. The 1983 reform plan concentrated exclusively on the provision of health care services, and did not deal with the financing side. Membership in the funds is compulsory and is based on occupation. Most of funds are public entities and operate under the rigid control of the central government. 100% of people are covered.
CATEGORY: Centralized.
MANAGEMENT: Regions should be theoretically responsible for planning and managing the health care system. However, due to lack of human resources and of a managerial structure, they have not become operational yet. Thus, regions have no responsibilities at present.
FUNDING: The central government retains control of financing responsibilities. Both municipalities and communities play no significant role in the financing of health care services, except in large cities (such as Athens).

IRELAND: 26 counties.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: The health care system is mostly tax-funded. The whole population is covered. A voluntary health insurance (VHI) is also offered to citizens and has played an important role in the Irish health system for almost 50 years. In 2000 almost 50% of the population had a coverage with the VHI.
CATEGORY: Decentralized.
MANAGEMENT: Provision and management of services is the role of the 8 regional health boards (RHBs) present on the Irish territory. The system is now undergoing the most extensive reforms since 1970. The RHBs have been abolished; from January 2005 a Health Service Executive (HSE) is managing services as a single national entity, accountable directly to the Ministry for Health and Children.
FUNDING: Public funding for health services is determined annually in negotiations between the Department of Finance and the Department of Health and Children. Together they set out budgets for each of the eight RHBs.

ITALY: 20 regions.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: The NHS covers the whole population. Since the 1970s it created jurisdictional conflicts among the different levels of authority established by law. Responsibility was not clearly divided and health care was not planned coherently at the national and regional levels. The sharp separation between central financing responsibilities and regional and local spending power was seen as the main reason for the constantly rising health care expenditure. Faced with these problems, a process of regionalization has started in the 1990s. In 1997 there was the first step towards fiscal federalism, as it provided some sources of autonomous financing to the regions. In 2000 the National Health Fund has been replaced by various regional taxes.
CATEGORY: Centralized.
MANAGEMENT: Planning and management responsibilities between the central government and regions were not clearly assigned and specified. This led to a situation of high discomfort with the system. The dissatisfaction with the organization of the NHS led to its regionalization, which was started in the late 1990s (this is why Italy is considered a health centralized country for the period 1990-2000). Since 2000 the Ministry of Health is in charge of political planning and regulation, and reviewing regional legislation. The regions are the main administrative level of the NHS and are responsible for implementing decisions taken by the Parliament and for providing health services. The Health Units (approx. 650) are in charge of the daily management of health services and for coordination between hospitals.
FUNDING: The health care system is tax-funded. Prior to the 2000 decentralization reform the funding was completely centralized and the central government provided financial resources to the regions. These latter considered the amount of financial resources they got to be insufficient to satisfy the health care needs of their populations, so they consistently run into deficits. The central government had then to intervene in order to bail them out.
Since 2000 the NHS is funded through general taxation collected centrally, but regions also partly finance their health care units through various regional taxes. Those regions unable to raise sufficient resources will receive additional funding from the National Solidarity Fund to be allocated annually.

LUXEMBOURG: 3 districts.
TYPE OF HEALTH CARE SYSTEM: SHI
GENERAL DESCRIPTION: The fundamental principles of the health care system are the free choice of the provider by patients and compulsory health insurance. 99% of the population is covered by health insurance. Citizens are allocated to health insurers on the basis of their professional occupation. They are also offered a voluntary health insurance, which is, however, not highly used.
CATEGORY: Centralized.
MANAGEMENT: There is no decentralization in the health care system. The Ministry of Health is in charge of planning and organizing the system, establishing new hospital facilities and extending the existing ones.
FUNDING: The health insurance has three sources of finance; contributions from the state (a maximum of 40% of the total), from employers (about 30% of the total) and from insured individuals (about 30%). Contributions are collected centrally for all branches of social security by the Common Center of Social Security and are allocated to the Union of Sickness Funds.

THE NETHERLANDS: 12 provinces.
TYPE OF HEALTH CARE SYSTEM: SHI
GENERAL DESCRIPTION: In the Netherlands, three parallel compartments (named pillars) of insurance coexist: the first compartment is a national health insurance scheme for exceptional medical expenses (it is compulsory for the whole population). The second compartment consists of different regulatory regimes; one for compulsory health insurance through sickness funds for those under a certain income, and another for private health insurance, mostly voluntary. The third compartment is voluntary supplementary health insurance.
CATEGORY: Centralized.
MANAGEMENT: The government has ultimate control over planning and management of health care facilities.
FUNDING: The central government has responsibility for and financial control of most aspects of health care. The Central Agency for Health Care Tariffs exercises strong control over the fees and charges set by providers and oversees the setting of hospital budgets.

NEW ZEALAND: 12 regions.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: The health care system is funded mainly through nationally taxation revenue. Health organizations are divided into two types of agencies: those that identify and purchase health care services, and those that deal with the provision of health care services. There is the possibility to take out a private health insurance, but this is not so widespread in New Zealand.
CATEGORY: Centralized.
MANAGEMENT: The central state has retained overall responsibility for ensuring the provision of health care services.
FUNDING: The health care system is centrally funded with no funds, except for some environmental health funds, channeled through local government.

NORWAY: 19 counties.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: Norway has a mainly tax-financed health care system. The three tiers of government (central state, counties, and municipalities) were all involved in the organization and funding of the system, prior to the change in 2002 (that caused a re-centralization of the health care system). As all inhabitants are covered by the public system, voluntary health insurance has not played a significant role so far.
CATEGORY: Decentralized.
MANAGEMENT: Counties are responsible for planning and provision of specialized care. Municipalities deliver and manage primary health care and social services.
FUNDING: Contrary to other Scandinavian countries, Norway has a centrally tax-funded health care system. Municipalities and counties can also draw on local taxes in addition to the earmarked grants and block grants from the state.

PORTUGAL: 7 regions.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: The Portuguese health care system is characterized by three coexisting systems: the National Health Service (NHS), special public and private insurance schemes for certain professions (health subsystems) and voluntary private health insurance, such that some groups have double or even triple coverage. Decentralization is a formal keyword of the organization of the health care system; however, the current system still maintains the features of a highly centralized NHS.
CATEGORY: Centralized.
MANAGEMENT: Responsibility for the functioning, organization and management is shared between the Ministry of Health and the five Regional Health Authorities (RHAs). However, in practice responsibility for planning and resource allocation in the Portuguese health care system has remained highly centralized even after the creation of the five current RHAs.
FUNDING: The hospital budget is defined and allocated by the central state. The RHAs have autonomy over primary care budget setting and spending. However, their work is strongly influenced by the Ministry of Health.

SPAIN: 17 autonomous communities.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: The Spanish health care system has been characterized for about two decades by a situation of "asymmetric federalism". Some autonomous communities (AC) were given substantial planning powers already during the 1980s and 1990s, while some others were still under the control of the central government. The central government maintains its power to fund the system.
CATEGORY: Centralized.
MANAGEMENT: The Spanish health care system underwent a major reform in 2002, when all the 17 AC gained full autonomy from the central government for the planning and management of their health care systems. However, during the period of analysis (1990-2000) the National Institute of Health (INSALUD) was the body in charge of organizing the social security health care services in 10 AC. The other 7 AC had already achieved complete autonomy and responsibility for the management of health care services in the 1980s and 1990s. Spain has been catalogued as a centralized state because decentralization was a piecemeal process, and took considerable time and effort to continue it. The way in which responsibilities were shifted to the AC varied between them, causing great confusion in the overall system. Furthermore, the coexistence of relatively independent AC and those where central government continued to manage directly health care services had blurred the distinction between the functions that corresponded to the ministry as a health authority at national level and those related to the direct supervision and management of health care in a given part of the country.
FUNDING: Funding is collected centrally. In year 2000, 98% of total public health care expenditure was funded through general taxation, while the remaining 2% was generated by care provided for patients with other types of coverage. Most taxes are centrally raised, due to the limited fiscal autonomy of Spanish regional and local governments. For example, in 1996, taxes generated by AC represented less than 9% of total public health care financing, while the equivalent figure for local governments was 0.3%. This characteristic of central funding is unchanged under the new system either.

SWEDEN: 21 counties.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: The Swedish NHS is regionally-based and publicly operated. It involves all layers of government: national, regional (counties), and local (municipalities). Private health care is very limited in Sweden, accounting for less than 1% of total health care revenue and providing only elective coverage to citizens.
CATEGORY: Decentralized.
MANAGEMENT: Counties are responsible for delivery, planning and management of health care services, with some notable exceptions where municipalities have the responsibility. About 85% of the counties' activities are devoted to health care issues. Municipalities are in charge of organizing social welfare services, environmental hygiene, nursing homes and home health care.
FUNDING: The political responsibility for financing health care services has been delegated to county councils. Municipalities finance long-term care for the elderly, disabled, and long-term for psychiatric care. Local municipalities are not subordinated or accountable to the county councils. The laws on health care and social services allow the county councils and municipalities to impose taxes to finance their activities.

SWITZERLAND: 26 cantons.
TYPE OF HEALTH CARE SYSTEM: SHI
GENERAL DESCRIPTION: The health care system is insurance-based. Premiums are community-rated, so they are not linked to an individual's wealth. Since 1996 it became mandatory to take out a health insurance policy, so 100% of the population is now covered. Compared to other OECD health care systems, the Swiss shoulder a significant large portion of health care costs, through out-of-pocket payments or private supplementary health insurance.
CATEGORY: Decentralized.
MANAGEMENT: The health care system is highly decentralized. There exists no national Ministry of Health. Cantons are the main bodies responsible for planning, organizing, managing, and providing health care services to their own population. Municipalities are in charge of planning and organizing nursing homes and home care services. There exists 26 different health care systems within the country, as no two systems are exactly alike.
FUNDING: The federal intervention in health care has traditionally been kept to a minimum. Much of the responsibility for financing goes to cantons and municipalities, together with compulsory and supplementary (private) health insurance.

GREAT BRITAIN: 86 counties.
TYPE OF HEALTH CARE SYSTEM: NHS
GENERAL DESCRIPTION: Health care services are provided mainly through the National Health Service, providing universal coverage and financed mainly through general taxation and a small contribution of the National Insurance Contribution Scheme.
CATEGORY: Centralized.
MANAGEMENT: The Ministry of Health is responsible for the Regional Health Authorities (RHAs), District Health Authorities (DHAs), Family Health Services Authorities and hospitals. The reforms in the 1990s designed to increase the quality and efficiency of health care services through liberalization, decentralization and the creation of quasi-market did not impact that much, because the degree of autonomy granted by these arrangements was very limited. Both purchasers and providers are accountable to the regional offices of the NHS Executive. In addition, the NHS Executive exerts strong control over DHAs and trusts in terms of planning and service priorities, and RHAs are part of the NHS Executive itself.
**FUNDING**: The NHS is financed mainly through central government taxation together with an element of national insurance contributions.
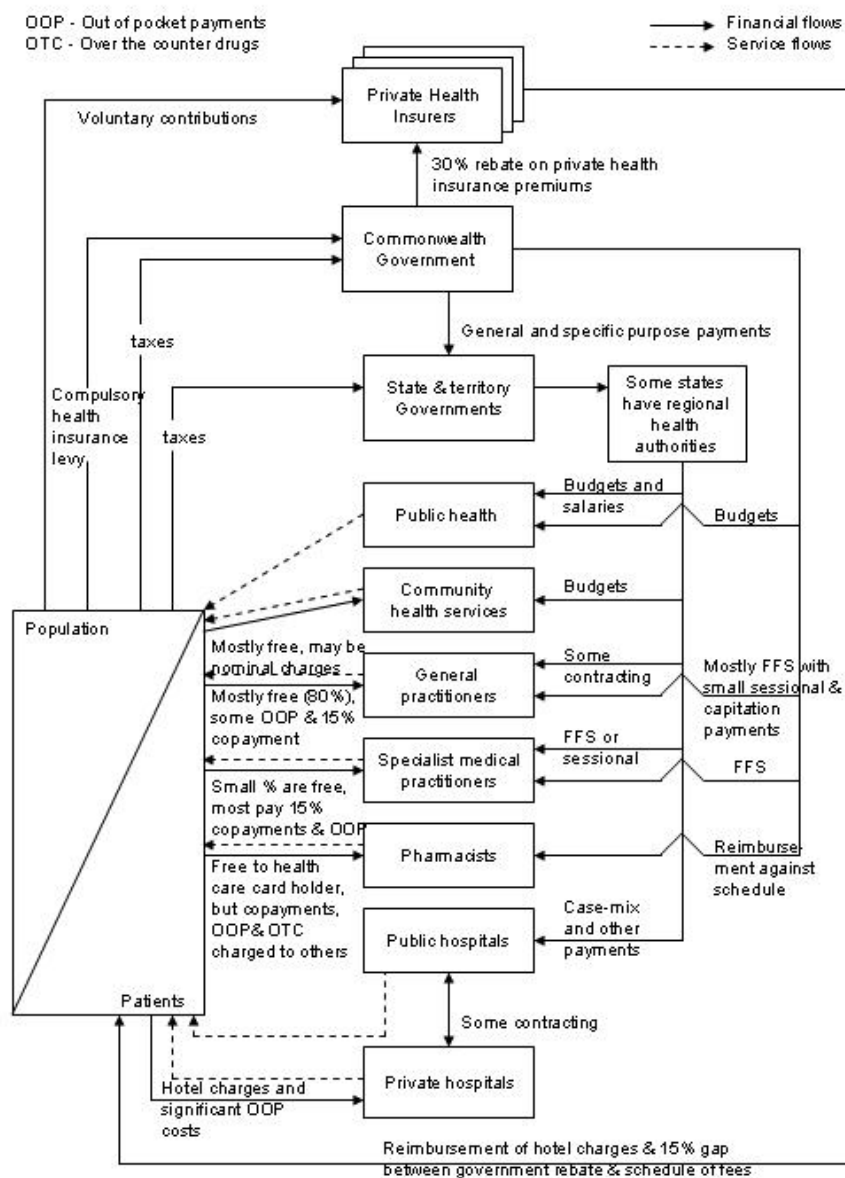
ANNEX 2: ABBREVIATIONS OF COUNTRIES

AUS	Australia
A	Austria
B	Belgium
CAN	Canada
DK	Denmark
FIN	Finland
F	France
D	Germany
GR	Greece
IRL	Ireland
I	Italy
LUX	Luxembourg
NL	The Netherlands
NZ	New Zealand
N	Norway
P	Portugal
E	Spain
S	Sweden
CH	Switzerland
UK	United Kingdom
USA	United States of America
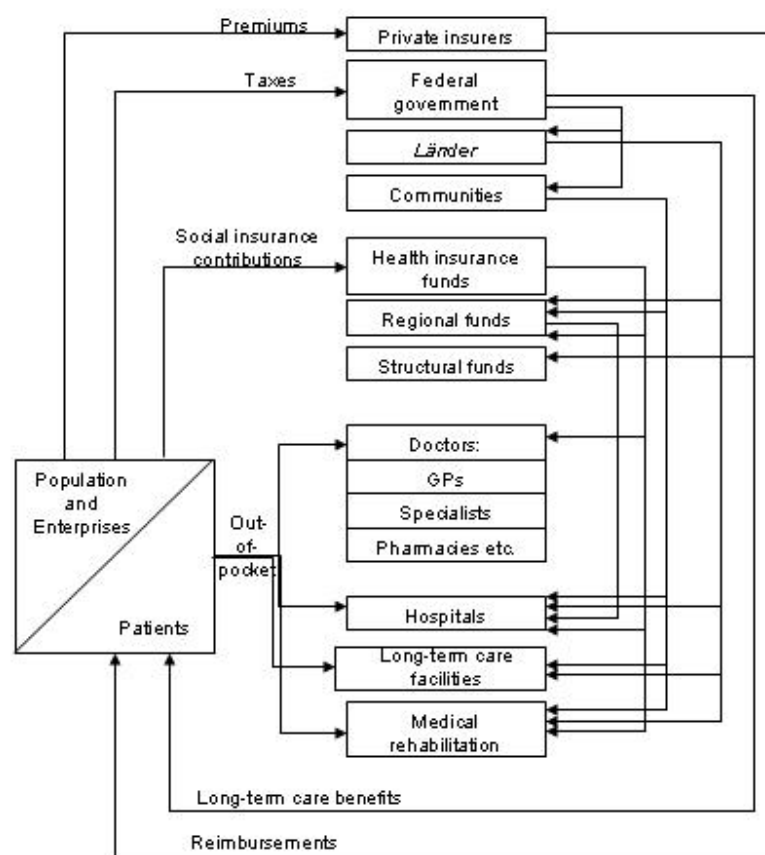
ANNEX 3: DIAGRAMS OF HEALTH CARE SYSTEMS

AUSTRALIA (1999)
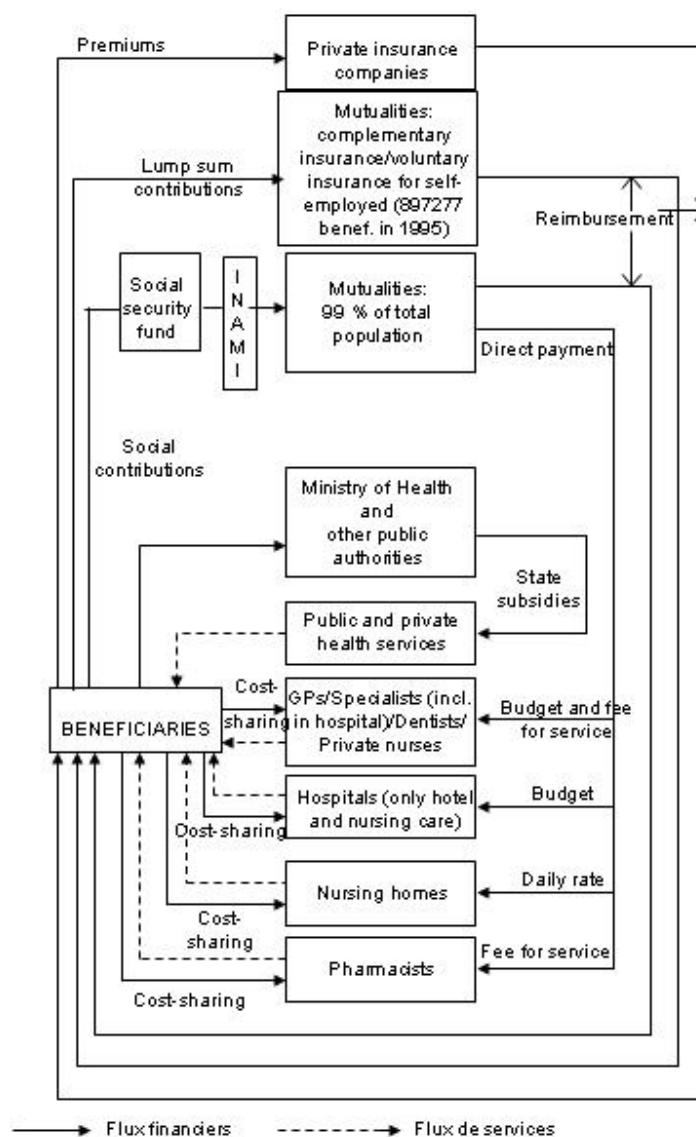
Source: OECD Secretariat

AUSTRIA (2003)
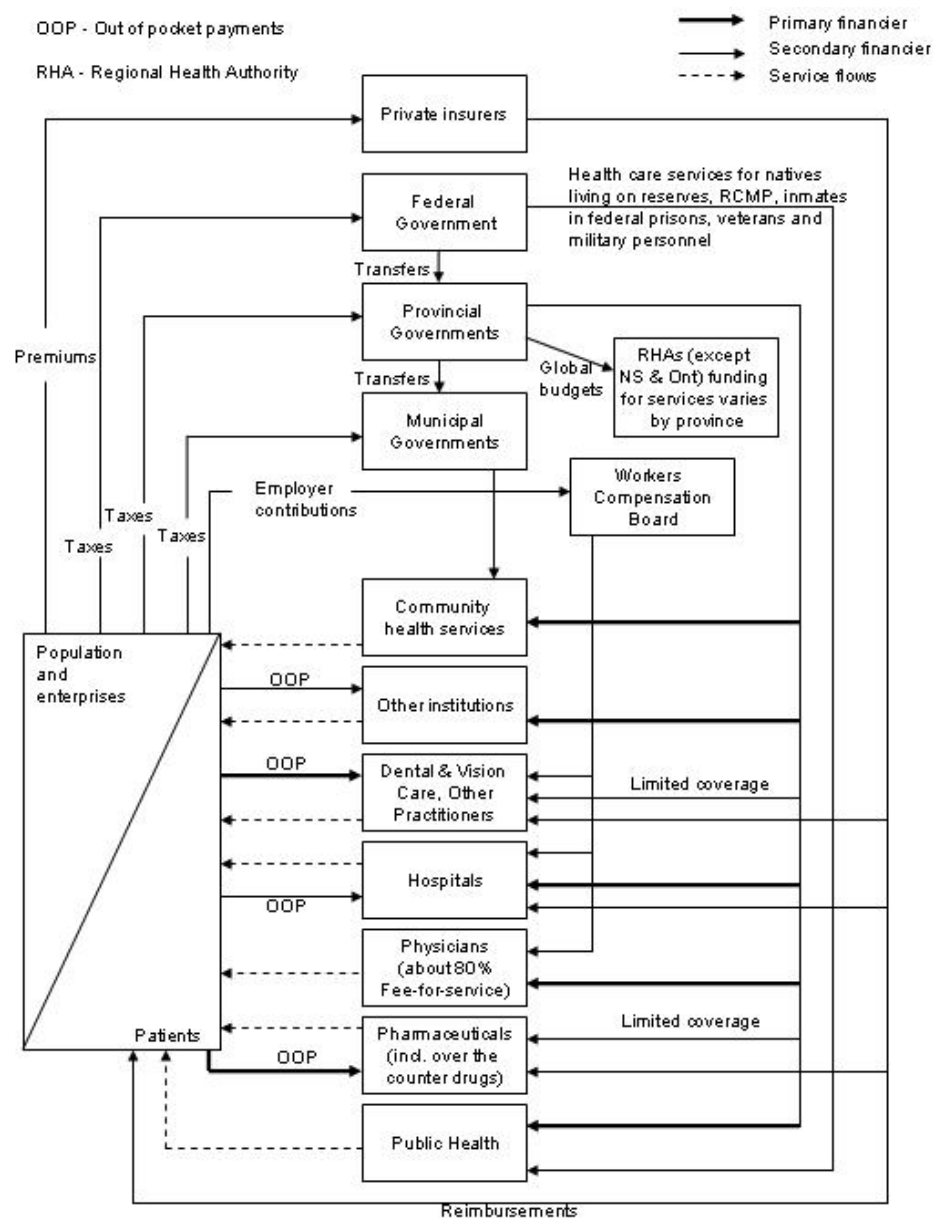
Source: Adapted version from "Finanzströme im Gesundheitswesen", BMFG (Austrian Federal Ministry for Health and Women)

BELGIUM (1995)
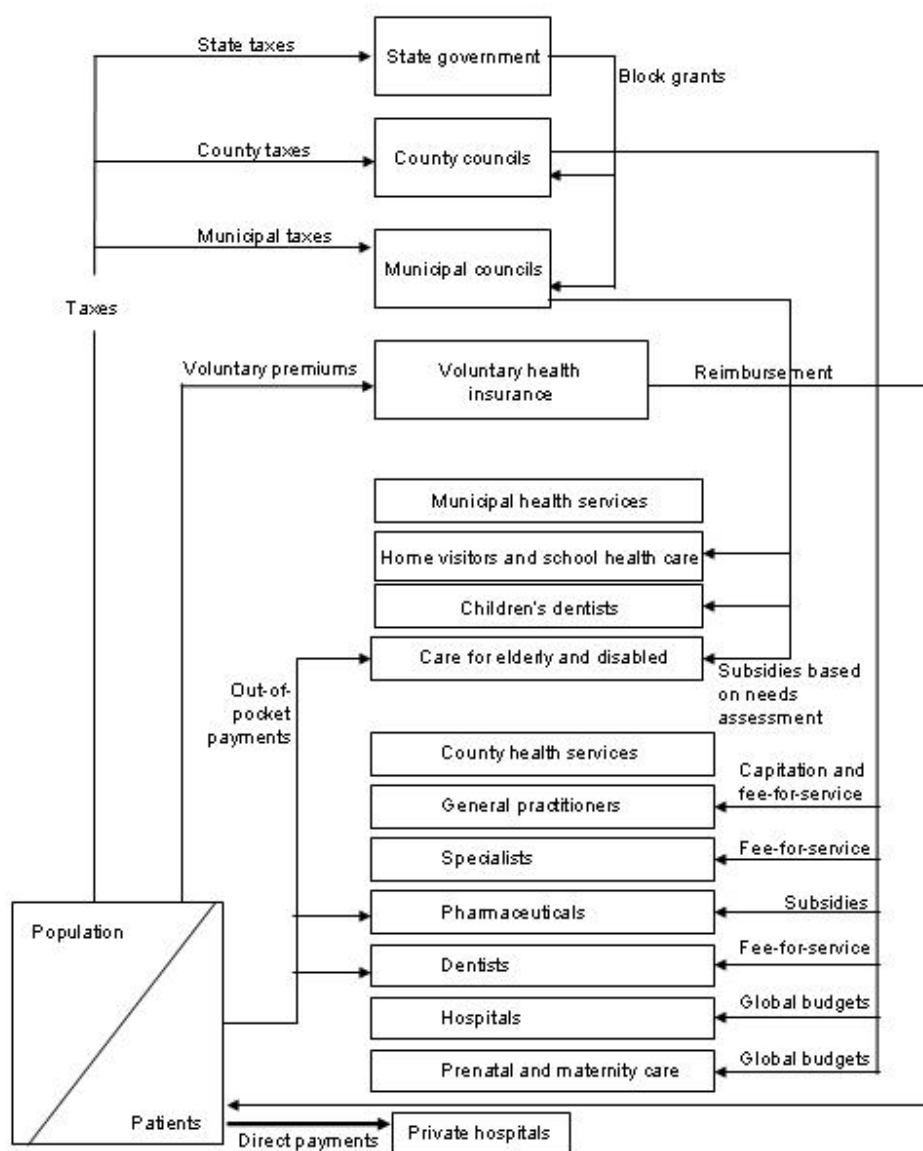
Source: Adapted from The Reform of Health Care – A comparative Analysis of Seven OECD Countries, Health Policy Studies No. 2, OECD (1992); Department of Health and Children

CANADA (2000)

OOP - Out of pocket payments

RHA - Regional Health Authority

→ Primary financier
→ Secondary financier
--→ Service flows

Private insurers

Federal Government

Health care services for natives living on reserves, RCMP, inmates in federal prisons, veterans and military personnel

Transfers

Provincial Governments

RHAs (except NS & Ont) funding for services varies by province

Global budgets

Transfers

Municipal Governments

Workers Compensation Board

Premiums

Employer contributions

Taxes

Taxes

Taxes

Population and enterprises

Community health services

OOP   Other institutions

OOP   Dental & Vision Care, Other Practitioners

Limited coverage

Hospitals

OOP

Physicians (about 80% Fee-for-service)

Patients

Pharmaceuticals (incl. over the counter drugs)

Limited coverage

OOP

Public Health

Reimbursements

Source: OECD Secretariat

DENMARK (2001)
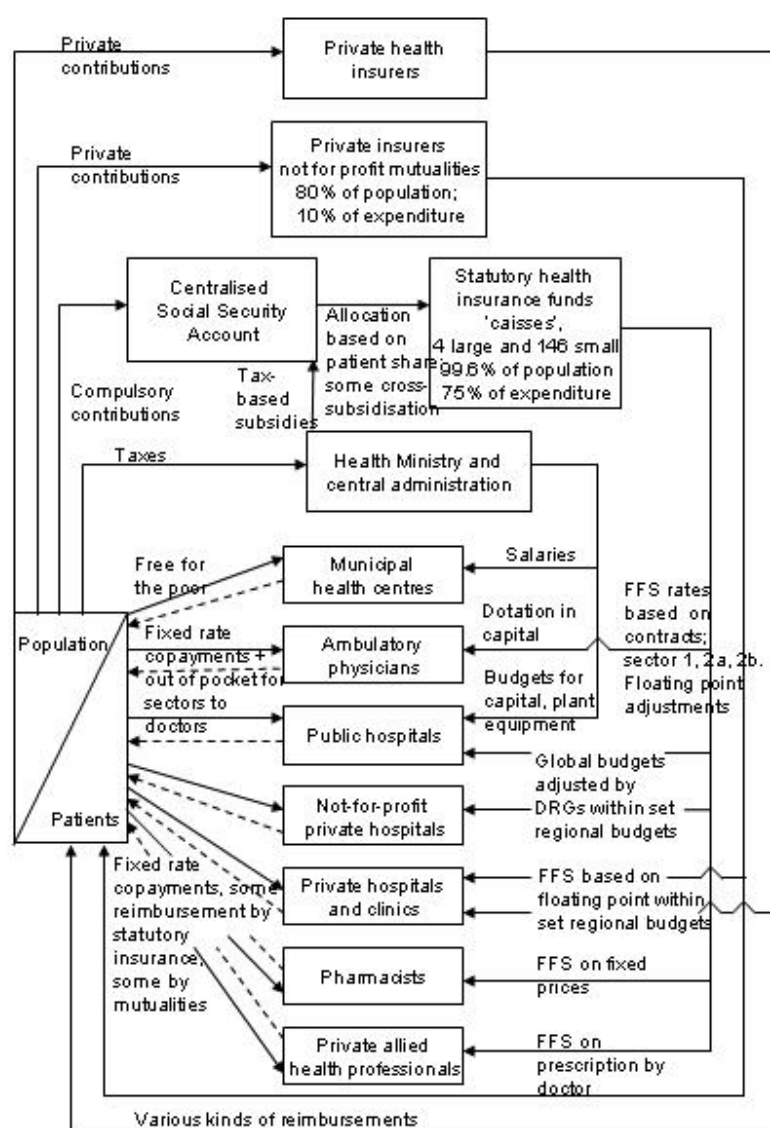
Source: European Observatory of Health Care Systems (2001)

FINLAND (2001)


Source: European Observatory of Health Care Systems (2002)
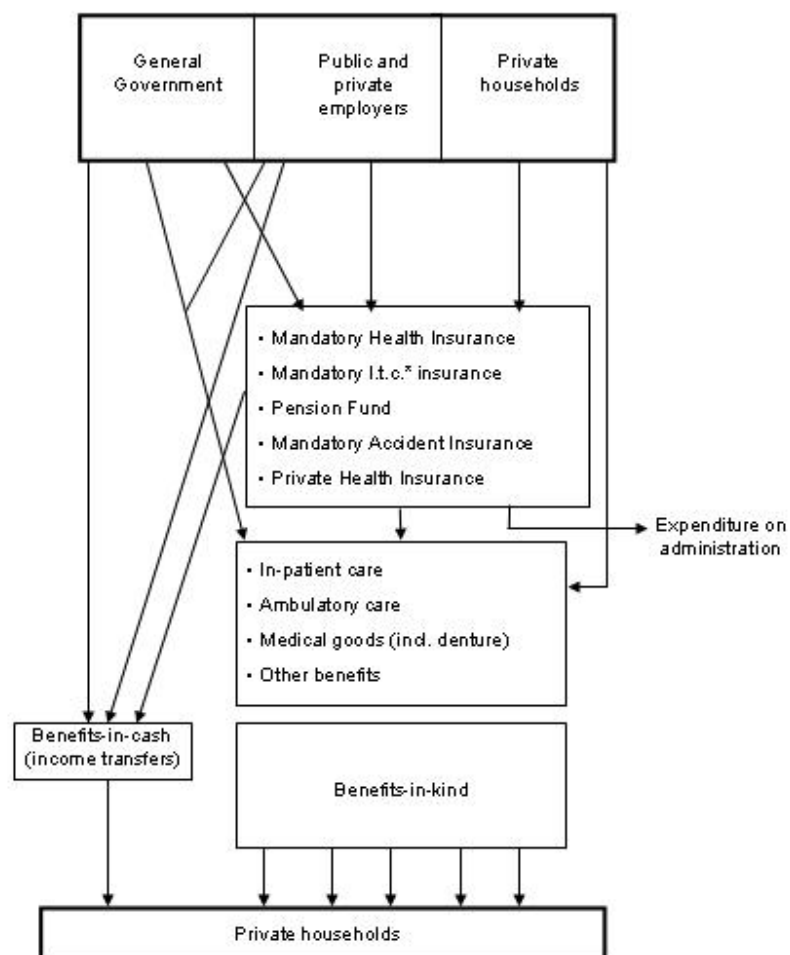
FRANCE (1999)


Source: OECD Secretariat (2001)

GERMANY (1995)
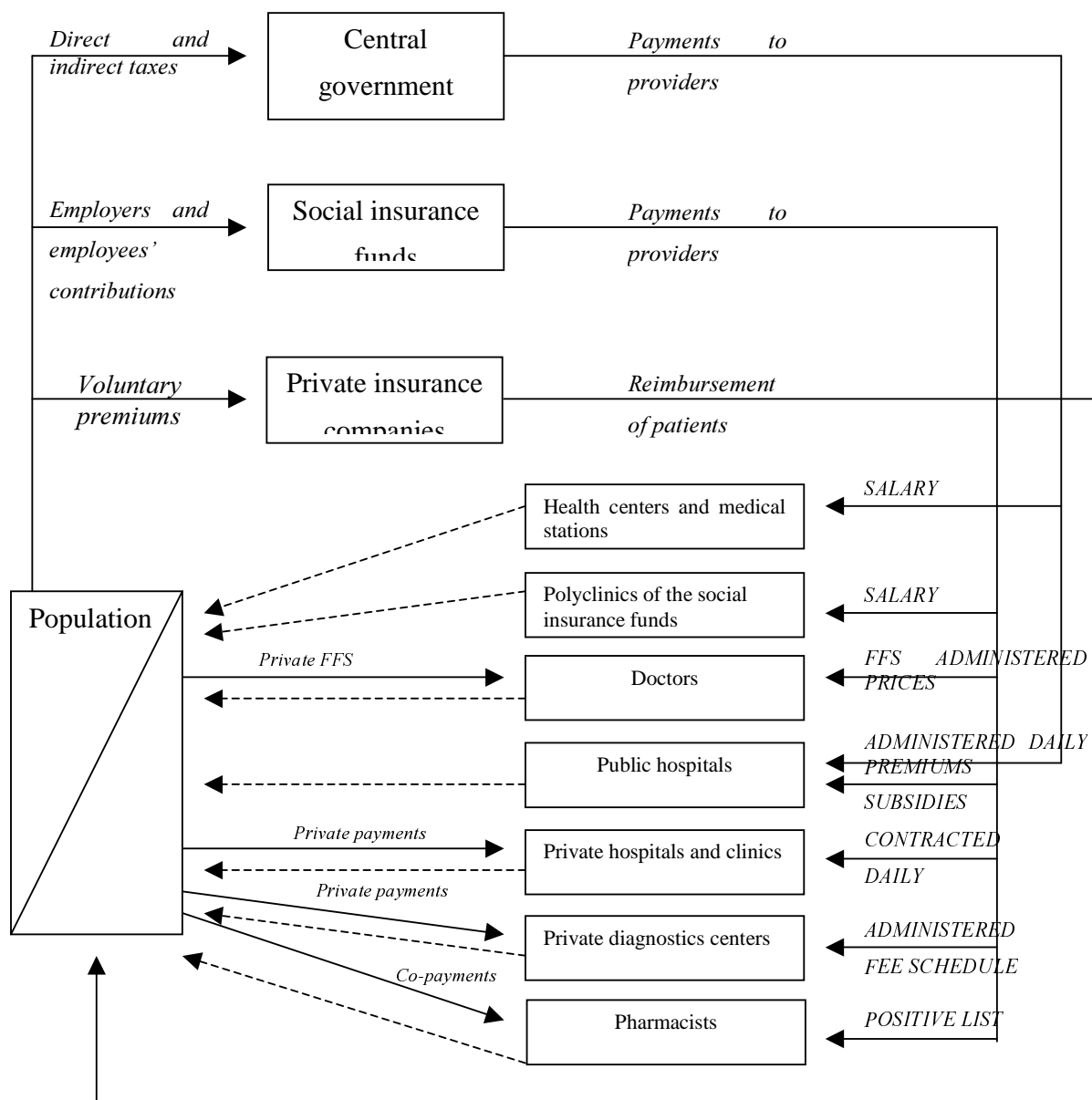
Note: The benefits-in-cash, which are not included in most of the diagrams, are included here.
* l.t.c.: long-term care.
Source: Adapted from Federal Office of Statistics (1998)
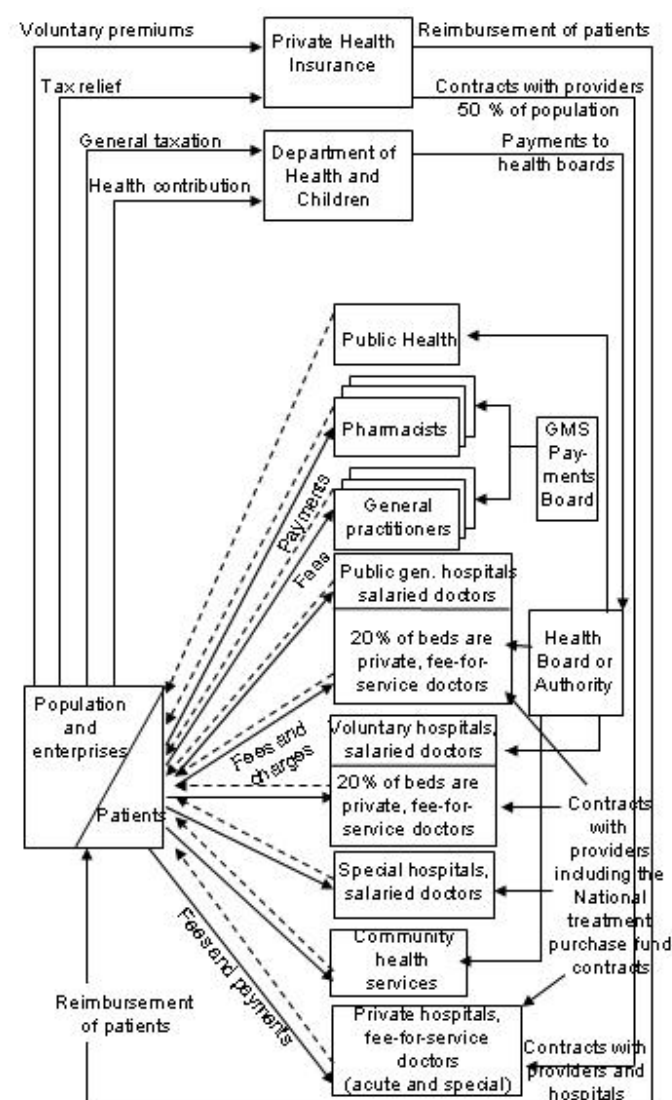
GREECE (1990s)

Direct and indirect taxes → **Central government** — *Payments to providers*

Employers and employees' contributions → **Social insurance funds** — *Payments to providers*

Voluntary premiums → **Private insurance companies** — *Reimbursement of patients*

Population

Health centers and medical stations ← *SALARY*

Polyclinics of the social insurance funds ← *SALARY*

Private FFS → Doctors ← *FFS ADMINISTERED PRICES*

Public hospitals ← *ADMINISTERED DAILY PREMIUMS* / *SUBSIDIES*

Private payments → Private hospitals and clinics ← *CONTRACTED DAILY*

Private payments → Private diagnostics centers ← *ADMINISTERED FEE SCHEDULE*

Co-payments → Pharmacists ← *POSITIVE LIST*

Source: The Reform of Health Care Systems, OECD (1994); IRDES web site (www.irdes.fr)

IRELAND (2002)

Source: The Reform of Health Care – A comparative Analysis of Seven OECD Countries, Health Policy Studies No. 2, OECD (1992); Department of Health and Children
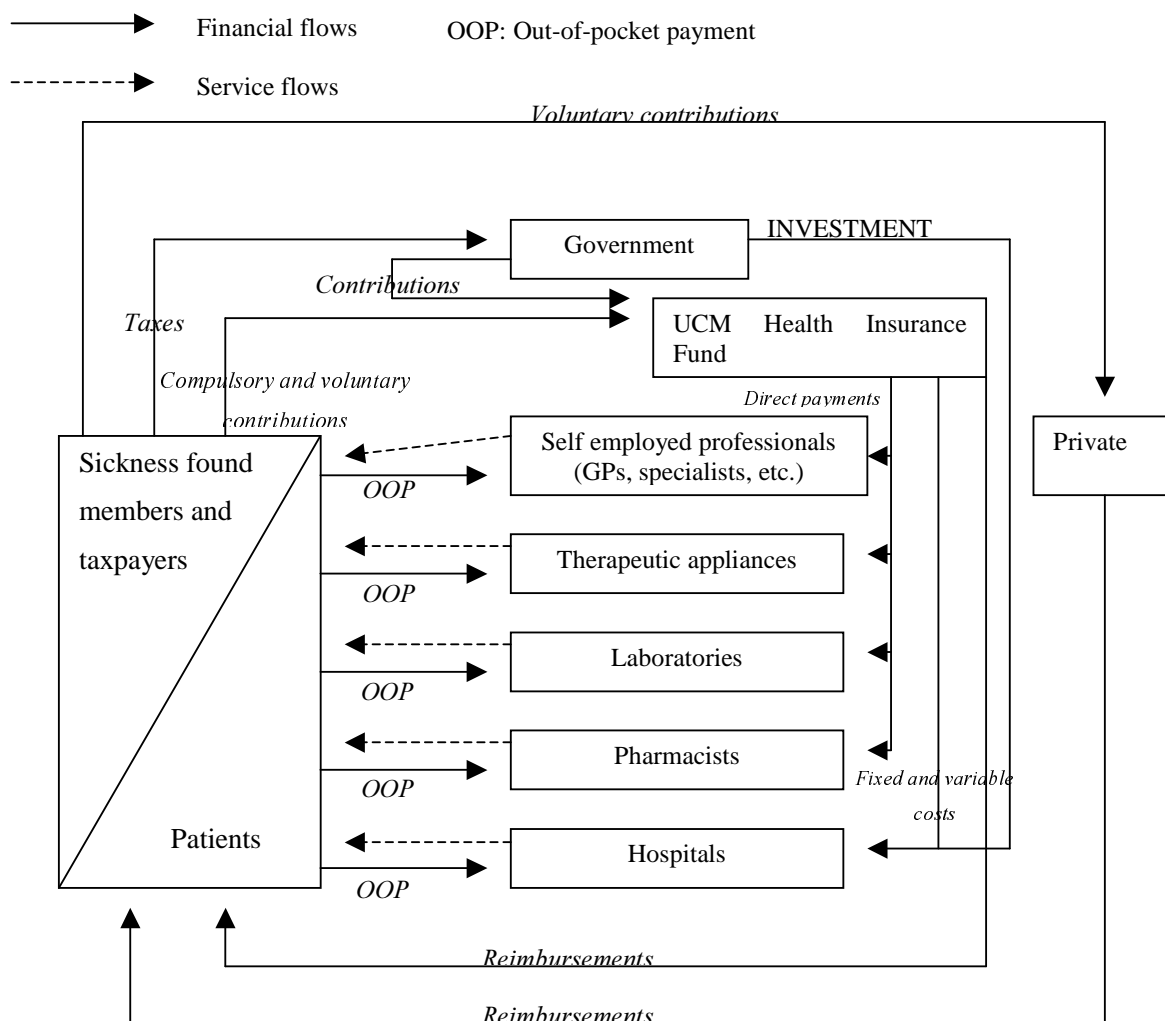
ITALY (1990s)

* Outpatient care, household advisory bureau, therapeutic appliances and thermal services, care for poor people, for Italian who live abroad and for foreigners who live in Italy.
Source: IRDES web site (www.irdes.fr)
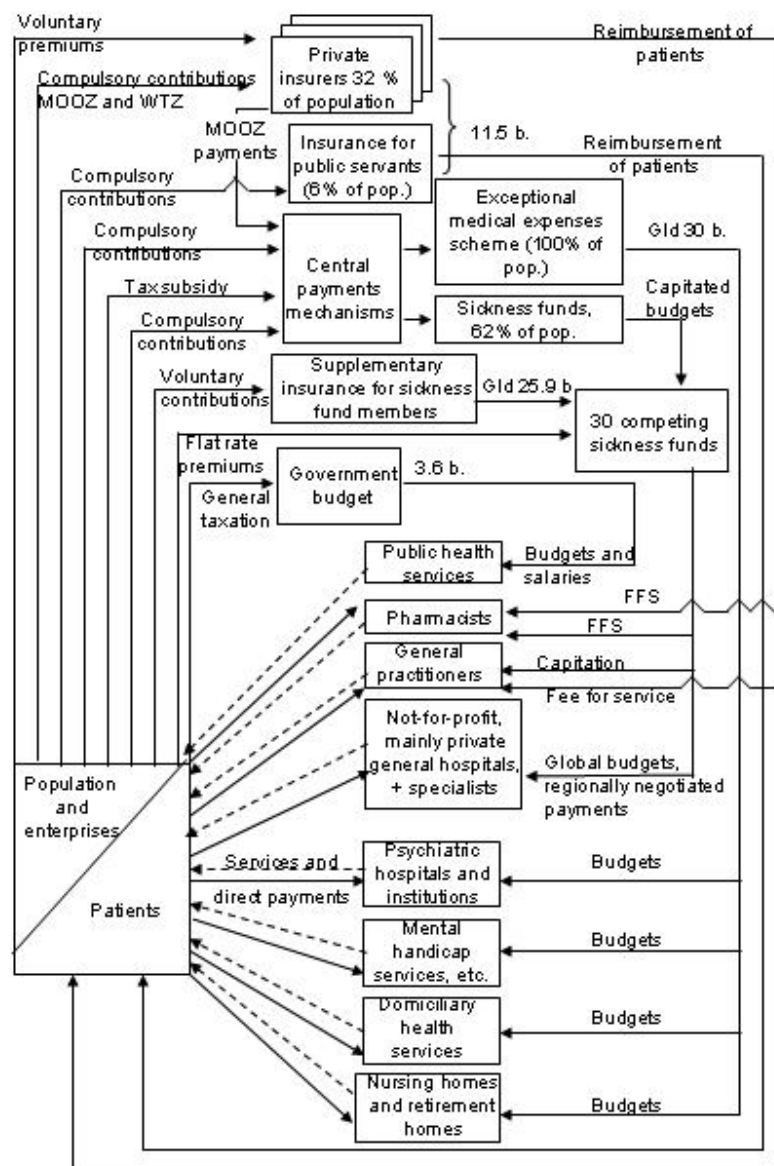
LUXEMBOURG (1998)
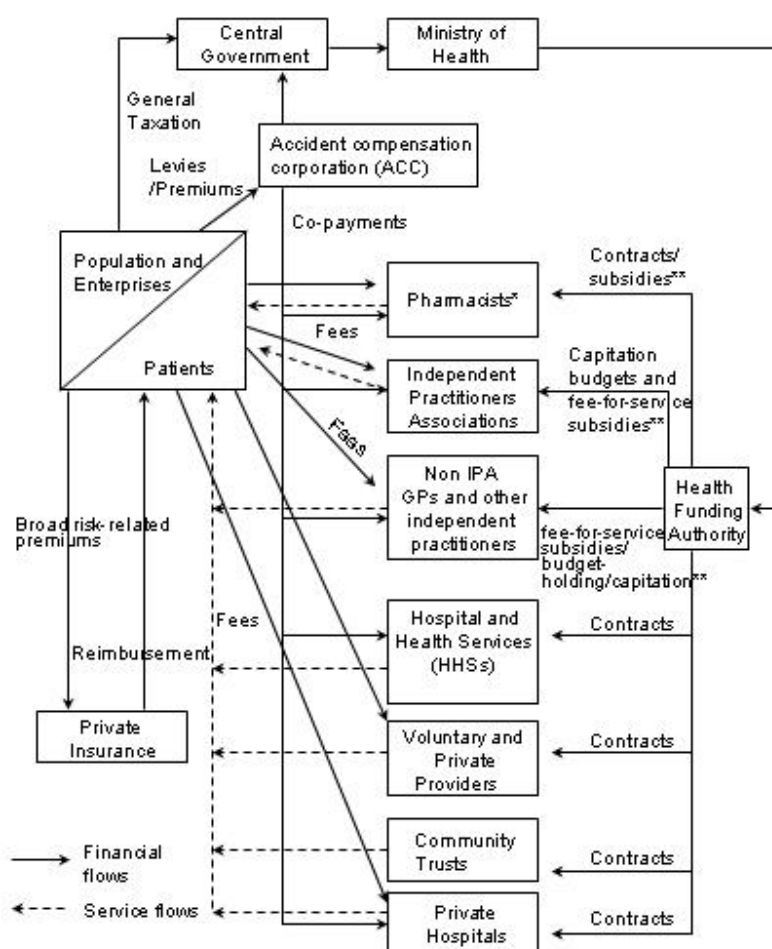
Source: IGSS (Inspection Générale de la Sécurité Sociale) Luxembourg (1998)

THE NETHERLANDS (1999)

Source: *Adapted from* The Reform of Health Care – A comparative Analysis of Seven OECD Countries, Health Policy Studies No. 2, OECD (1992)

NEW ZEALAND (1998)
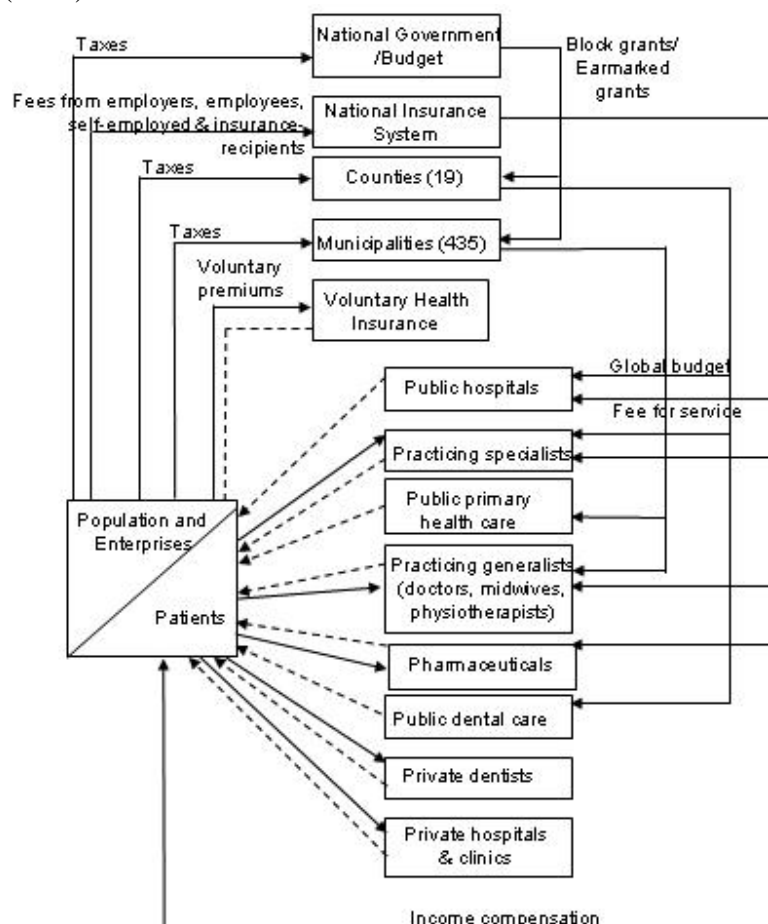
* and other providers, such as laboratories and radiology clinics.
** relating to contracts with the Health Funding Authority.
Source: IRDES web site (www.irdes.fr)
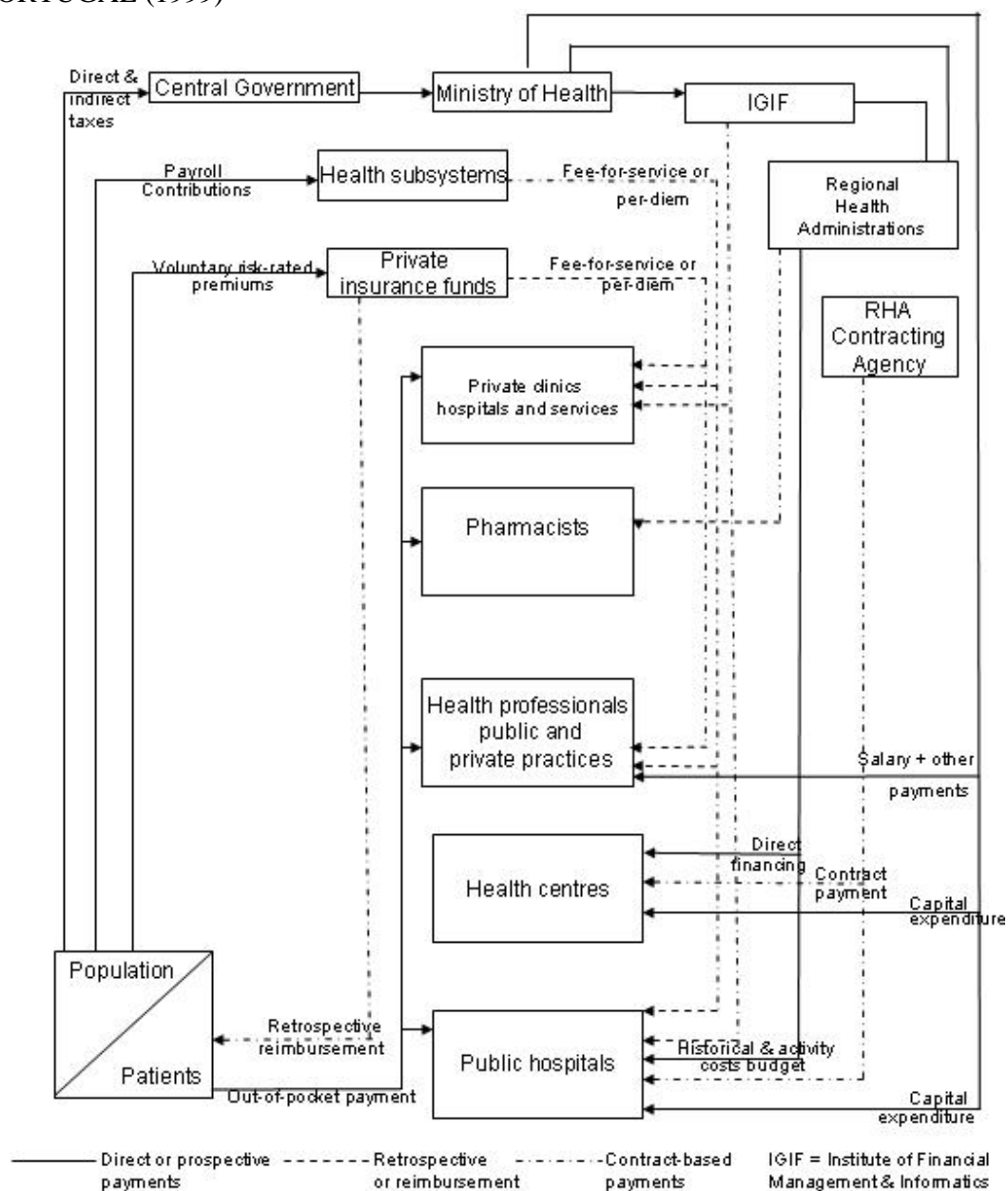
NORWAY (2000)

Source: European Observatory on Health Care Systems (2000)
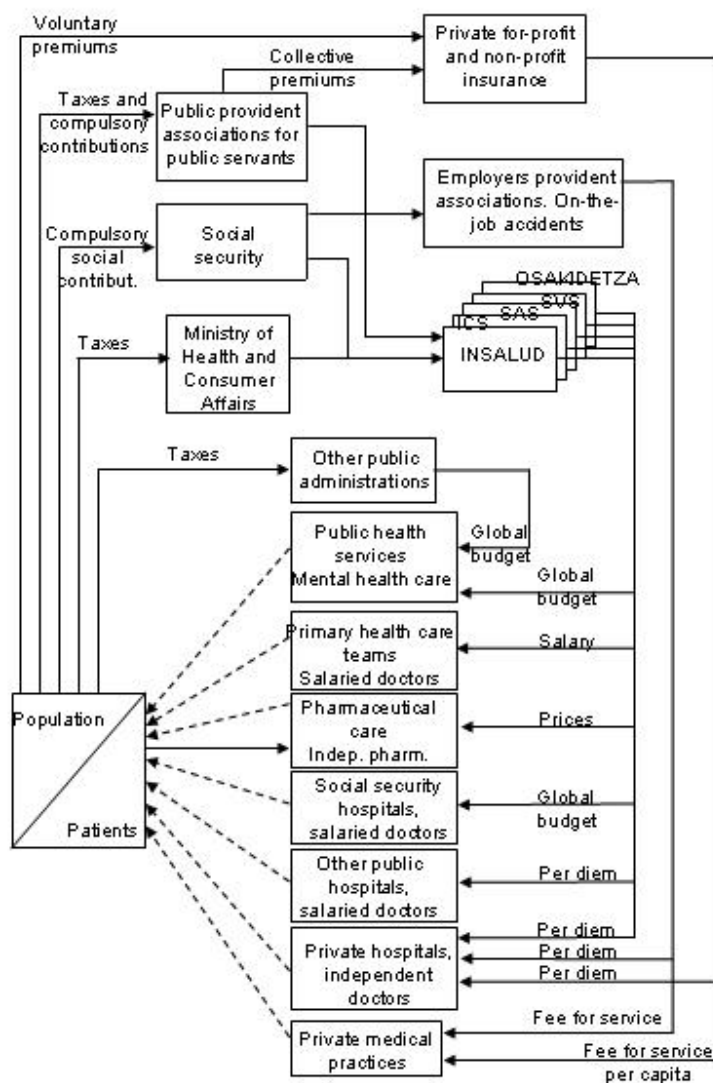
PORTUGAL (1999)
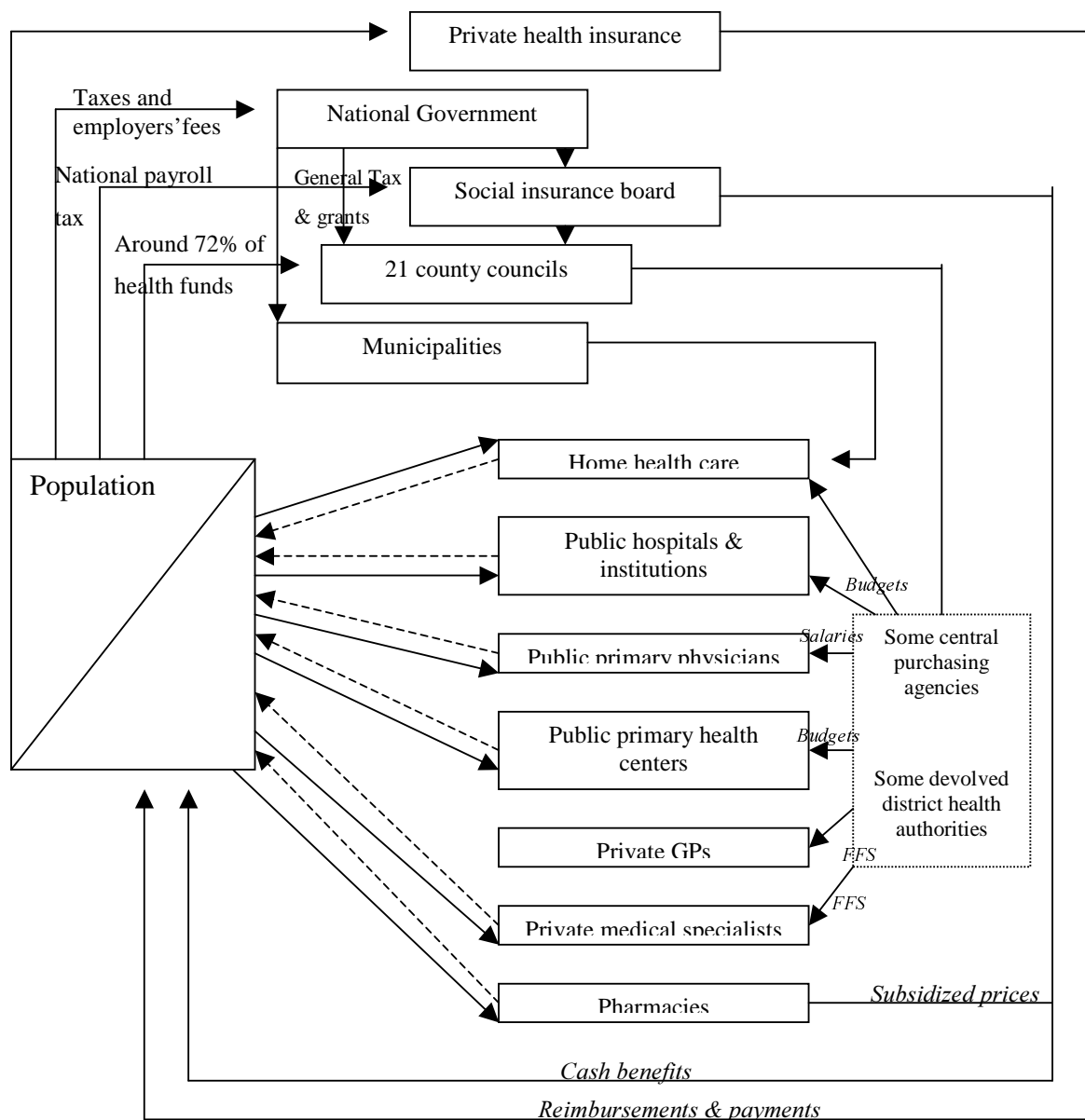
Source: European Observatory on Health Care Systems (1999)

SPAIN (1990s)
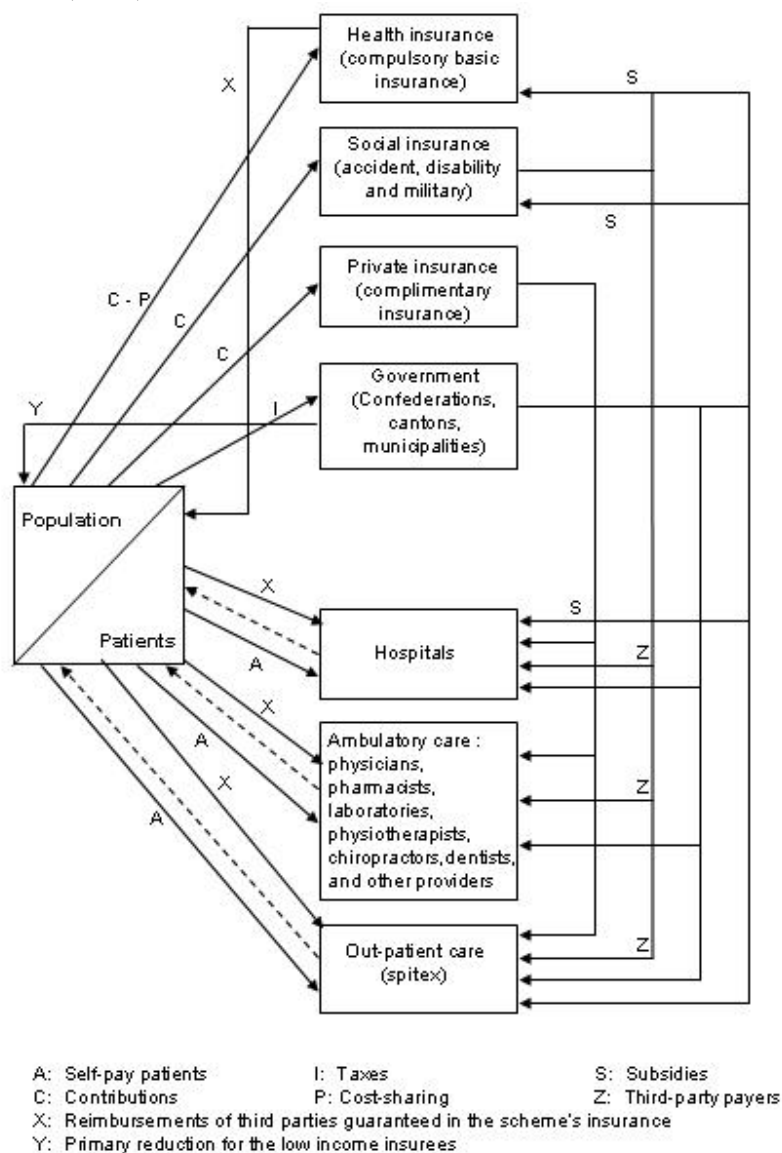
Source: The Reform of Health Care – A comparative Analysis of Seven OECD Countries, Health Policy Studies No. 2, OECD (1992)

SWEDEN (1999)
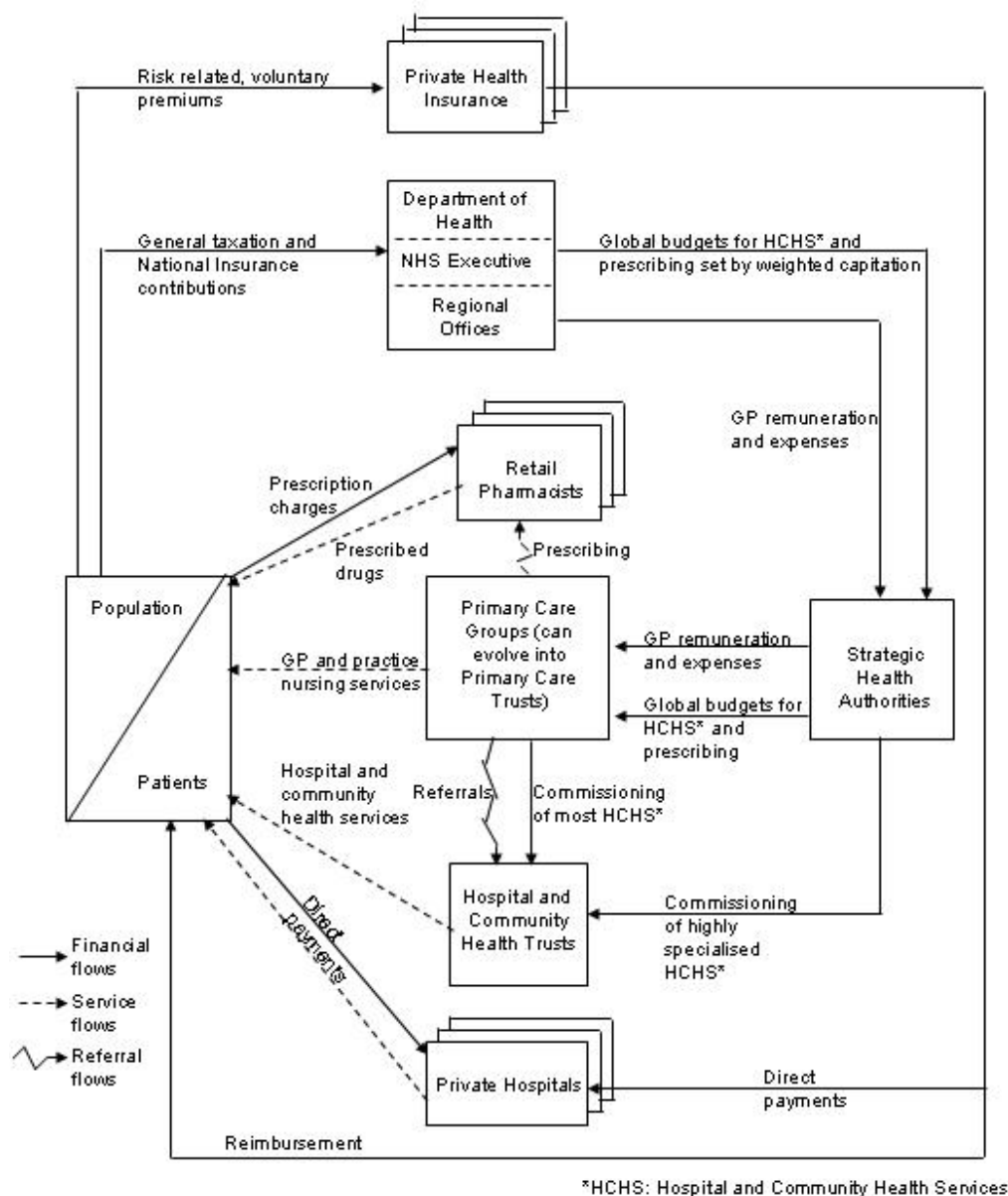
Source: Adapted from, The Reform of Health Care – A comparative Analysis of Seven OECD Countries, Health Policy Studies No. 2, OECD (1992)

SWITZERLAND (1998)

A: Self-pay patients   I: Taxes   S: Subsidies
C: Contributions   P: Cost-sharing   Z: Third-party payers
X: Reimbursements of third parties guaranteed in the scheme's insurance
Y: Primary reduction for the low income insurees
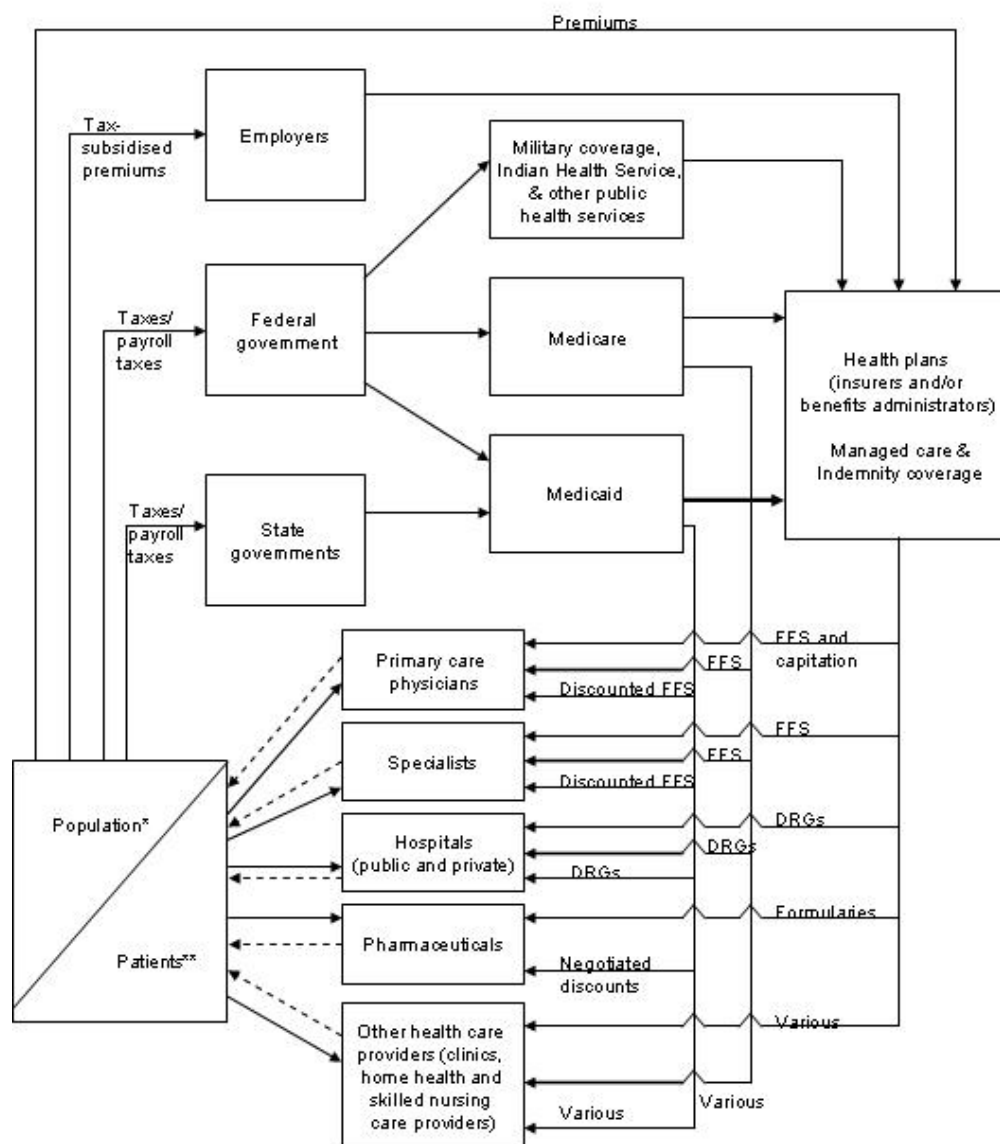
Source: Federal Office of Statistics (1999)

UNITED KINGDOM (after the 1999 reform)

Source: Department of Health (2000)

UNITED STATES OF AMERICA (2003)

*Health care for the 14% of the population lacking health insurance coverage is financed by publicly subsidized charity care and patients' out-of-pocket payments to health care providers.

**Patient cost-sharing arrangements vary widely by type of coverage. Indemnity coverage generally includes deductibles and co-insurance. Managed care plans often require co-payments s for certain services.

Source: OECD Secretariat (2003)

ANNEX 4: ABBREVIATIONS OF SWISS CANTONS

AG   Aargau

AI   Appenzell-Innerrhoden

AR   Appenzell-Ausserrhoden

BS   Basel City

BL   Basel Land

BE   Bern

FR   Fribourg

GE   Geneva

GL   Glarus

GR   Graubünden

JU   Jura

LU   Lucerne

NE   Neuchâtel

NW   Nidwalden

OW   Obwalden

SH   Schaffhausen

SZ   Schwyz

SO   Solothurn

SG   St. Gallen

TG   Thurgau

TI   Ticino

UR   Uri

VS   Valais

VD   Vaud

ZG   Zug

ZH   Zurich

ANNEX 5: ECONOMETRIC RESULTS OF THE SWISS ANALYSIS WITH THE AMEMIYA-MACURDY ESTIMATOR FOR ERROR COMPONENT MODELS

Coefficient	AMEMIYA-MACURDY
Constant	8.855*** (1.180)
Income (Y)	- 0.118* (0.062)
Unemployment (UN)	0.008 (0.011)
Poverty (PO)	0.021 (0.226)
Over 75 (A75)	0.288*** (0.104)
Under 5 (A05)	- 0.157 (0.132)
Mortality (MO)	- 0.268 (0.228)
Density of Population (DP)	0.087*** (0.032)
Direct Democracy Index (DDI)	0.099 (0.194)
Physicians (PHY)	0.170* (0.098)
Acute beds (BEDS)	- 0.014 (0.015)
French- and Italian-speaking cantons (DLAT)	0.276* (0.142)
Time (T)	0.035*** (0.004)

*, **, ***: significantly different from zero at the 90, 95 and 99% confidence level.

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AUSTRIA

Ministry of Health, Labor and Social Affairs: http://www.bmgf.gv.at/

Statistics Austria: http://www.oestat.gv.at/

BELGIUM

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Statistics Belgium: http://www.statbel.fgov.be/

CANADA

Department of Health: http://www.hc-sc.gc.ca/

Statistics Canada: http://www.statcan.ca/

DENMARK

Ministry of Health: http://www.im.dk/

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FINLAND

Ministry of Social Affairs and Health: http://www.valtioneuvosto.fi/

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FRANCE

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GERMANY

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GREECE

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IRELAND

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ITALY

Ministry of Health: http://www.ministerosalute.it/

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LUXEMBOURG

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THE NETHERLANDS

Ministry of Health, Welfare and Sport: http://www.minvws.nl/

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NEW ZEALAND

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NORWAY

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PORTUGAL

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SPAIN

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SWEDEN

National Board of Health and Welfare: http://www.sos.se

Statistics Sweden: http://www.scb.se/

SWITZERLAND

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UNITED KINGDOM

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UNITED STATES OF AMERICA

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