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## **DIPLOMOVÁ PRÁCE**

### **Provider Payments in Healthcare**

*The Influence of Payment Mechanisms on Behaviour of the Health  
Care Providers*

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### **Platební Mechanismy ve Zdravotnictví**

*Vliv Platebních Mechanismů na Chování Poskytovatele Zdravotní  
Péče*

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## **PROHLÁŠENÍ**

Prohlašuji, že jsem diplomovou práci vypracovala samostatně a použila pouze uvedené prameny a literaturu.

*Except where reference is made to the work of others, the work described in this thesis is my own or was done in collaboration with my thesis supervisor.*

V Praze dne 28. 6. 2010

## **PODĚKOVÁNÍ**

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## **ABSTRAKT**

Velká část neefektivit, s níž se potýkají zdravotní systémy dneška, vyvstává z chování jednotlivých hráčů vystupujících v oblasti zdravotnictví. Tato diplomová práce se zaměřuje na chování poskytovatelů zdravotní péče a existující nástroje přispívající k omezení neefektivit způsobených jejich chováním. Zásadní hypotézou této práce je problém působení poskytovatelů zdravotní péče jako nedokonalých agentů.

Pozornost je věnována specifickým nástrojům představovaným úhradovými mechanismy, které jsou využívány ve zdravotních systémech, zejména ve vztahu mezi poskytovatelem a třetí stranou nákupčího zdravotní péče. Práce dává přehled základních úhradových mechanismů, jejich výhod a úskalí. V rámci jednoduchého teoretického modelu potom umožňuje srovnání některých mechanismů zaměřujíc se na jejich vliv na nákladovou efektivitu, prevenci, vytváření čekacích seznamů a produkci zdravotní péče. Základem analýzy jsou užitkové funkce tří důležitých stran podílejících se na chodu zdravotních systémů: poskytovatelů zdravotní péče, nákupčích zdravotní péče a pacientů.

## **ABSTRACT**

A great proportion of inefficiencies the health systems need to deal with arise from the behaviour of the health sector actors. This thesis will focus on the behaviour of health care providers and some of the existing tools which might help to eliminate inefficiencies their behaviour causes. The crucial hypothesis this paper was built upon concerns the imperfect agency problem of the health care providers.

The attention is paid to a particular sort of tools represented by various payment mechanisms implemented in the health systems within the relationship between the health care providers and the third-party purchasers. The paper revises some of the most common payment methods, their diversity, advantages and limitations.

This thesis presents a simple theoretical model which provides a comparison of some payment mechanisms focusing on their enhancement of cost-efficiency, prevention, creation of waiting lists and production of health care. The analysis is based on utility functions of three important actors of the health systems; health care providers, third-party purchasers and patients.

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## **INTRODUCTION**

Health is one of the most treasured values in a life of all people. Although one can object that health care concerns above all issues connected with medicine, doctors, death and life, economics is one of the important pieces creating the mosaic of health care problematic at national and supranational levels.

*“In principle economists are concerned with better choices and in particular making the best use of existing resources and growth in the availability of resources...As economists started to work on problems in the health sector, the new discipline of health economics emerged.”* (McPake, Kumaranayake, & Normand, 2002, p. 3)

With the development of new technologies, methods and innovative knowledge, with the evolution of people’s expectations about their life standards, prolongation of life expectancy, growth of median age as well as the growing importance of the health care sector within economies the world became interested in profound aspects of the systems within which healthcare is provided and whose management and structure may influence not only the level of success of health sector but may have an impact as well on other fields of human activity, other public or private sectors. Existence of this new interest in health care field also from the point of its functioning and financing emerged a new discipline called health economics.

Two main streams influencing the development of health systems may be identified. The first one can be called economic aspect, which is given especially by the problems which stem from technological and demographic development, from the changes of people’s expectations concerning their health, issue of difference between the needs of patients and their demand for health care, information asymmetry problem and the overall economic worries which all put pressure on public budgets and their limited resources. The second may be recognized as an issue of social values, in other words range of objectives the societies require to be treated by the health systems, which extended greatly during the last decades. Both of these aspects need to be taken into consideration during the decision-making in order to find a well-functioning and sustainable setup of health systems.

This thesis analysis focuses on especially European health systems, which, in general, are publicly funded<sup>1</sup>. This means that the health care systems are designed to finance all or most of the care provided from the publicly managed funds, whose income is, on the whole, given either by taxation or by national health insurance, covering almost 100 % of inhabitants in most of the European countries. The fact, that health sector is one of the fields which take a great part in the public expenditure division, stirs among the policy makers even larger feeling of necessity to optimise the functioning of the health systems. Trying to find a more efficient way of organizing the health systems, to avoid failures while satisfying all the objections demanded by the society, leads to immense discussion concerning various aspects of health care.

A great proportion of inefficiencies the health systems need to deal with arise from the behaviour of the health sector actors. In this thesis we will focus on the behaviour of health care providers and some of the existing tools which might help to eliminate inefficiencies their behaviour causes. The crucial hypothesis this paper was built upon concerns the imperfect agency problem of the health care providers, which is also a fundamental issue solved by whole health economics.

The attention will be paid to a particular sort of tools represented by various payment mechanisms implemented in the health systems. The main concern of the thesis will be those systems, where the purchaser's role, executed by a third-party payer, is separated from the provision of health care. The paper concentrates mostly on publicly funded European health systems and their practice and experience.

The third-party payers dispose of various tool contributing to enhancement of better performance of health care providers. Among the ways the payers may influence the providers' behaviour belong for instance payment mechanisms and contracting, however, the real extent of power within which the third-party purchasers operate, in order to minimise these inefficiencies, depends on various factors such as the nature of the provider organizations, their form of ownership, their degree of autonomy and scope for decision making and the type of market structure.

This paper will draw its attention particularly to payment mechanisms, their diversity, advantages and limitations. Although, as will be seen below, there is a great

---

<sup>1</sup> According to the World Health Statistics 2010, the median share of the private resources (including the private resources used for private health insurance) in the European region equals 24%, while 76,2% percent of countries' private expenditures do not exceed 40% of total health expenditures.

extent of the literature concerning description of various payment mechanisms and experiences of various economies with their implementation, only little part of these sources pays attention to more theoretical analysis of their influence on the health care providers' behaviour. On the basis of health economics, behavioural economics (principal-agent models) and microeconomic analysis of the utility functions of the particular actors it will attempt to compare particular payment mechanisms by focusing on their enhancement of some factors important for the systems' functioning.

The analysis used in this thesis is based on utility functions of three important actors of the health systems; health care providers, third-party purchasers and patients. The defined utility functions are then further used to set a simplified theoretical model in order to compare influences of particular payment mechanisms on the behaviour of health care providers. The original model was introduced by Seidman & Frank (1985) and later adjusted by Roubal (2005) comparing some aspects of the DRG and per diem payment mechanism used to reimburse hospital health care. For the purposes of this paper, the model was slightly reformulated and adjusted in order to enable a comparison of payment mechanisms separately for the outpatient and for the inpatient health care provision. The analysis introduced in this thesis concentrates particularly on factors such as volume of health services provided, prevention, cost efficiency or waiting lists.

*“Optimal payment contracts for providers should induce providers to render high-quality, effective treatments, while promoting a rational allocation of resources to and within the health sector.” (Langenbrunner & Liu, 2004, p. 2)*

Chapter 1 of this paper provides the reader with a general insight into the issues which present the core subjects of recent debates about health care at the policy-making level. The chapter rather points out the main streams of the health reforms of the last decades invoked by the changes of importance of health and health systems in society. The issue of health and health systems and their financing is presented vis-a-vis some of the recent challenges presented by drivers such as technology and medical development, changes in people's expectations, demographic changes, growth of the health sector and its importance, etc. All these changes and factors have greatly influenced the position health care occupies in minds of the societies nowadays, given their values and expectations.

Chapter 2 focuses more thoroughly on some aspects of the health care market. In order to prepare good background for the further analysis, it introduces four crucial terms typical for the field of health systems. The important notions which will play an important role in setting up the assumptions of the model presented in this thesis are: consumer's sovereignty, imperfect agency, perfect agency and medical necessity. Further in the chapter, the reader will be introduced to the aspects of purchasing in health care, particular attention will be paid to the method of strategic purchasing and some of its specificities; third-party purchasing and triple principal-agent problem. Last part of the chapter will attempt to define utility functions for three of the main health system players; patients, health care providers and third-party purchasers.

The following two chapters present the core of this paper. Chapter 3 discusses various payment mechanisms, their use in different health systems, their advantages, limitations, some possibilities of their adjustments taking into consideration the impact they have on the behaviour of the health care providers vis-a-vis objectives and goals of well-functioning health systems. The description was limited more or less to those mechanisms which are used in the European countries (especially the member states of the European Union).

Chapter 4 will present a simple theoretical model which shall enable the reader to compare the basic extent of influence of various payment mechanisms on the health care provider behaviour and decision-making. The model used in this paper was inspired by a model presented by Seidman & Frank, 1985 which was adjusted by Roubal, 2005. The comparison focuses on four main aspects: the influence the particular payment mechanisms have on production of health care services and their provision, whether these contribute to the creation of waiting times, their impact on cost efficiency in providers' behaviour and the role of incentives to prevention in each of the mechanisms.

## **Chapter 1: RECENT CHALLENGES OF HEALTH SYSTEMS**

This chapter gives a brief introduction to the European health systems taking into consideration their reforms which took place during the last century, moving from the goal of all possible care for everyone to rather high-quality essential care, and the challenges which preceded them. This part stresses the growing importance of health sector for the world economies with the focus on European countries. The chapter describes the framework of health systems of these days given, on one hand, the crucial drivers which exert pressure on the systems' financing while, on the other hand, confronting it with the basic objectives and value basis of health systems. Three objectives are pointed out in order to set a background for further discussion, which will follow in next chapter of the paper.

During the last century, the European health systems went through a large scale of reforms. The crucial ones started by the foundation of national public health systems established in many countries after the World Wars, and the extension of social insurance schemes<sup>2</sup>. Another characteristics of the health systems functioning in most European countries is their reliance on state insurance systems, which have progressively expanded between 1960s and 1990s<sup>3</sup>.

Right to health was included as a human right and the governments started to seek *health for all* as the main goal of their health systems. In order to reach universal coverage which could have guaranteed access to health care for the whole population, the systems began to focus on primary care. However, given the large amount of attention paid to the perceived needs of people, little importance was devoted to the individuals' demand for health. The supply-side of health care had to put up with difficulties caused by the inability to meet both of these requirements. However, attempts to fulfill all the needs for health care without taking into consideration the expressed demand for health care may lead to overproduction of health care (supply effect) and to overconsumption (demand effect) of services, effects which, in general, greatly burden the public health systems, which deal with limited financial resources<sup>4</sup>.

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<sup>2</sup> Oxley & MacFarlan, 1994.

<sup>3</sup> Zápál & al., 2009.

<sup>4</sup> Oxley & MacFarlan, 1994.<sup>5</sup> See Figure 1.

Given the increase of growth rates of health-care spending (in absolute as well as real terms<sup>5</sup>) over the 1960s and 1970s most governments considered the health expenditure inconsistent with sustainability in the sector of public finances, which contributed to an increasing concern of policy makers with finding ways to bring these expenditures under control. Initially, governments aimed at constraining health-care spending through various kinds of macroeconomic restrictions. Since these often created problems in the provision of health care, nowadays the focus turned to encourage more efficient provision of care<sup>6</sup>.

In its report from 1999 the World health organization introduced a notion of “new universalism“ into the health care debates. This term recognizes limits the governments face, however, at the same time it retains their responsibility for leadership, regulation and finance of health systems. The report stresses that if services are to be provided for all, then not all services can be provided. At this time, the health systems began to place emphasis rather on *high-quality essential care for all* instead of *all possible care for everyone*, and along with that the search for well-functioning health care systems, effectiveness, cost and social acceptability gained their importance.

On the other, the expectations of people about health care services, their accessibility and quality rose naturally, given the ever growing medical technological progress. New drugs and medical devices made people believe in and expect growing quality and efficacy of the treatments they received. Moreover, the raising stock of physical facilities for health care and rising number of medical personnel, led to rising supplier-induced demand (see Chapter 2.1.4.). On top of that - in some countries it has already become a problem, in others it is a threat for the future - the prices of the health-care sector inputs started growing relative to the GDP deflator while at the same time the working-age population started shrinking caused by the population ageing<sup>7</sup>.

Unnecessary increases in healthcare spending may reduce the capacity of economies to expand over time, as well as it places limits on governments’ fiscal capacities to address other policy goals which might also have a positive impact on health outcomes<sup>8</sup>.

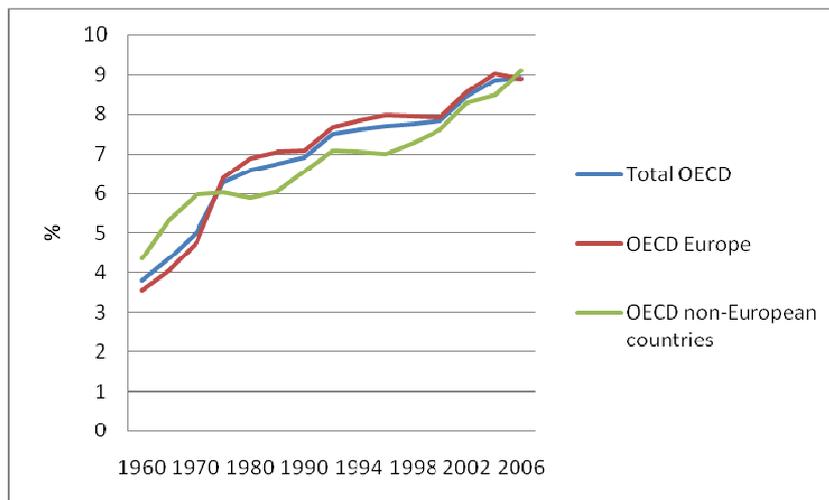
**Figure 1: Total expenditure on health care as a percentage of GDP, 1960-2006**

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<sup>6</sup> Docteur & Oxley, 2004.

<sup>7</sup> Persons aged over 65 consume, on average, roughly four times as much health care as those below 65 (OECD, 1987).

<sup>8</sup> Oxley & MacFarlan, 1994.



Source: OECD Health data 2009.

As Figure 1 demonstrates we may observe an increasing trend of the share of health expenditures relative to GDP in the member countries of OECD in the years 1960-2006, which signifies generally growing importance of the health care sector.

The health-care sector became an important industry in many economies. Oxley (1994) states that in the OECD member states, on average, employment in the health-care sector in the year 1992 was ranging between 4,4 and 10 % of total employment. This suggests that governments, when setting new reforms, need to look beyond the immediate problems of public finance and deficits to the broader issue of the efficiency of health care provision. As well should it take into account the implications for economic performance of all sectors of the economy.

Originally, as the fundamental objective of health policy making was considered particularly the access to health care. This was approached first by making insurance coverage of essential care universal and later by taking steps to eliminate financial barriers, ensure adequate supply and address disparities related to social characteristics. Only quite recently, as a reaction to the rising importance of health, the countries turned their attention to other dimensions of health system performance, which shall ensure that the system works to improve health and functional ability, be more responsive to the needs of patients providing an adequate level of satisfaction to patients as well as to the society, stress the requirement of greater efficiency in allocation of scarce resources<sup>9</sup>.

<sup>9</sup> Docteur & Oxley, 2004.

## 1.1. Objectives of health care systems in European countries

As mentioned above, over the last century the concept of health and health systems in the societies went through important changes, transforming from *all possible care for everyone to high-quality essential care for all*.

Recent health systems deal with health expenditure drivers such as population ageing, technological progress, ageing of population or demand induction (further described in Chapter 2.1.4.). In the light of these factors, the debates over the well-functioning health systems are suddenly forced to take into consideration newly set objectives of health systems. Next to allocation of resources and efficiency, responsiveness to health care needs of the citizens, quality requirements and the principle of solidarity as well as the new notion of financial sustainability<sup>10</sup> became a matter of discussion.

According to the World Health Organization<sup>11</sup> the objective of good health is twofold. One aspect is the *goodness*, which calls for health systems well-responding to the people's expectations. Another aspect is *fairness*, requiring health systems which are able to respond equally - without discrimination - to everyone. With respect to well-functioning health systems, the World Health Report (2000) punctuates three essential goals of health systems: *good health*, *responsiveness* to the expectations of the population and *fairness of financial contribution*.

OECD paper by Oxley & MacFarlan (1994) also defines three broad goals, which are usually pursued by governments in the field of health care. The first of these goals presented is *equity* which points out access of all citizens to some incompressible minimum level of health care. According to this objective, treatment should be based on need for care rather than solely on income and individuals should be offered some degree of protection against the financial consequences of falling ill, and payment for this protection should be income-related rather than based on individual risk. The second objective is *microeconomic efficiency*, which states that quality of care and consumer satisfaction should be maximised at minimum cost. Third term focused on is *macroeconomic cost control*, dealing with appropriateness of the share of GDP consumed by the health sector.

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<sup>10</sup> See Thomson et al., 2009.

<sup>11</sup> WHO, 2000.

According to the European Commission, the health system objectives of particular interest are *accessibility*, a term which means ensuring access to healthcare on the principles of universality, equity and solidarity. Another objective is *quality*, which shall afford the patients with safety and consistent standards; *sustainability*, which should maximise health improvement using the resources available while at the same time not leave any individual without reasonable and appropriate care<sup>12</sup> (for further explanation of appropriateness of health care see Chapter 2.3.2.).

*“A wide range of objectives are often put forward in various mixes in different policy documents, including health gain, cost containment, solidarity, health outcomes, allocative and technical efficiency, consumer satisfaction, equity access, choice, quality, transparency, accountability, citizen participation and provider satisfaction. These objectives may all be important but they exist on different levels – from the philosophical to the technical and operational – overlap with each other and are often difficult to define and measure.”*  
(Figueras, Robinson, & Jakubowski, 2005, p. 46)

Although different resources accentuate slightly different objectives and goals of health systems, the European national policy makers broadly agree on the core objectives that their health systems shall pursue. The list of objectives is comprised of: *universal access* for all citizens, *effective care* for better health outcomes, *efficient use* of resources, *high-quality services* and *responsiveness* to patient needs. However, putting emphasis on just one of these objectives might cause a large simplification for well-performed health systems, therefore when willing to reach one we always need to have in mind all the other objectives as well<sup>13</sup>.

Throughout this thesis, the author will focus particularly on three objectives, which will become the main framework of the analysis of individual payment systems.

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<sup>12</sup> HLG/2004/5, 2004.

<sup>13</sup> Oxley & MacFarlan, 1994.

### ***1.1.1. Efficiency***

According to Murray, Evans, & eds., 2003 there are two levels of understanding the efficiency of health systems. The first one concerns the “value for money”, and the second one takes into account the allocative efficiency. *Value for money* is the term used to assess whether an organization has or has not obtained the maximum benefit from the goods and services it gets or provides, taking into consideration available resources. On top of the issue cost it also looks at quality, resource use, fitness for purpose, timeliness and convenience, which – altogether – shall constitute a good value. On the other hand, the *allocative efficiency* focuses on distribution of resources among different interventions in order to maximize the overall health levels achieved from available resources.

Palmer & Torgerson, 1999 examine three concepts of efficiency: technical, productive, and allocative. *Technical efficiency* refers to the physical relation between resources (labour and capital) and health outcome, addressing the issue of using given resources to maximum advantage. *Productive efficiency* considers the choice of different combinations of resources to achieve the maximum health benefit for a given cost. *Allocative efficiency* then represents the productive efficiency with which healthcare resources are used to produce health outcomes in combination with the efficiency with which these outcomes are distributed among the community. According to them, adoption of the criterion of economic efficiency implies that society makes choices which maximise the health outcomes gained from the resources allocated to healthcare. Inefficiency then occurs when the resources could have been reallocated in a way which would have increased the beneficial health outcomes produced.

This paper will be mainly concerned with the value for money definition of efficiency, in other words the improvements of health the health care provision contributes to with regard to cost containment. One of the major inefficiencies in this sense, which the health systems have to face, is the over-production of health care in certain health sectors, while at the same time there is a lack of production of other health services, given, for instance, the existence of waiting lists, limited access to high quality specialized health care in some countries, restrictive limits on treatment using modern methods and medicaments. This problem is caused by lack of incentives within the contractual relations between insurers and patients and between insurers and providers of health care. Asymmetry of information between providers and third-party payers makes it difficult for payers to judge whether treatments are, in fact, necessary. In the paper we will be mainly

dealing with the problem of over-production, which is not, however, a pure question of costs but also quality and utility of delivered services, which are all factors playing an important role in improving the health systems' performance.

Clearly, this means that if policy makers decide to implement purchasing (see Chapter 2) as a tool to improve the performance of their system by rising their efficiency and quality, they need to choose a more complex approach to purchasing than just a simple reimbursement of providers for the costs of products and services. It is necessary to find such a way of purchasing which is able to ensure that the services bought satisfy the needs and values of the society. This approach shall not only raise the *allocative efficiency*, but it shall also take into consideration the *value for money*, making sure the money spent leads to the most cost effective and the fairest provision of services possible.

### ***1.1.2. Quality***

Quality is a multi-dimensional variable. According to McPake, Kumaranayake, & Normand (2002) good quality in health care requires appropriate facilities and equipment, short waiting times, good clinical outcomes, timely and accurate information or good food. Additional aspects of quality which can be mentioned are the time the provider spends in interrogation of the patient and the carefulness with which he examines and treats the patient. Although it belongs to one of the most important objectives of health systems, it is very difficult to be measured. McGuire (2000) recognizes an important aspect of quality which is its non-contractibility, which means that for the third-party purchaser, the quality is hard to measure and control and therefore very difficult to put into the contract between the purchaser and the provider. All health systems attempt to introduce a type of a regulation in order to ensure some level of a quality control in health care provisions.

The most commonly named mechanisms which aim to assess and ensure quality are accreditation, the use of quality registers, systems of performance indicators, complaints mechanisms, etc. All these regulatory mechanisms aim to induce providers to choose higher levels of quality of the care they supply. They either attempt to exploit providers' interest in pursuit of profit to do this, or to exploit providers' interest in quality for its own sake.

The regulatory mechanisms may either concentrate on the supply or the demand side, depending on the particular background of each health system. The methods which target the supply side are usually aiming to make it more expensive to provide poor-quality

than to provide high-quality health care. Alternatively, if we assume the profit motive of providers, regulatory mechanisms can focus on the demand side. It signifies that the consumers (patients) will be encouraged to raise their own willingness-to-pay for higher-quality services. This method will then shift the demand curve to a point where it becomes more profitable to supply higher-quality health care. However, the remaining question is: Are the patients able to recognize high-quality healthcare? This subject will be discussed further on in Chapter 3.1.1.

### ***1.1.3. Responsiveness***

The term responsiveness in the field of health care can be looked at from two basic perspectives; responsiveness to the patient needs or responsiveness to the expectations of the population. These two distinctions can lead us to the maximisation problem of providers which will be discussed in the Chapter 2.1.2. and Chapter 2.3. Shall the health-care provider maximise patient's utility function (which represents also his expectations) or his health status (which shall mirror his needs no matter up to which extent the patient is aware of them).

The most problematic is its measurement. What methods shall we use in order to reveal the level of responsiveness in health systems? Different organizations try to find an answer to this question. For instance the World Health Organization's work on health systems responsiveness aims to develop the technical tools to assess, monitor and raise awareness of the ways the patients are treated as well as of the environment in which they are when seeking health care. The Organization for Economic Co-operation and Development in collaboration with the World Health organization, the Commonwealth Fund, the Dutch Centre for Consumer Experiences in Health Care and country experts runs the HCQI project which is focusing on the development of population based survey and learning and sharing of national systems for the measurement of patient experiences.

For the purposes of this paper, there will be made specific assumptions about the state of development of measurement of responsiveness in health systems for the uses of the theoretical model, which will be introduced in Chapter 4.

## **Chapter 2: PURCHASING IN HEALTH SYSTEMS**

The following chapter briefly consults some basic characteristics of the health care markets. Some terms, such as consumer's sovereignty, perfect agent, imperfect agent, medical necessity, will be introduced in order to enhance clarity and complexity when setting assumptions for the graphical model presented further in Chapter 4. Second part of this chapter will pay attention to the subject of purchasing in health care sector, explaining the method of strategic purchasing which was introduced in the health systems of many European countries. As a part of strategic purchasing we will discover the issue of third-party purchaser and closely related matter of triple principal-agent problem which accrues from the relationships among health care providers, health care purchasers and patients. The last section of this chapter will concern utility functions of three health system players - patients (consumers), health care providers (producers), third-party payers (purchasers) - and the variables influencing their shape. The utility functions are described with regard to the needs of analysis presented in the chapters below, therefore they focus particularly on some variables, while they omit other variables with a relatively smaller importance for this paper.

The analysis of this thesis focuses mainly on the European health systems, which are in general publicly funded. This means that the health care systems are designed to finance all or most of the care provided from publicly managed funds. Their strong reliance on public provision of insurance was influenced among others by three fundamental reasons: adverse selection problem which might limit access to affordable insurance for high-risk individuals, moral hazard which implies a propensity to consume beyond the social optimum and information asymmetry putting the providers of health care in a position when they might induce the demand for care. Health systems based on public insurance scheme are basically financed either via taxation or via national health insurance, covering between 90-100 % of inhabitants in most of the European countries<sup>14</sup>. For most of the European health systems it is characteristic that their health insurance is commonly compulsory, attempting to protect the patients from harm caused by their poor investment decisions or their own ignorance.

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<sup>14</sup> Zápál, 2009.

Basically, the health expenditures in all European health systems are financed by public or private resources. The latter contain the expenditures on private health insurance and some form of *out of pocket payments* paid by a patient directly to the provider in full, by user fee, cost sharing or deductibles. When focusing on direct payments of patients (out of pocket payments), in that case there is no necessity for the third-party to enter the transaction and the patients carry part or all of the risk. The introduction of these payments became part of most of the health care reforms during the last two decades, especially as a consequence of overconsumption<sup>15</sup> of health care, particularly in the systems with full insurance, where the consumers did not face the costs of the care they demanded.

In a perfect market, consumers (patients) express their willingness/ability to pay through consumer demand. Suppliers compete in a full market and prices are at the equilibrium point between the expressed demand and supply. The advantage of direct payments in health care lies in the clarity of the signal it sends to the consumer about the price of the service supplied. In addition, it makes the health care provider aware of the demand. In contrast, its major disadvantage is that poor patients or patients receiving expensive care for major illnesses may not have the disposable income needed to surpass the period between having paid for the service and receiving a full or partial reimbursement from the insurance company<sup>16</sup>. The issue of direct payment flows from the patients to the providers is a matter for a thorough discussion which will not be a part of this paper, which will focus particularly on the payment mechanisms which the third-party purchasers enter in, using the mechanisms as a tool to influence the providers' behaviour.

## **2.1. Some characteristic features of health markets**

The oncoming paragraphs will address briefly some specific features of the health markets which will be useful for further development of the topic, moreover they will be needed for defining the assumptions of the model introduced in the Chapter 4.

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<sup>15</sup> Over-consumption in the health sector is governed by changes in demand-side variables, such as the substitution of family for institutional care, or the rise in pharmaceutical consumption. The most common ways used in fighting overconsumption are usually the reduction of demand for health care by the use of increasing user charges, or other out-of-pocket payments (Oxley & MacFarlan, 1994).

<sup>16</sup> Figueras, Robinson, & Jakubowski, 2005, p. 236.

### ***2.1.1. Consumer's sovereignty***

Standard economic models suppose that the consumers are sovereign in making their own decisions, assuming that they are the best judges about what is best for them. However, in health care, ignorance on the consumer's side is not matched by ignorance on the part of the provider. Therefore, an asymmetry exists.

*“Basically, consumers desire improvements in or maintenance of health status. However, improvements in health status cannot be purchased in the market. The consumer is forced to purchase health care in order to achieve an improvement in health. Health care itself is normally of no value but is linked to health improvements via a ‘technological’ relationship about which doctors know more than consumers.”* (Donaldson & Gerard, 2005, p. 44-45)

The information asymmetry the consumer is forced to deal with during the decision-making process constitutes an inefficiency for the consumer who is seeking all relevant information concerning his/her health status and its improvement while trying to understand them on his own. Therefore we observe the use of agents – doctors and other medical staff, who are directly or indirectly “employed<sup>17</sup>” by the consumers (patients), who are playing role of principal. Given the lack of ability of consumers to judge what types, amounts and qualities of health care they need, or even to judge when care is needed, the doctor is placed in a position of advising the patient on his/her consumption.

In some cases of the principal-agent relationship, a great part of their occurrence is encountered in health markets where the agent is at the same time the supplier of the service. This means that demand and supply are not completely separable and gives rise to the risk that agents-suppliers will abuse their role as agents following their profit-seeking interest as suppliers. The doctor acts as an ‘agent’ on the patient's behalf. This places the doctor in a unique position of influence in which he can act as both demander and supplier of health care. The opening for misbehavior leads us to question the two sides of physician's agency - physician as a perfect or as an imperfect agent<sup>18</sup>.

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<sup>17</sup> Whether the doctors are employed directly or indirectly by the patient depends on each system and its application of third-party purchaser – to be discussed in Chapter 2.2.1. and 2.3.3.

<sup>18</sup> Donaldson & Gerard, 2005.

### **2.1.2. Perfect agent**

Health care provider is exposed to a role of an agent, whose principal is the patient, however we shall ask, what “kind” of agent do the providers play. Can a health care provider with his own interests, such as income, leisure or professional satisfaction play a role of a perfect agent?

*“The ‘perfect agent’ would need a split brain, one half advising the patient solely in the patient’s interest, the other half reacting to the patient’s resulting consumption choices in a self-interested, own-welfare maximising way.” (Evans, 1984, p.67)*

First we will look at what we could expect from a general practitioner working as a ‘perfect’ agent. McPake, Kumaranayake, & Normand (2002) recognize three possible objectives of a doctor acting as a perfect agent:

1. Maximisation of the health status of the patient.
2. Maximisation of the utility of the patient.
3. Maximisation of the health status or utility of the whole society.

The first option means that the doctor shall try to persuade the patient to avail her/himself to all the treatment which is necessary to her/his cure. By contrast, the second possibility places a doctor to the role of an advisor, someone who will provide the patient with all information but lets him to freely decide about undertaking a particular treatment. Although McPake, Kumaranayake, & Normand (2002) do not take it into consideration, this view can be extended by the provider maximising individual utility by taking into account also relative efficacy of a treatment for particular patient vis-a-vis discomfort and pain it will cause her/him. The third option mirrors the growing awareness of inevitability of rationing in health care – awareness that to provide a service to one patient may entail the denial service of another patient. Choice of one of these objectives depends greatly on each particular health system, its division of the role of doctor’s principal between the patient and the state, and the budget constraints it imposes, etc.

### **2.1.3. Imperfect agent**

It is perhaps the wish of any patient who comes for advice or treatment to a physician, that the advice he gets will not be based only on the physician’s profit motive.

However, it is clear, that doctors are human, and fall short of the ideal because their decisions, as those of any other economic agents, are influenced also by financial incentives.

*„Imperfect agency (due to unobservable medical effort) is a recognized market failure in health care“.* (Kenneth, 2008, Abstract)

*“When advice responds to economic incentives, doctors cannot be applying their best guess about the best possible treatment all of the time.”*  
(McPake, Kumaranayake, & Normand, 2002, p. 54)

Imperfect agency (in the doctor-patient relationship) results in two adverse outcomes, depending on the payment scheme. Under retrospective reimbursement, there is a danger that doctors will be induced to over-treat in order to boost their net revenue. Under prospective payment, the incentive might be to under-treat. The incentives provided by these payment schemes lead to agency costs in the form of inefficiency<sup>19</sup>.

#### **2.1.4. Supplier-induced demand**

The combination of information asymmetry discussed above and space for opportunism give rise to the potential for the much debated phenomenon in health economics, which is ‘supplier-induced demand’.

*“Supplier-induced demand refers to a specific type of agency imperfection and implies that in order to promote her own interests, the doctor recommends care the perfect agent would not recommend.”* (McPake, Kumaranayake, & Normand, 2002, pp. 50)

*“Roemer’s law: ‘a built bed is a filled bed’.”* (Roemer, 1961)

The phenomenon of supplier (physician)-induced demand hypothesis – associated with Evans (1974) – means that physicians engage in some persuasive activity in order to shift the patient’s demand curve in or out according to the their (the physician’s) self-

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<sup>19</sup> McPake, Kumaranayake, & Normand, 2002.

interest. This becomes even more possible since the patients face incomplete information about their health condition and may be vulnerable to this advertising-like activity.

The debate over the supplier-induced demand in health care is not uniform; there exist studies which confirm its existence<sup>20</sup> as well as studies which conclude this hypothesis as unproven<sup>21</sup>.

### ***2.1.5. Medical necessity***

The notion medically necessary care refers to health service or treatment which is essentially necessary to protect and improve the patient's health status and whose omission could mean harmful consequences for the patient's health. The health systems standardize the level of medical necessity by implementing clinical practice guidelines.

*“Practice guidelines are systematically developed statements to assist practitioners and patients in making decisions about appropriate health care for specific clinical circumstances.”* (Wong et al., 2000, p. 29)

The use of clinical practice guidelines has spread into many health systems all over the world. Their implementation can be found for instance in the health systems of Australia, Canada, Denmark, Netherlands, New Zealand, Norway, United Kingdom or United States. Their use has been increasingly common also in the German health system since 1950s, when the German Medical Association started to develop them for different topics with interdisciplinary aspects. The levels of obligatory force of the use of clinical guidelines vary according to the particular setup of each health systems.

## **2.2. Strategic purchasing**

Purchasing in healthcare is often linked to resource allocation. This connection stems from the fact that the provision of health services requires mobilization and effective use of financial resources, especially when it concerns public financial resources.

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<sup>20</sup> Donaldson & Gerard, 2005, p. 46.

<sup>21</sup> McGuire et al., 1988; Mooney, 1994; Folland et al., 1997.

Purchasing could be then regarded as a mechanism used to allocate the limited financial resources to the producers of health services (health care providers)<sup>22</sup>.

Most of the public health care services originally used to be operated by the *command-and-control models*. However, in the 1990s a great number of countries of Western and Eastern Europe moved towards the second type, the *purchasing-based models*, where the third-party payers are organizationally separated from the providers of health care and the participation of all stakeholders increases<sup>23</sup>.

During the last two decades, for instance the following countries have implemented some kind of purchasing in their health systems: Sweden<sup>24</sup> (introduced by most city councils in 1990s), Finland<sup>25</sup> (1993), Czech Republic<sup>26</sup> (1994), some regions of Spain<sup>27</sup> (1990s), some regions of Portugal<sup>28</sup> (1996), Slovakia<sup>29</sup> (2006), Netherlands<sup>30</sup> (2006).

Although most health systems acquired the purchasing-based approach, their organization of purchasing differs especially with respect to the types of organizations which act as purchasers (e.g. central government, regional government, municipalities, health insurance funds), the number of purchasing organizations and the ways they interact between each other, including the fact of whether or not competition exists among them, the existence of constraints about the volume of healthcare to be purchased, price constraints or recommendations. The health systems also vary in regards to their funding sources (social insurance versus tax-based systems) and jurisdictions (geographical, occupational, religious affiliations). These complex diversities are governed by social, economic, cultural and historical factors of each country.

According to Figueras, Robinson, & Jakubowski (2005), there exist five main elements necessary to better purchasing which then may improve efficiency and performance of health systems. First, the system shall *empower citizens*. The purchaser shall always take into consideration their wishes and needs, their values and view and enable them to choose the most convenient services. Second, the *role of government as a*

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<sup>22</sup> Perrot, 2002.

<sup>23</sup> Figueras, Robinson, & Jakubowski, 2005.

<sup>24</sup> Glenngard, Hjalte, Svensson, Anell, & Bankauskaite, 2005.

<sup>25</sup> Vuorenkoski, Mladovsky, & Mossialos, 2008.

<sup>26</sup> Until 1994 the purchasers had a role of a passive payer. They had to contract for an unlimited volume of health services (Rokosová, Háva, Schreyögg, & Busse, 2005).

<sup>27</sup> Durán, Lara, & van Waveren, 2006.

<sup>28</sup> Barros & de Almeida Simoes, 2007.

<sup>29</sup> Figueras, Robinson, & Jakubowski, 2005.

<sup>30</sup> Schäfer, et al., 2010.

*credible regulator and supervisor* of the purchasers shall be strengthened. The policy objectives shall be defined in a way which would enable their translation from purchasing decision-making into efficiency of the system. The third aim shall be *cost-effective contracting*, in other words, the citizens' needs should be transmitted into contracts in a way which takes into consideration both, the policy objectives and priorities as well as cost-effectiveness of alternative interventions. The purchasers should attempt to better link the planning and the contracting by incorporating evidence-based best practices and inducing an appropriate payment system which will lead to delivering services of high-quality, responsive to the patients' needs, with a high level "value for money". The fourth condition of a better purchasing system is the development of *appropriate purchasing organizations*. These organizations have to be able to carry out all the previously mentioned necessary elements of a well-functioning purchasing system, which is cost-effective, empowers citizens and the public, with a strong government stewardship. Last but not least, a well-performing purchasing model shall lead to *improving performance of provider*, by increasing provider autonomy, making the providers accountable and making a new power balance. The first one of the above states aspects concerns the demand side of the health care markets, the second one refers to the overall functioning of the health systems, the last three points are those which will be important for this paper. Cost-effective contracting, development of appropriate purchasing organizations and improving performance of provider are goals which are partly or fully in the hands of third-party purchasers themselves given by the use of their tools to influence the health systems' performance and efficiency.

Due to the information asymmetry that the health care markets face neither consumers nor producers have full information about preferences, prices or the market in which they operate. Although physicians act as agents for their patients, even they often do not know the full impact of the treatment they are recommending, which may lead to a so called *defensive medicine*<sup>31</sup>. That is why both, consumers' and providers' behaviour are important, therefore pricing and payment mechanisms become crucial mean providing an opportunity to shape the behaviour of both through incentives.

In the World Health Report 2000 the World Health Organization introduced the term *strategic purchasing*, in which proactive decisions of purchasers play a major role in

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<sup>31</sup> Defensive medicine reflects the tendency of a health care provider to supply larger amount of health services in order to prevent the risk of being sued because of under-treatment (Arrow, 1963).

defining which health care services are to be purchased, how and from whom<sup>32</sup>. This method represents an active approach to addressing various market failures that affect consumers, providers, prevail and society in general. For providers in particular, it represents an important factor, although it is only one of many, along with better knowledge about clinical outcomes, cultural factors, and the professional ethics of providers.<sup>33</sup>

*“Strategic purchasing aims to increase health systems’ performance through effective allocation of financial resources to providers, which involves three sets of explicit decisions: which interventions should be purchased in response to population needs and wishes, taking into account national health priorities and evidence on cost-effectiveness; how they should be purchased, including contractual mechanisms and payment systems; and from whom, in light of relative levels of quality and efficiency of providers.”* (Figueras, Robinson, & Jakubowski, 2005, p. 45)

The incorporation of more active purchasing is often conditioned by the introduction of competition among purchasers, who can then implement more selective purchasing according to performance criteria. Although some countries have embraced the general principle of strategic purchasing in their health care reform efforts while in other countries this approach has been confined to local experimentation, the passive purchasing still dominates in many countries.

*“In its ideal form the strategic purchasing brings together a range of separate functions with the potential to improve efficiency, effectiveness and responsiveness.”* (Figueras, Robinson, & Jakubowski, 2005, p.11)

The variability of purchasing approaches differs across countries depending on the nature of their purchasing agents, their independence, competition among them, the population group they cover, the size of the purchasers’ boards and in general on the level of the purchasers’ responsibilities and their interest on the result of their treatment. The

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<sup>32</sup> WHO, 2000; Baeza & al., April 2007.

<sup>33</sup> Figueras, Robinson, & Jakubowski, 2005.

payment and contractual mechanisms used to steer the providers' performance differ substantially across countries<sup>34</sup>.

### **2.2.1. Third-party purchaser**

Recognizing purchasing as an important mechanism in searching the path to better performance of health systems went hand in hand with *distinguishing the responsibility for purchasing health services and the responsibility for providing them*. Only this separation gave the tool of purchasing its power to contribute to improvements in health systems performance. Separation of functions and provision of services through contractual relationships had always been typical for the Bismarckian style of health systems, however, the purchasing presented there used to have a rather passive form, not giving the purchasers many possibilities to address improvement of the efficiency of the systems<sup>35</sup> (Figueras, Robinson, & Jakubowski, 2005).

Let's assume there is no purchaser and so the patient pays directly for the service he receives. This sends the provider of the health care service a clear signal about the price the patient is willing to pay for services provided to him. This direct relationship between the patient and the provider also gives the provider better awareness of the demand, which depends on the needs and wants of the patient and also on his transaction and opportunity costs. On the other hand, without the existence of the purchaser there is a large financial pressure exerted on those patients who receive expensive care or those who cannot afford care. These patients have to survive the period between the paying of the care and the reimbursement of it (either partial or full) often without a sufficient disposable income. These high costs that the patients had to bear led to a rising demand for establishing the third party in the systems of health care – the insurer (either private or public), who fulfils the role of the health care purchaser and intermediates the financial relationship between the patient and the provider of care.<sup>36</sup>

By contrast, when purchasing is introduced in the health system, the patients' willingness or ability to pay (demand side problem) becomes less important since the third

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<sup>34</sup> Figueras, Robinson, & Jakubowski, 2005.

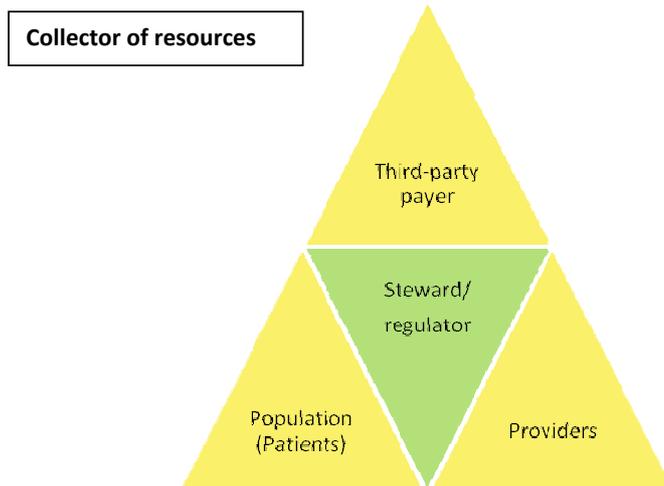
<sup>35</sup> For instance, in social health insurance countries such as Germany or the Netherlands, sickness funds traditionally had the legal obligation to enter into uniform and collective contracts with each physician established in their working area.

<sup>36</sup> Figueras, Robinson, & Jakubowski, 2005.

party purchaser is the one who pays for the services. The provider-purchaser separation in health system is depicted in Diagram 1.

The supply is shaped by the contracting and the payment mechanisms used to pay the providers of health care for their services. The equilibrium can then be displaced by co-payments. Informal charges or subsidies from the perspective of the demand, on the other hand, can be adjusted by restrictions in production or monopolies, by way of provider reimbursement or the reward mechanism on the side of the supply.

**Diagram 1: Separation of payer-provider in health systems**



Source: Saltman, Busse, & Figueras, Social health insurance systems in western Europe, 2004.

### **2.2.2. Triple principal-agent problem**

The role of the third-party payer is executed by a variety of organizations depending on each public health system. In Social health insurance systems (SHI) the role of purchasers is performed by the sickness funds, while the number of them differs in every country. On the contrary, in National health systems (NHS) function of the payer is represented by the health authorities delegated by the government.

This three party health care model faces a triple principal-agent problem. The first part of the problem is shown by the relationship between the *purchaser* and the *patient*. The purchaser's role is to secure health services satisfying the needs of patients, which makes him the patients' agent. The second part of the relationship is found *between the providers of health care* as the agents *and the purchasers* as the principals, whose goal is

to secure services from the providers to the purchasers' insurees. The third aspect of this problem lies in the relationship *between the state* as the principal *and the purchaser* as the agent, who shall ensure the responsiveness of purchasing decisions to the national health objectives and priorities. Analysis following in the next chapters will rather focus on the first two aspects of the triple principal-agent problem.

## 2.3. Utility functions of particular actors

The focus of the following chapter will be definition of the utility functions of particular actors of the health systems. Although also the utility of government or other actors have a particular importance in the overall analysis of health care systems and their functioning, this paper will focus only on three actors crucial for analysis and discussion presented in Chapter 4, these are: patients, health care providers and third-party purchasers. When defining the utility functions, the author was inspired by the analyses presented by Antořová (2005), Roubal (2005). However, in order to set such utility functions which will be useful for the purposes of this thesis and its aim – which are further used in Chapter 4, certain aspects of the utility functions introduced by these two authors were adjusted or omitted, while some others were added.

### 2.3.1. Patient

The goal of the following paragraphs will be to find the most important factors which enter the individual utility function of health care. First of all we shall note that an individual demand for health care services is given by various factors, such as health status, treatment available and the price of the services. Also we shall be aware that health care has a value for an individual only in case when it shall lead to improvement or maintaining of his/her health status.

The patient's problem comprises maximisation of his utility the consumption of health care brings him subject to his budget constraint. The price of health care plays a role in the patient's decision making in the systems without complete insurance coverage, or partially in systems where the patients directly face some portion of the health care costs through out-of-pocket payments. The influence that the various amounts of out-of-pocket payments play on the patient's decision-making is beyond the analysis of this paper, therefore this issue will not be treated in this thesis.

**Individual utility function** ( $U_{pat} = U(HC, q, P)$ )

When considering the utility that the patient gains from the consumption of health care, we can think of four factors: health status improvement, pain management, price and quality. For better clarity, we can write the patient's utility function as follows:

$U_{pat} = u_1(HC_{HS}) + u_2(HC_{pain}) + u_3(q) + u_4(P)$ , where  $u_1(HC_{HS})$  is the part of the individual utility that mirrors the influence of health status improvement on the level of utility of a patient,  $u_2(HC_{pain})$  is the utility stemming from the pain which the patient must tolerate when undergoing treatment and  $u_3(q)$  then represents the impact of the level of quality on the individual utility, this will be further specified lower in this section, in the discussion about the impact of quality on the individual utility function. Last part of the individual utility function defined for purposes of this paper is  $u_4(P)$ , which represents the utility (in fact disutility) the price of the services paid directly by the patient constitutes for him, assuming these as opportunity costs.

Apparently, the health status improvement as well as the “pain” component both depend on the volume of health care provided ( $HC$ ). These two factors, however, have an opposite impact on the final level of utility. Improvement of health status using particular amount of health services will bring to the patient higher (positive) utility. By contrast, the second element represents the negative utility (disutility) caused by the pain a patient needs to overcome during his/her consumption of particular volume of health care. Before deriving the shape of the utility function with respect to the volume of health care, we shall introduce another important assumption about the existence of a point of saturation that a patient reaches by accessing health care ( $HC^b$ ), i.e. an individual bliss point of desired health care consumption. A thorough analysis of this feature of a patient’s utility function is explained by Antošová (2005, Chapter 2.1., p. 28).

### ***Health care volume (HC)***

At the bliss point, the patient is saturated by the amount of health services he/she has been supplied with and if the amount of health care were to exceed this saturation level ( $HC^b$ ) it would lead to a decrease in the patient’s utility. This suggestion stems from the “pain factor” which brings the patient a disutility from the consumption of health care ( $u_2(HC_{pain}) < 0$ ) and the marginal utility of this partial utility function is always negative

( $mu_2(HC_{pain}) < 0$ ). Due to the possibility of “pain” people will not undergo a treatment (for instance a surgery) if they are convinced it is unnecessary<sup>37</sup>.

Let's assume that at a fixed level of quality as well as the price ( $u_3(q) = c, u_4(P) = d$ ) the individual utility function will be that of increasing in health care for the amount of health care lower than the saturation point. However, as soon as the amount of health care provided exceeds the saturation point ( $HC^b$ ), the overall marginal utility of every additional health care unit, ceteris paribus, will be negative ( $MU_{pat} < 0$ ) and therefore the level of individual utility will fall with a growing number of health care services.

To sum up, for an individual utility function that considers the volume of health care, we suppose an existence of a non-zero volume of health care  $HC^* > 0$ , while it holds:

For  $\forall HC < HC^b$ :

$$mu_1(HC_{HS}) > 0 \wedge mu_2(HC_{pain}) < 0 \wedge mu_1(HC_{HS}) > |mu_2(HC_{pain})| \Rightarrow MU_{pat} > 0;$$

For  $HC = HC^b$ :  $mu_1(HC_{HS}) = |mu_2(HC_{pain})| \Rightarrow MU_{pat} = 0$ ;

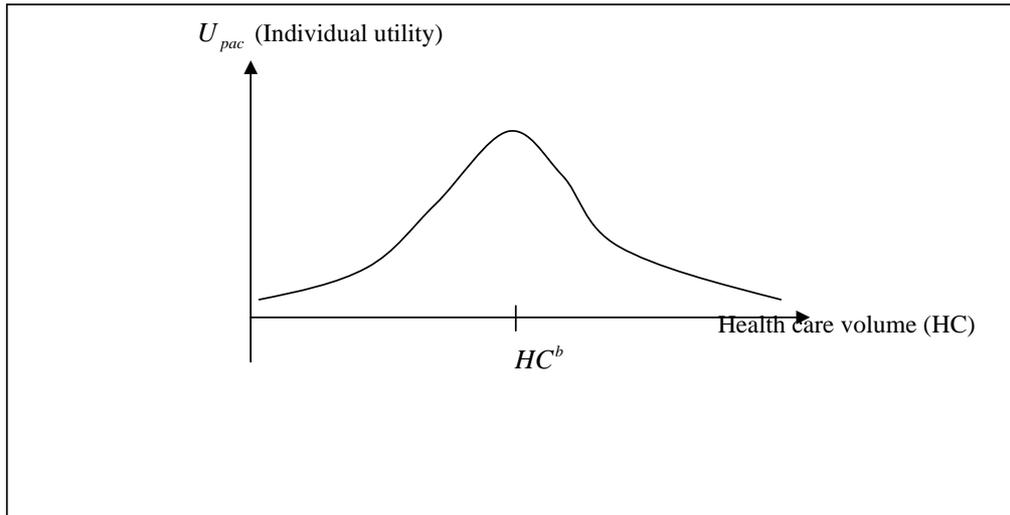
For  $\forall HC > HC^b$ :  $mu_1(HC_{HS}) \leq 0 \wedge mu_2(HC_{pain}) < 0 \Rightarrow MU_{pat} < 0$ .

The individual utility function is concave in  $HC$  (the second derivative of the utility function with respect to  $HC$  is negative), with the maximum being in the saturation point ( $HC^b$ ).

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<sup>37</sup> Given the imperfect information, the patient's personal opinion whether the health care is or is not necessary may greatly differ from the level of necessity stated by the health care professionals (see Chapter 2.1.).

**Graph 1: Individual utility function dependency on health care volume**



### **Quality (q)**

The importance of quality of health care services was discussed in the Chapter 1.1.2. We defined it as the carefulness of the health care provision, which includes the thoroughness of the methods used for the treatment, the time spent by examination and interrogation of the patient. The text above also presented possible difficulties connected with its measurement and detection. However, we will assume that the patients are able to recognise the quality of services provided to them by different health care providers<sup>38</sup> and certainly, their utility will grow with higher quality of health care service provisions. In other words, with increasing quality they will be better off, higher quality contributes to their higher satisfaction. The first derivative of the patient's utility function with respect to quality will be positive (for  $\forall q > 0: U'_q > 0$ ). We can also suppose that with increasing quality the utility of an individual will be augmenting slower, which means that the second derivative of an individual utility function with respect to quality will be negative (for  $\forall q > 0: U''_q < 0$ ) and so the utility function will be concave in quality.

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<sup>38</sup> Pauly (1988) argued that patients can be regarded as being well-informed for about 25% of the healthcare they are provided with – this includes the routine care and care of chronic illnesses. As discussed above, for further analysis we will assume that patient is able to observe these „uncontractible“ aspects of health care provision and will appreciate them by raising the prestige and reputation of his health care provider.

### **Price ( $P$ )**

Price of health services enters the utility function of an individual patient in case when the patient faces directly expenditures on health care, this occurs in health systems, where some form of out of pocket payment is introduced at the beginning of this chapter. In those systems, the price the patient pays directly to the health care provider exerts an opportunity cost. The higher the price, the higher the disutility of the patient stemming from the health care provided to him. This implies, that the component  $u_4(P)$  of an individual utility function is negative for  $\forall P > 0$ , therefore, ceteris paribus, with increasing price of the services the individual utility will fall. In other words, the marginal utility of the individual utility function with respect to price is negative ( $U'_p < 0$ ).

### **2.3.2. Provider**

The economic theory of a firm supposes the goal motivating firms is profit maximisation. However, in the case of health care it is necessary to question the realism of pure profit maximisation, while taking into consideration other possible objectives that may have their importance in the decision-making of health care providers. The following chapter attempts to show some alternatives to the pure profit maximisation approach as well as pay attention to the question of agency problem in the relationship doctor-provider institution.

First of all we will search for objectives that may enter the decisions of physicians<sup>39</sup>. Later on, the text will focus on the provider institutions and conflicting objectives which may stand as an obstacle in decision-making of the provider institutions (hospital, ...).

### **Physician's objectives**

As with any rational economic agents, we will suppose that also health care physicians are interested in the level of their profit. However, quite specifically for the health care markets, there are also other factors entering the physician (health care provider) problem besides the profit maximisation.

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<sup>39</sup> By the term physician we will understand providers with an office-based physician practice, including solo practitioners and self-employed physicians with partners.

„A common mistake is to think that the behavior of physicians can be understood only in terms of their desire to maximize income.“ (Fuchs, 1974, p. 60)

Managerial theories which are applied to health sector often argue that the managers (providers of health care) may act as imperfect agents<sup>40</sup> for the owners (patients) and may pursue objectives other than profit maximisation. One model suggests that managers maximise revenue subject to a profitability constraint imposed by shareholders and possibly by the danger of a take-over by another firm. However, a more realistic theory for the health care field might be that managers maximise a managerial utility (in case of provider institution it assumes existence of only one utility function for the whole hospital) function<sup>41</sup>.

According to Reinhardt (1972) a physician can be treated as a firm of which the physician is the owner/manager who faces a utility (rather than profit) maximization decision. He/she makes decisions regarding his/her own effort to maximize a utility function in income and leisure, subject to constraints including his own time (work hours), market conditions, and the technical production relationship between his labor and other inputs.

As another alternative to profit maximisation of physicians, Kessel (1958) came up with so called “charity hypothesis“. Later on, Arrow (1963) introduced the issue of medical ethics and Feldstein (1970) the desire for interesting cases. Although these values are difficult to measure, their importance lies in the attention they draw to the concern for patient health and welfare, which will be also, although marginally, incorporated into the analysis of physician’s utility function.

### **Physician’s utility function ( $U_{ph} = U(q, A, F)$ )**

Starting from the above mentioned objectives of physicians, we may sum up that a physician<sup>42</sup> has two main concerns which the author focused on in this thesis: patient’s health status<sup>43</sup> and physician’s own income (profit).

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<sup>40</sup> The imperfect agency of the health care providers was discussed in the Chapter 2.1.3.

<sup>41</sup> McPake, Kumaranayake, & Normand, 2002.

<sup>42</sup> In this thesis we will omit the case where the physician make „dual practice“ decisions – allocating his working time between his practice in public and private sector.

First, we will look at the provider's concern about patient's health status and his maximisation<sup>44</sup> which will raise the provider's utility. Let's assume that the health status of a patient may be improved, respectively maximised, by the medical professional only if the physician provides the patient with an "effective treatment". By the *effectiveness of a treatment* we will understand a treatment which fulfils two important requirements – the high quality of the health care provision and the appropriateness of the care.

### ***Quality (q)***

First, we will analyse the impact of quality on the physician's utility function. The quality enters the physician's utility function from two perspectives: ethics and reputation. Ethics in this sense takes into account the fact, that the medical profession can be looked at as having a certain "mission" to contribute to better health of the patients, resp. society. Reputation refers to the assumption that higher quality will raise physician's good-name not only among his colleagues (which will contribute to his/her better status in society) but also among patients which may lead to an inflow of new patients and, consequently, raise the physician's net income. For further analysis let's assume that the income will always increase as a reaction to rise of quality.

*"More generally, a physician could be considered to have a probability of keeping a patient, with the probability increasing as the physician gives the patient more net benefit." (McGuire, 2000, p. 488)*

By the net benefit mentioned in this quoting it can be understood the rise of the patient's utility which, as discussed previously, *ceteris paribus*, increases with growing quality of health care provision. When the physician gives the patient more net benefit by raising his utility, not only will he raise the probability of keeping him as his/her client, but most likely will also gain a better reputation among other patients, which can lead to a gain of new patients and prestige in the field.

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<sup>43</sup> As discussed in Chapter 1, medical practitioner who is working as a perfect agent has several possible objectives: maximization of the health status of the patient, maximization of the utility of the patient, maximization of the health status or utility of the whole society.

<sup>44</sup> The maximisation of patient's health status is understood in the extent which is in capabilities of a physician. We need to be aware that healthcare is only one input into the process of improvement or maintaining individual's health, together with education, housing, income, employment status, nutrition, genetic endowment or work environment. (Donaldson & Gerard, 2005, p. 214)

Following this explanation, we may conclude, that the physician utility function is positively correlated with the level of quality. In other words, the first derivation of the utility function with respect to quality will be positive ( $U'_q > 0$ ). At the same time, however, quality requires a certain effort from the physician, which may bring him certain disutility, in this case the first derivation of the utility function with respect to quality would be negative ( $U'_q < 0$ ). We may not be sure with the final effect of quality on the health care provider's utility function, however, we will assume that the double positive effect – given by the ethical point and the revenue increase reasoning – will always outweigh the negative effect of the quality as an effort of the physician.

Moreover we will assume that there exists some implicit level of optimum quality ( $q^*$ ), which is known by the physicians as well as the third-party purchasers, which can be very difficult to control and explicitly measure. However, one may suppose that the provider is able to judge the level of the quality of his services. To bring more clarity into this notion, we can imagine saying that quality of health care includes two components: a basic one which contributes directly to better health status of a patient and a supplementary one which leads to his better comfort or satisfaction, indirectly influencing his health improvement. The optimum quality can be then defined as the level of quality in which the basic component still overrides the supplementary one.

*“Better health care<sup>45</sup> can be expected in general to lead to better outcomes, at least probabilistically. If good outcomes can be paid upon, this can motivate doctors, a principle on which some of the burgeoning literature on „performance contracting“ is based. Even if outcomes cannot be paid upon, that is, are „noncontractible“, outcomes may be observable by the clients. If the doctor is rewarded for doing a better job, because the patient is more likely to return or to recommend this doctor to friends, the doctor is encouraged to take unobserved actions to improve quality.” (McGuire, 2000, p. 498)*

### ***Appropriateness of care (A)***

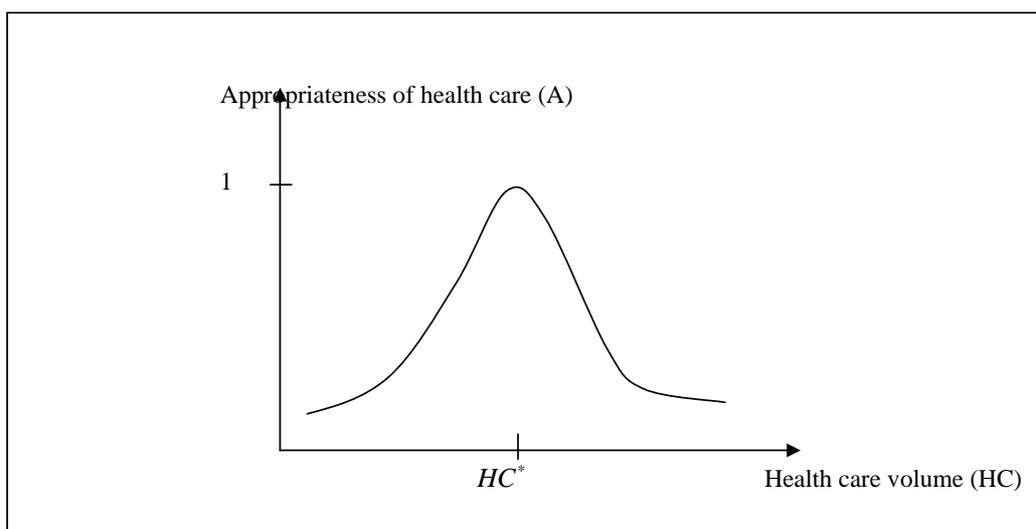
Second important factor linking physician utility function and the concern with the patient's health is the appropriateness of care, which shall be looked at from the

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<sup>45</sup> By *better health care* we can understand better treatment effectiveness, which signifies higher quality of services and appropriateness of care provided.

perspective of necessary and unnecessary health services, which are touched upon in Chapter 2.1.5. We will define the appropriateness as an increasing function of the amount of health services up to the optimum amount of care ( $HC^*$ ). The optimum health care  $HC^*$  ensures the patient with all the care necessary for the maintenance or improvement of his health (maximisation of his health status). After reaching this point, the level of appropriateness will decrease with a higher amount of health services. In summation, the second derivation of the appropriateness of health care with respect to the amount of health services is negative  $A''_{HC} < 0$  with the maximum at the point of  $HC^*$ . Without a loss in generality we may assume that the value of appropriateness of health care will lie in an interval between 0 and 1 ( $A \in \langle 0; 1 \rangle$ ).

**Graph 2: Appropriateness of health care**



Higher appropriateness of health care will bring a better outcome and therefore a larger positive impact on the improvement or maintenance of the patient's health status, which will consequently raise the physician's utility. To put it clearly, the physician utility function increases with the appropriateness of care (for  $\forall A > 0: U'_A > 0$ ). Since we defined the appropriateness as corresponding to the bliss point level of health care services, we can suppose that there exists a maximum level of appropriateness ( $A^*$ ) that will raise physician's utility.

### ***Financial motives (F)***

Next, the analysis will focus more on the physician's objectives connected with his profit maximisation. As with any rational economic agent, it is also true that the financial incentives constitute a very important influence on the physician's behavior and utility. The physician's financial motives are his salary (for instance, as an employee in a health care provider institution) or other types of income paid to him within the payment system. The utility function will be seen to increase in this factor  $U_{ph}^F > 0$ , because obviously a larger net revenue will always increase a physician's utility. As we have mentioned above, we shall bear in mind that quality also enters the profit maximisation problem of a health care provider.

Besides the three factors influencing the level of utility of a physician, one shall not forget about the constraints he needs to take into consideration when maximising utility. Among the most important of these belong the time constraint and the budget constraint. Within some boundaries, he needs to respect the level of health care stated in the contract between him and the third-party purchaser, therefore, when providing care to particular patients, he needs to bear in mind that provision of certain care to one patient may prevent him from providing this care to another patient, who might need the care more. To conclude, when providing health care, the physician always has to take into consideration relative contribution of health services to individual patients and therefore, he maximises the collective health status of all his clients rather than just the health status of each single patient. For the purposes of this thesis, we will take this into consideration only by the assumption that each health care provider has certain limits (constraints) which imply the maximum level of health care provision he may provide (see Chapter 4).

### **Provider institution objectives**

By contrast to the solo physician practices, in the case of provider institutions we need not forget about two dimensions of principal-agent problem. The first is an agent role of the provider institution towards its principals (purchasers), while the second is derived from the inner structure of the institution, where the agents (managers) are not the same people as the principals (owners). Behavioural theories, which focus on such problems, assume that firms are made up of diverse sets of actors, who might not share the same

goals and in fact, can even be in conflict. This fact complicates the health provider problem as well as the definition of their utility function<sup>46</sup>.

*“How competing objective functions are reconciled is likely to depend on the internal structure of the organisation. ... Ownership may also affect the internal structure of hospitals and other provider institutions, and this may be another route through which ownership affects the behaviour of different health care providers.”* (McPake, Kumaranayake, & Normand, 2002, pp. 149)

Simon (1957), who described the base of the behavioural theory in his work, introduced a distinction between substantive (or unbounded) rationality, which we know well from the economic theory, and procedural rationality. Procedural rationality, in contrary to the substantive rationality, occurs when agents may not necessarily succeed in maximising their own goals but, given their relative importance to the goals of other actors, deliberate them appropriately. This view is considered, particularly in the case of health care provider institutions such as hospitals.

In order to find the utility function of provider institutions we shall define actors entering the institution problem and name their goals and objectives. Let's assume that the main provider institution actors are: owners, managers, doctors and other medical staff.

### ***Owners***

We can assume that the main goal of owners is the prosperity of the provider institution they own. In regards to prosperity we can understand ***profit***, but we shall also not forget about ***quality***, which may contribute to further prosperity of the institution in future (as we explained in the case of physicians).

### ***Management***

Objectives of the management will depend on the specific legal form of ownership of the institution and its structure. In general, let's assume that the management utility function will be influenced by financial incentives such as ***salary*** and the ***operating result*** of the institution. We may also suppose that management will be interested in ***quality of care*** which increases prestige of the health care facility and contributes to its larger profit.

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<sup>46</sup> McPake, Kumaranayake, & Normand, 2002.

### ***Medical staff***

For medical staff we may imply that there are objectives similar to those for physicians: *salary* and *quality*, with the *time constraint*.

### **Provider institution utility function ( $U_{pi} = U(q, A, F)$ )**

To find one utility function of the whole provider institution we will put together all utility functions of all actors. Setting weights of every one of these utility function is beyond the extent of this thesis, therefore we will make a simplification, just stating, that the overall utility function of the provider institutions is increasing in financial incentives ( $F$  - given by the particular payment method used in the health system), increasing in quality ( $q$ ) and increasing in appropriateness of health care provision ( $A$ ).

### ***2.3.3. The third-party purchaser***

The role of the third-party purchaser may be carried out, for example, by central government, regional government, municipalities or health insurance funds, depending on each particular health system. The following paragraphs will attempt to reveal the factors which influence the utility function of these third-party purchasers of health care, who work as agents of patients (consumers) and in addition to following their own interests (profit-seeking), they shall also have in their focus the well-being of their clients (patients). For further discussion we will assume, that they focus on the improvement of health status of their clients (patients), although it would have been probably more realistic to assume their concern with the health status of the society as the whole, since due to the limited financial resources, the providers often have to choose the patients to be treated according to the relative severity of their cases compared to the other patients.

### ***Purchaser's utility function ( $U_{pur} = U(OC, AC, A, q)$ )***

First, we shall recall the agency role of the third-party payers (see Chapter 2.2.4.). On one hand, the purchaser is an agent of a patient, whose role is to represent the patient's interests when dealing with the health care provider. On the other hand, he plays a role of a principal of this provider. In this instance, the purchaser attempts to raise the utility of his principals (patients), while at the same time exerting control over his agents (providers) in

order to ensure high-quality and efficient treatment (which would improve the health status of the patients) while facing his own limited resources and operational results.

### ***Operational and administrative costs (OC, AC)***

Factors which do influence the utility function of purchasers, but will not become part of the analysis of this thesis are the operational costs of these institutions. Obviously, the higher these costs are the lower utility it brings to the purchaser. The utility function will then decrease in operational costs ( $U'_{oc} < 0$ ). Since this factor will not influence the results of analysis of this paper, for further discussion we can assume these costs remain constant without leading to any change of the utility of purchasers. Another aspect we shall take into consideration are the administrative costs, which include, for example, costs connected with the functioning of the payment system as it is applied to the providers of health care. For simplicity we will assume that for all the payment mechanisms there are the same levels of cost that the purchaser has to bear for the system's well-functioning, although, as will be briefly discussed in Chapter 3, administrative costs of particular payment methods do vary. As with the operational costs, the rise in administrative costs will also lead to lower utility of purchaser and so, the first derivative of the utility function with respect to administrative costs will be negative ( $U'_{ac} < 0$ ).

A purchaser is an agent of a patient who is his principal and based on the behavioural theory, we will assume that the utility of purchasers will be positively correlated with the utility of patients. Even though we could get the impression that one of the objectives of the purchaser will then become maximisation of individual utility, first we need to realize the role of limited resources disposed of by the purchaser. In addition, for better clarity, we will include an assumption of 100% redistribution of risks among all the purchasers operating in the health system<sup>47</sup>. The limited resources will put the purchaser in a situation when he may not only maximise individual utilities of his clients, but he is forced to maximise the utility of all of his clients (patients) altogether, comparing relative contribution of the services to the patients' utilities.

### ***Appropriateness of health care (A)***

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<sup>47</sup> This assumption will rule out danger of cream-skimming from purchasers towards the patients.

In the following paragraphs we will adjust the assumption introduced for the individual utility function, as we will replace the individual health care saturation point by an optimum amount of health care ( $HC^*$ ), which will signify the level of health services where the health care provided to the patient is the most appropriate ( $A=1$ ). No other amount of health care can contribute more to the maximum health status of a patient.

The replacement of the saturation point by an optimum amount of health care in a sense “objectivises” the individual utility function while substituting the utility on the vertical axis of the Graph 1 by the appropriateness of health care. The term “objectivise” in this sense means that we replace the subjective individual’s perception of saturation by health services by the appropriateness of health care, or in other words responsiveness of provided care to the individual’s needs<sup>48</sup>.

This step is possible only under an assumption that health care purchaser is well informed about the necessary care for each individual and that the purchaser actually knows the level of appropriate care for each patient. However, this assumption seems not to be very realistic, considering the large number of patients with various health problems and the very problematic control the large number of health care providers hold from the side of purchasers. To make this assumption a little bit more imaginable, one may suppose an application of standards and practice guidelines, which recommend treatment procedures to the health care providers. Another necessary assumption is that the health care providers will not cheat when reporting the amount of health care and the diagnosis of the patients they were treating.

From the analysis of the provider utility function we know already that the appropriateness of health care ( $AC$ ) lies an interval between 0 and 1 ( $AC \in (0;1)$ ):  $AC \rightarrow 0$  if  $HC \rightarrow 0$  for  $HC < HC^*$  or if  $HC \rightarrow \infty$  for  $HC > HC^*$ ;  $AC = 1$  for  $HC = HC^*$ . In other words, the patient’s health status grows with growing level of appropriateness of health care which then implies increase in purchaser utility. To sum up, the purchaser utility function is increasing in appropriateness of health care.

### *Quality (q)*

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<sup>48</sup> Note that individual’s utility is traded for need, which represents direct connection to individual’s health status and its maximisation.

*“The physician almost always supplies her own input into the production of health care for the patient. This input, which is often referred to as “effort”, but also could be understood as “quality,” is simply not contractible.”*  
(McGuire, 2000, pp. 466)

Although quality of health care is very difficult to be measured and controlled by the third-party purchasers, it does supposedly play an important role in purchaser’s utility function. We will stick to an assumption made in the case of individual utility function, where we supposed that the clients are able to compare quality of different providers, although up to a limited extent. If we set a system in which the clients (patients) are free to choose their health care provider, the information about the quality (overall satisfaction) of patients with particular health care providers will reach also the third-party purchaser who can then monitor the inflows and outflows of clients to and from particular providers. With these assumptions, the quality may enter the purchaser’s utility function, whose first derivative will be increasing with respect to quality ( $U'_q > 0$ ) and so the purchaser utility function is increasing in quality.

### ***Price ( P )***

The price of health services is also a crucial component of a purchaser’s utility function. Prices are set within the payment mechanism used in particular health system. Throughout this paper we will assume the purchasers to be the price-setters, who establish prices with respect to resources and estimates of the volume of health services to be provided. Whether these are estimates or realistic numbers is dependent on the nature of the mechanism – retrospective or prospective, as we will discuss in Chapter 3.

## **Chapter 3: PAYMENT MECHANISMS AS TOOLS OF HEALTH INSURANCE FUNDS**

Why can't a purchaser just buy wanted services from hospitals and doctors? Part of the answer is that it is impossible to fully specify all services, such a list of service specifications would never be complete; secondly it is the problem of enforceability of contracts which may create financial cost and allocation risk which may be undesirable for the health systems and their objectives; last but not least it is the matter of imperfect information the purchasers have. The "right" choice of payment systems or their combination is one of the possible ways to soften impact of these effects<sup>49</sup>.

Many countries have experimented with alternative ways of paying providers of health services. Payment mechanisms, used to reimburse the health care services supplied by the physicians and provider institutions to the patients, belong to the most important ways the health care purchasers dispose of to influence providers' behaviour in order to enhance efficiency and quality of the health systems' performance with respect to the objectives of particular systems. This chapter presents some of the basic types of the payment mechanisms commonly used (either in present or in past) in the European health systems. The first part of the chapter gives a brief overview of the main trends accompanying historical development of the use of provider payment mechanisms in Eastern and Western European countries. Further on, the chapter introduces some ways of categorization of the payment methods with respect to various criteria. Last part then describes selected payment mechanisms, their advantages, limitations and modifications based on practice of different European health systems in more detail. This introduction of particular payment mechanisms will become a basis for the analysis displayed in Chapter 4.

Oxley (1995) recognizes three categories of the financial relationship between purchasers and health service providers:

- Reimbursement approach – providers are funded retrospectively for services delivered,

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<sup>49</sup> Oxley, 1995.

- Contract approach – some kind of prospective agreement between health care purchaser and provider,
- Integrated approach – combination of the roles of purchaser and provider shielded by a single institution (e.g., a local or central government).

Contracts and payment systems are two elements among the mix of factors that determine the extent to which the purchaser can influence the provider's behaviour. Another important factor will be the nature of the provider organizations themselves, the form of their ownership, their degree of autonomy, the scope for decision making and the type of market structure within which they operate. All of them will influence the way in which they act as the purchaser's agent. Even though the author is aware of interesting implications which these aspects might bring to the analysis, they will not be discussed in this thesis as they are beyond its extent.

In the following paragraphs we will pay attention to particular payment mechanisms, however, we shall first briefly revise the structure of contracting. Contracts are the most visible and practical part of purchasing. They serve as the key tool that defines the relationship between purchaser as a principal and provider as an agent. Although the actual content of the contracts may vary considerably, most often they cover items such as type and volume of services, duration, price, invoicing, extra-contractual referrals, eligibility, organizational requirements, level of human resources and facilities, monitoring, remuneration levels, confidentiality of information, sanctions and rewards, quality standards including waiting times, outcome, audit procedures and targets, etc. Contracts, in general, help to make clear what services are to be provided and the terms on which they are to be supplied. They closer specify the risk-sharing arrangements, regarding to who bears the financial risk during the health care provision, that apply in the face of unplanned events on either the purchaser or the provider side, or they make explicit the constraints on volume of health care provision, etc. In the case of a separation of provider and purchaser (existence of the third-party) contracts shall assure the link between financial resources and the health service outputs and outcomes, they shall allow clarification of the responsibilities of purchasers and providers improving the provider's accountability. Contracting may also be conducive to better responsiveness of the system

to the supply and demand changes, especially through periodical adjustments and renegotiations of health care delivery<sup>50</sup>.

Current European experience suggests that active contracting is a fairly new activity in many countries, having only really developed during the 1990s. Nonetheless it is becoming an increasingly important feature of purchaser–provider relations in both Western Europe (for example, Denmark, Netherlands, Spain and the United Kingdom) and Eastern Europe (for example, Czech Republic, Estonia, Georgia, Kyrgyzstan, Latvia, Romania and the Russian Federation)<sup>51</sup>.

Although the contract approach has been widely introduced recently in all types of health systems<sup>52</sup>, its use bears various implementation problems. Its introduction also has to deal with a strong opposition of the medical profession. The imperfect information and a large number of suppliers compared to the number of purchasers leads to rising costs of making and implementing a complete contract. Therefore a legislative framework and government regulations are applied to secure fulfillment of the contracts as well as their compliance with health policy objectives.

Another way to influence the behaviour of providers is via payment mechanisms. Langenbrunner & Liu (2004) distinguish three main approaches to payment of health providers under resource allocation and purchasing arrangements;

- Direct payment to providers by the patient,
- Direct payment to providers by the patient with later full or partial reimbursement of the expenses incurred through the resource allocation and purchasing mechanism,
- Direct payment of the provider by the resource allocation and purchasing mechanism with the patient bearing only a limited copayment or informal charges.

The first two possibilities allow sending a clear signal to the provider concerning the price and the demand of the services, however, it may cause major problems to poor

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<sup>50</sup> This holds only in the case when the purchaser is aware of these changes which occur given the renegotiations.

<sup>51</sup> Figueras, Robinson, & Jakubowski, 2005.

<sup>52</sup> Contracting can be found in the Beveridge health systems (England, Italy, Portugal, Spain, Sweden, ...) as well as it plays an important role in the reforms of the former communist Semashko type systems, as well as it has been widely introduced in the systems of the Eastern European countries which had shifted towards Bismarck type funding (Figueras, Robinson, & Jakubowski, 2005).

patients either to pay for the services they need or to overcome the period between paying for them and being reimbursed by the third-party payer. In the following chapter we will focus on the third possibility with omission of the copayment or informal charge scheme. The analysis will then focus only on those payment methods which address the relationship and risk distribution between provider and purchaser, leaving patients out.

The payment systems have gone through a diverse development in Western and in Eastern European countries. In the case of Eastern Europe, the main milestone was the breakup of the Eastern bloc. Before that, the health care budgets in these countries focused their attention primarily on hospitals. Primary care and outpatient providers were suffering from poor training and were usually underpaid, relying often on informal payments, which brought about low productivity and lowered efficiency of the health systems.

On the other hand, in Western Europe, we may observe three main methods used for paying doctors; *salary*, *capitation* and *fee-for-service*. According to a common practice, the primary and outpatient care doctors are usually paid by salary or capitation. The doctors working in the public hospital sector are paid on the salary method, with the exception of some countries which traditionally preferred the fee-for-service approach, but recently moved towards a case-based payment system, according to diagnosis related groups (e.g. Austria, Germany). Some countries (e.g. Denmark, Portugal, the United Kingdom) use marginal fee-for-service payments to provide more incentives in order to reach some policy objectives, such as reducing the surgical waiting lists, etc.

The payment methods have gone through systems used in the case of hospitals exhibit a tendency to move from systems of *retrospective reimbursement* to *global budgeting*, while in some cases the elements of case payments are based on diagnosis-related groups. Combination of global budgeting with *DRG* system is recently being applied for instance in Austria, Belgium, France, Germany, Ireland, Italy, Portugal, Spain and Nordic countries. The Nordic countries can serve as a good example of systems which are heading towards the activity-based reimbursement instead of capped global budgets, using a billing system on a DRG basis (e.g. Finland, Sweden). The system DRG was applied to hospital global budgets in Portugal (1990s), Ireland (20% of hospital budgets) and England (use of a variant of DRG to specify national reference prices to be used to reimburse hospitals)<sup>53</sup>.

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<sup>53</sup> Figueras, Robinson, & Jakubowski, 2005.

By contrast, in Eastern countries the new payment systems, created at the beginning of the 1990s, introduce a wide use of capitation payment, especially in the primary care (e.g. Baltic states, Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Romania, Slovakia and Slovenia). Recently, the share of capitation payments accounts for just a half of the primary care payments.

The original method of payments for input (beds or doctors) in the inpatient sector was alternated by the fee-for-service system in the reform period of 1990s, which consequently caused an increase in activity and exerted a financial pressure on purchasing organizations. In order to move away from these incentives, a number of the countries put stronger emphasis on the global budgets approach (e.g. Bosnia and Herzegovina, Bulgaria, Croatia, Slovakia and Ukraine).

In general, during the last two decades new and more sophisticated payment methods evolved, above all focusing on broadening of units of payment and preferring setting the payments rather prospectively moving away from the retrospective schemes.

### **3.1. Typology of payment mechanisms**

There are more possibilities of basic typology of provider payments. First we can distinguish two groups of the methods of provider payment; retrospective and prospective methods. Under the *retrospective method*, the provider reimbursement is based on the actual costs (amount) of the health services provided by him/her during a certain period. In this case, the risk - connected with the marginal costs - is shifted towards the health care purchaser, since it incentivises the providers to profit from the possibility of supplier-induced demand and the moral hazard market failure. This system often leads to a higher volume of health care being provided and subsequently leads to rising expenditures on health care.

By contrast, in the system of *prospective payments* the volume of financial resources is set *ex ante*. These mechanisms are often introduced in order to reach cost containment. The prices in these systems are usually set administratively rather than being set based on the market. The risk in this case is shifted towards the health care provider, however the size of the risk depends on how realistically the *ex ante* level of the payment is set.

Langenbrunner & Liu (2004) after reviewing literature conclude in general that the retrospective payment systems address issues of access, acceptable levels of provider risk, adequate revenues, patient selection, and quality enhancement. On the other hand, the prospective payment methods work better for the optimal level of services, efficiency, and cost containment.

Table 1 shows another possible classification of provider payment methods based on the typology presented by Ensor & Langenbrunner (2002). In the table the payments are divided according to the type of provider – individual practitioner or medical institution. The second dimension of categorization sorts payments into three groups – *time based*, where the suppliers of health care are paid according to the length time it takes to provide a certain service irrespective of the number of patients served; *service based*, where the basic unit is a unit of service and the provider is paid according to the amount of these units supplied to the patients; and *population based*, where reimbursements depend upon the number and size of population the health care facility serves for, irrespective of the number of patients actually attending it<sup>54</sup>.

**Table 1: Typology of provider payment**

	<b>Individual practitioner</b>	<b>Medical institution</b>
<b>Time based</b>	salary	global budget line-item budget
<b>Service based</b>	fee-for-service fee for patient episode (e.g., admission)	fee-for-service fee per hospital day (per diem) DRG
<b>Population based</b>	per capita payment	

Source: Based on Ensor & Langenbrunner (2002).

Historically, in both Eastern and Western Europe, provider remuneration has been mainly time and population-based. In countries of the Eastern bloc, the Soviet Union countries (before the 1990s), as well as in some Western European countries (including the United Kingdom), most staff were paid a time-based salary. Time-based payments were typically based on input characteristics such as past qualifications and years of experience

<sup>54</sup> Figueras, Robinson, & Jakubowski, 2005, Chapter 11.

for individual providers, and beds and numbers of staff for facilities. However, this input-based approach suffered from inflexibility when responding to local needs or changing technology and treatment patterns, therefore a different approach was called for. The health care systems started gradually moving towards service-based payment systems which allowed linking the payments with performance, outputs and ultimately outcomes. The new type of payments also offered a possibility of combining them with demand-side mechanisms such as copayments or deductibles and therefore extending the possible tools with which purchasers operate.

### **3.2. Characteristics of provider payment mechanisms**

In the following section the author analyses the provider payment mechanisms in order to clarify the basic characteristics, advantages and limitations of each one of them. The paper will focus on the payment mechanisms most commonly used (recently or in history) in the European health systems.

#### ***Line-item budgets*** (prospective)

This mechanism is a prospectively fixed budget payment mechanism which was typical for the Soviet Union under the Semashko-type health care systems, but is now dying out<sup>55</sup>. The provider is paid an amount per given period for an ahead defined responsibility of services. It specifies detailed budgets allocated according to specific categories of expenses, such as salaries, equipment, food, drugs and so on, with a little possibility of reallocation. Their allotment was usually based on the previous year's allocation and capacity norms. The height of funds cannot be flown over among items without an approval of the funding agency, typically represented by the Ministry of Finance. Line-item budgets are predictable and enable very strong central control, thanks to their simplicity and low administrative costs. On the other hand, they are inflexible, discouraging cutbacks and providing no incentives for efficiency or quality care. This mechanism offers no financial incentives for rising productivity and leaves very little room for tailoring resource allocation towards the needs of the local population. The experience showed that it gives incentives for inefficient use of resources connected with rapid

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<sup>55</sup> Langenbrunner & Liu, 2004.

spending by the end of the budget year. Its inflexibility often motivated some health care providers to use their good informal relationship with the political regime in order to negotiate advantages for them and to reach softening of their budget constraints.<sup>56</sup>

Experience with this system led all transition countries to the development of new payment methods which have the potential of long-term influence on incentives, volume, price of services, eventually on the performance of health care system in terms of health outcomes and total health care expenditures.

### ***Fee-for-service***<sup>57</sup> (retrospective or prospective)

This method enables the purchasers to pay for basic units of services (office visits, X-rays, laboratory services, etc.) to individual providers. The level of remuneration - given by the value of points which are associated to each health care service - can be determined either prospectively or retrospectively (e.g. Slovenia). It modestly transfers the risk from purchaser to the health care provider. In this case the risk associated with the diagnosis of a case remains with the purchaser, while the risk associated with variations in treatment costs is transferred to provider. Traditionally, it is based on a list of charges for various procedures. Often these charges are evaluated within a point system in which a relative weight is attached to all service types. Consequently, the providers are paid according to the volume of provided services expressed in points.

This method of payment is the norm used commonly for primary and outpatient care which is delivered privately. In some countries it is used in the public sector as an additional incentive related to specific policy objectives, such as achieving reductions in surgical waiting lists (e.g. Denmark, Finland, Hungary, Portugal, the United Kingdom).

Traditionally, payment of inpatient services in many countries of Europe was based on inputs such as beds or doctors, but with the reforms of 1990s, adopting new social health insurance systems, most of them introduced the system based also on fee-for-service. Recently it represents the mainstream method used to pay doctors who are providing inpatient care in the private sector in all countries often in combination with other payment methods (e.g. Belgium, Czech Republic).

The fee-for-service payment method constitutes a problem, especially considering its tendency to raise the activity levels, contributing to an overproduction of health care.

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<sup>56</sup> Langenbrunner & Wiley, 2002, Szende & Mogyorosy, 2004.

<sup>57</sup> Czech translation: úhrada za výkon.

The empirics actually show that there is a correlation between the pronounced rise in volume and the overall health expenditures<sup>58</sup>. Under the basic form of this mechanism, the health care provider is not forced to provide services efficiently according to the system, rather to the contrary, in order to maximize his own utility he is incentivised to provide to the confiding patient as many treatments as possible as long as he is able to justify his steps in front of the health insurance fund. The asymmetry of information allows him to be the only one who is able to judge the kind and amount of care to be provided. Elimination of such a problem lies only in the hand of a suspicious patient who asks for the second opinion of another doctor (if this possibility exists in the particular health system).

The usual response to the rise of expenditures as an effect of applying this method of payment is for the purchasers to cap overall spending on the supply side and along with that encourages some patient cost sharing to minimize the moral dilemma. Alternatively, some countries placed a cap on the monetary value of the provider point (e.g. Hungary) or on the volume of services providers can offer within a certain time period (e.g. Czech Republic, Estonia, Slovakia, Poland), some countries enriched these restrictions also by degressive fees method (e.g. Czech Republic<sup>59</sup>). In the wake of these precautions, some countries observed development of significant waiting times for specialist out-patient care (e.g. Poland). In other cases, when the out-patient payments became relatively smaller than inpatient payments, strong incentives (especially in the out-outpatient departments operating within hospitals) were created to increase hospital admissions (e.g. Hungary, Poland)<sup>60</sup>.

In general, this mechanism exerts a little purchasing power over providers. Some insurers have therefore found it advantageous to seek out competitive advantage by insisting that their members use preferred providers who have agreed on discounted fees and possibly on certain quality standards. This method promotes providers' internal efficiency, since it rewards their productivity, but works against the social efficiency from the systems' point of view. The system encourages overprovision of services pushing up the expenditures. On the other hand, it encourages the providers to work longer hours,

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<sup>58</sup> Figueras, Robinson, & Jakubowski, 2005.

<sup>59</sup> Capped fee-for-service scheme was introduced to the Czech health system in 2001, when the strict cap placed on the volume of services led to an excessive rationing of care for some specialties. Later on, in 2007 the system of degressive fees started to be used - up to a pre-defined threshold, care provided is reimbursed on a fee-for-service basis according to the List of Health Services, care beyond this threshold was also reimbursed on a fee-for-service basis but using a lower point value (Bryndová et al., 2009).

<sup>60</sup> Szende & Mogyorósy, 2004.

which may for instance positively influence the health care provision of high priority services or an access to health services in rural areas, etc.

***Fee per diem***<sup>61</sup> (retrospective or prospective)

This payment mechanism is used as the basic mode for inpatient health care (e.g. Belgium, Hungary, Slovenia), the facility is reimbursed a fixed amount for each inpatient day regardless of actual use of services, drugs and medical products. In general, it is used in combination with other methods of payments for health services. The health care suppliers are paid upon an agreed fee per bed-day.

Similarly as with the previous method, this mechanism is also “consumer friendly” in the sense that the patient does not bear the risk of not getting sufficient health care. However, this certainty, which may lead to unnecessary health care, puts a large financial pressure on the health systems. This mechanism does not motivate the health care providers to cost containment, in fact the opposite extreme, it often leads to overutilization of hospitals. The day payments create incentives for hospitals to keep patients longer than strictly necessary, particularly as bed-days costs decrease towards the end of the stay. Due to this overutilization, the patients may then face long waiting periods or insufficient flexibility of the health care facility<sup>62</sup>.

This system is efficient in the sense of its administrative straightforwardness, however, it causes the problem of overproduction by its tendency to encourage rise in volume of services.

***Fee per case, diagnosis*** (prospective)

In its simplest form, one standard payment is made for every case or diagnosis, regardless of the actual cost of care which had been provided. The case payment is more commonly found to reimburse inpatient health care.

This basic model encourages increased admissions of less severe cases. Other models are adjusted for case mix, to reflect variations in hospital caseload. They are complex to run and demand a lot of data. Case-mix models do reward hospitals for keeping

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<sup>61</sup> This mechanism is also called fee per hospital day.

<sup>62</sup> Figueras, Robinson, & Jakubowski, 2005; Szende & Mogyorosy, 2004.

costs within payment limits – but they also encourage hospitals to upgrade the severity of cases, and to discharge patients early and readmit them often.

The best known and most used type of this method is the *DRG mechanism* (*Diagnosis Related Groups*). Based on cost homogeneity and medical relation the diagnoses are divided into groups. Each of these groups is matched with a relative weight which is established according to estimated values of average costs. Some form of DRG is used for instance in Austria, Czech Republic, Germany, Netherlands, Slovenia, etc.

The main pitfalls of this method are its administrative demand factor and the requirement of high-quality relevant information which lead to “correct” evaluation of the weights of individual diagnoses. Their wrong estimation may create a deformation of the providers’ behaviour in order to maximize his income and may cause deterioration of the quality of health care. On the other hand, if administered correctly, this method can contribute to cost containment and improvement of internal efficiency. Its main advantage is that it removes economic incentives to overprovision of health care as well as it eliminates the motivation to keep the patient in the hospital for an extended amount of time.<sup>63</sup> Langenbrunner & Liu (2004) points out four main disadvantages of this method; code creep (wrong classification of a group code in order to get higher reimbursement), cost shifting (providers shift patterns of care and costs to non-DRG patients), incentives to unnecessary admission or readmission, incentives to either underprovide services or discharge admission prematurely where costs are shifted to outpatient services, home service care or nursing homes.

### ***Global budget*** (retrospective or prospective)

This approach can be described as a budget setting which is related to service outputs – the hospitals are paid according to the product of number of admission and case-mix index (the more admissions and the sicker patients the hospital has, the larger amount of money it receives – given by historical evidence in case or prospective setting or by the evidence of particular year in case of retrospective arrangement).

The prospective type fixes price as well as volume for all inpatient or outpatient services based on the relevant period of the previous calendar year taking into account of the inflation rate; a hospital then receives a lump sum to cover all specified services during

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<sup>63</sup> Figueras, Robinson, & Jakubowski, 2005; Langenbrunner & Liu, 2004; Roubal, 2005; Szende & Mogyorosy, 2004.

a given period. At the end of the period, the hospital keeps all the surpluses while at the same time, it must cover any eventual shortfalls. Setting their size requires a complex calculation of activity, costs and case mix. In order to reflect the hospital production more accurately, some health systems add flat fees<sup>64</sup>.

If this method is strictly enforced, it can encourage efficiency (by limiting the incentives to strategic behaviour such as unnecessary lengthening of the stays in hospital or incorrect setting of diagnosis) and allow hospital management real flexibility in allocating resources. The risk of marginal cost is shifted from purchasers towards the providers of health care. On the other hand, the purchasers may lose control over the services executed and without the necessary monitoring, the quality of care may fall.

### ***Fee per capita (capitation)***

Capitation in principle is a similar payment method to the previous fee per hospital day. It means, in its most simple form, one payment per person during a fixed period of time (it is usually associated with some bundle of mandatory services – for instance prevention, etc.)<sup>65</sup>. The ceiling of these fees is set prospectively, hence it can be related to the data on service mix and costs from earlier periods. We can find its utilization usually as a reimbursement mechanism of physicians in primary care, although it may also be used in the hospital sector, combined with other methods of payment (e.g. used in the Czech Republic, Finland, Slovenia).

This payment scheme may lead to cream-skimming, when it may become profitable for the physician to register patients who face the smallest risk of need of health care. Such a provider may then tend to register more patients than he is able to treat in order to ensure as large an income from the capitation fees as possible. To avoid this risk, the fees are typically adjusted to the age structure of the covered population, generally with higher weights for children and elderly. In order to anticipate these problems and promote equity

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<sup>64</sup> For instance, in the Czech republic, it works as follows: hospital treating fewer than 101% of the cases treated during the same period in the previous year, the flat fee per insured person was paid in full; if a hospital treated more than 101%, it was paid 100% of the flat fee up to 101% and 50% of the flat fee when treating between 101 and 105% of the cases; if more than 105%, the flat fee above 105% of treated cases was reduced by 80%). To be granted the full budget, the hospital had to report a certain threshold amount of points for medical services (usually set at 90% to 95% of the previous year's production). This led to cost-containment, mainly because of the shift of the financial risk to the providers, on the other hand, this could have had a negative impact as to the rationing, which could have a negative effect on patient access to health care. (Bryndová et al., 2009)

<sup>65</sup> Langenbrunner & Wiley, 2002.

and encourage efficiency, some countries introduced further adjustments to the payment formula. To address equity, Hungary and Baltic states included additional payments for treatments provided in rural, low-density and remote areas. Hungary and Latvia, when attempting to improve efficiency incentives introduced additional payments in to respect higher qualification of family physicians. Other countries included quality and economic incentives through reserving a certain percentage as a bonus payable if the physicians reached pre-specified cost containment targets (Czech Republic) or cost containment and public health targets are achieved (Slovenia).<sup>66</sup> Usually also the total number of patients per physician is subject to a limit, beyond which the physician receives smaller per capita payments.

The most important advantage – compared to for example fee-for-service – of capitation system is its ability to remove economic incentives for overprovision, while it motivates to prevention, which becomes usually a prerequisite for receiving the capitation payments. Since the provider is responsible for delivering the contracted package of services for the fixed payment, the she/he is motivated to innovate in cost-reducing technology, use lower cost alternative treatment settings, and provide cost-effective care. On the other hand it may offer an incentive for under-provision of necessary care.<sup>67</sup>

This payment mechanism can be often seen in combination with the fee-for-service and it is usually accompanied with a list of mandatory services, which have to be provided (such as prevention).

### ***Salary*** (prospective)

Salary is a payment method used for doctors based on the time of work. It is quite commonly used in the European health systems. This method can be found for instance in Denmark, where it is used to reimburse 60% of doctors according to the result of the negotiations between trade unions, professional organizations, the Danish Regions and the National Association of Local Authorities. In Finland the salaries are used in 45-50%, usually in combination with some extra fee-for-service payments for selected time-consuming service items or minor procedures and capitation payments. The method is used also for instance in Greece, Netherlands, Portugal, Spain, etc.

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<sup>66</sup> Szende & Mogyorosy, 2004.

<sup>67</sup> Langenbrunner & Liu, 2004.

Maynard, Marinker, & Gray (1986) claimed that the advantages of a salaried system are that it would make health care planning easier, as doctors' salaries would be known in advance, and that promotion could be related to performance. The limitations they pointed out are little incentives of the general practitioners and hospitals to compete over patients. They may have larger motivation to please their boss than to meet the health care needs of the patient. The motivation problem arises also in the case of those doctors who have reached the top of the promotion ladder. If we omit the non-financial factors (such as ethics), the doctors, having no prospect of increase in salary, will not have incentives to do their best for the patient. The doctor may then be incentivised to refer patients inappropriately to other departments or to other doctors in order to minimise the time spent with them.

### ***Individual contracts***

This method is used for instance in the Czech Republic, where for certain types of medical services the health insurance funds may negotiate contracts with individual providers. These services include hip replacement therapy, the implantation of defibrillators or artificial heart pacemakers and cataract treatment. The individual contracts usually cover a package of services including the surgical procedure itself, all of the pre- and post-operative examinations, and early rehabilitative measures. The number of procedures and their cost are defined individually in each provider-purchaser contract and are regulated only in so far as the health insurance funds must spend at least the same amount of money on these services and cover at least the same number of services as in the previous year. This mechanisms accounted for only 1,5 % of total hospital revenue in 2008 and for 3,9 % in 2009<sup>68</sup>.

### ***Performance-related payments***

These payment mechanisms link directly payment to the performance and the contribution of health care providers. Performance is measured by the size of deviation of a specified task is implemented against the set target. These methods, however, are not commonly used in the European health systems. We may find their use, which has expanded since 1980s, for nurses in the United Kingdom and North America. It has also

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<sup>68</sup> Bryndová et al., 2009.

been widely used in very poor developing countries, where complicated payment incentives and systems might be excessively cumbersome for the delivery of basic services.<sup>69</sup>

### ***Combinations of payment mechanisms***

No existing payment mechanism satisfies all requirements the societies demand, all the health systems' objectives. Therefore the systems tend greatly to combine the payment mechanisms in order to reach the optimal payment arrangement.

For instance, in Finland, the outpatient health care providers are reimbursed by combination of basic salary, capitation and fee-for-service, trying to eliminate the advantages of each of these methods and to make the best of each of them. As well, in Slovenia and the Czech Republic, the primary health care providers are reimbursed by a combination of capitation and fee-for-service payment. In Belgium, we can find use of combination of capitation and fee-for-service payments in inpatient care. Inpatient care in the Czech Republic is reimbursed using a combination of DRG, individual contracts, global budgets and fee-for-service. The range of different combinations is very wide, given by particular experiences of each country.

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<sup>69</sup> Langenbrunner & Liu, 2004.

## **Chapter 4: MODEL – ANALYSIS OF PAYMENT MECHANISMS**

This chapter will present a simple model which shall enable us to compare the basic extent of influence of various payment mechanisms on the health care provider behaviour and decision-making. The model used in this paper was inspired by a model presented by Seidman & Frank (1985) which was adjusted by Roubal (2005). The original model which was used to compare the DRG and per diem payment impact on the health care provision in hospitals, was rearranged in order to allow comparison of payment mechanisms used not only in inpatient but also in outpatient health care. These two sectors are analysed separately.

The main health care actors entering the model are providers of health care, patients and third-party purchasers as patient's agents. In the first part of the chapter the reader is familiarized with model assumptions building upon discussions presented in previous chapters concerning utility functions and some specific features of the health systems. Second part then provides graphical analysis of six payment mechanisms.

### **4.1. Model assumptions**

There are three main actors entering this model: health care providers, patients (health care consumers) and third-party purchasers. The analysis is based on the provider's maximisation problem as introduced in the Chapter 2.3 and the utility function of purchasers of health care, who plays an agency role for the patients, as well as the assumptions about patients' behaviour concerning their health care.

#### ***Providers (health care producers)***

The provider maximisation problem entering this model is a problem of maximisation of provider's net revenue and the level of the health status of each of his patients (patients who demand health care at his office). This assumption may seem fairly strong since we deal with publicly funded health systems, where the financial resources are limited<sup>70</sup>. However, in the general form of this model we will suppose that the only

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<sup>70</sup> Usually, in such systems, the provider's decision depends on a budget constraint, since the financial reimbursement he receives from the purchaser is limited by a certain amount. This means that he has to always bear in mind that providing a service to one patient may mean having to deny it to another patient.

limitation of the amount of services the provider supplies to his patients, is the amount of time the provider has to use for health service provision.

Each provider can work only fixed number of hours per week. In order to simulate the existence of waiting times in the model, let's make, although unrealistic, an assumption, that the patients demand care only in first  $W_0$  weeks of each time period (year). Therefore, when there are no waiting lists ( $HC \leq HC^*$ ), the providers supply health care only first  $W_0$  weeks in each period.

For the purposes of this model we will assume existence of number of health care providers who dispose of the same capabilities and equipment in their office. The quality of care they provide will then be up to their decision and this includes their choice of the amount of effort (time) they spend with each patient in order to reach a certain level of quality of services. We will assume that all providers are able to provide services under the same productivity (amount of services per hour) within particular level of quality of service provision.

We make a simplifying assumption that the health care providers supply only one type of service – the one the patient needs. Along with that we suppose that each provider knows exactly how much of this service must be supplied to a patient in order to maximise his/her health status using the knowledge that this amount is generally accepted as a necessary and sufficient requirement for the patient's successful treatment (according to, for instance, practice guidelines – see Chapter 2.1.5.). By this assumption we leave out the possibility of imperfect information of health care provider about the optimal treatment, which may lead to defensive medicine as presented in the Chapter 2.2.

Further, we assume that all providers are rational economic agents and have interest in the amount of their profit. However, an important objective which plays a crucial role in their decision-making (along with profit maximisation) is also ethics, as explained in Chapter 2.3.2. As a reminder, the chapter concludes that there exist two main provider objectives, which can sometimes be contradictory; profit maximisation and maximisation of patient's health status.

*Maximisation of profit* is defined as maximisation of revenues while minimising costs<sup>71</sup>. In our model we will suppose the cost function to be the same every period, and withal it will be identical for all health care providers supplying the same health services.

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<sup>71</sup> For more thorough explanation of profit maximisation see Varian, 1995, Chapter 18.

By implying this assumption we omit the possibility that an individual provider could face lower costs of his production relative to other health care producers. In contrast, the providers may raise their relative revenues, compared to other health care providers, by provision of larger amount of health services or by increasing the quality<sup>72</sup>. These two actions are, however, partly contradictory. The extension of the amount of health services might mean that the provider (under the assumption of the same level of skills) will have less time to spend providing each service, which may lead to a reduction of quality but will contribute to the higher revenues which he will receive during the first period, unless he will decide to work more weeks in each period ( $W > W_0$ ), which will then give rise to the existence of waiting lists (further discussion in the sections below). On the other hand, the rise of quality will demand the provider to spend more time in the provision of the same level of services but will not allow him to produce as many services as possible under lower quality level. In contrast this will lead to an augmentation of the provider's revenues in the next period, when his good reputation brings him more patients and at the same time he may have to extend his working time in order to keep the original level of quality. We will assume, however, that decreasing quality level by one unit will give the provider less time than decreasing amount of health care by one unit. Therefore, we may suppose, that

the following relationship holds:  $\frac{\frac{\partial r}{\partial q}}{\frac{\partial r}{\partial HC}} = \alpha < 1$ .

According to this reasoning one may assume a trade-off between the level of quality of the provision of health services and the net revenue received today (during the first period). At the same time however, we will assume that the payment mechanisms are set as to allow each provider, under any level of quality and health care provision, to make a certain amount of profit each period. It is an amount necessary for indispensable investments which allows the provider to keep up with the ever developing medical technologies and methods and by doing so retain competitiveness with other health care providers.

*Maximisation of patient's health status* means for provider to supply services of highest possible treatment efficiency<sup>73</sup>.

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<sup>72</sup> As explained in Chapter 2.3. higher quality will raise prestige of the particular provider and will bring him more patients in the future and therefore also higher future net income.

<sup>73</sup> This factor and its relation with the patient's health status were explained in Chapter 2.3.2.

### ***Patients (health care consumers)***

The main assumption concerning the health care consumers which enters this model is that all of them demand the same service with the same individual utility function from the treatment used. For simplicity we will consider such a health systems, where direct payments of patients to the providers are not present and therefore do not enter the patient's utility function, therefore in the model we will omit the element of price within the individual utility function.

Although, we know that the patient's capability to pass judgement on quality is limited<sup>74</sup>, for purposes of this model we will assume that each patient is able to recognize the level of quality of the health services provided to him. Although this assumption is very strong, it shall not have an influence on the generality of comparison of various payment mechanisms presented by the model. To make the assumptions about quality more realistic, let's suppose an existence of some minimum level of quality ( $q_{\min} > 0$ ) that no provider of health care will (want to) fall below, causing the care provided by him to be immediately harmful for his patients. At the same time we may suppose some maximum level of quality which is observable by the patient and which is feasible for the provider taking into consideration its time demand, or required level of the provider's effort. We will denote this level of quality as  $q^*$ , where  $q^* > q_{\min}$ <sup>75</sup>. To sum up, let's assume the patients are able to recognise the quality of services provided to them by different health care providers<sup>76</sup> and certainly, their utility will grow with higher quality of health care service provisions.

The patients' interests are represented in the model by the relation between the appropriateness of health care and the volume of services, which represents the relationship between the individual utility function of patient and the volume of health services. In contrast to the individual utility function described in Chapter 2.3.1. we "objectivised"<sup>77</sup> it by substituting the former utility on the vertical axis by the

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<sup>74</sup> The level up to which the patients are well-informed about health care provided to them and their ability to judge its quality are discussed in the Chapter 2.3.1. and 1.1.2.

<sup>75</sup> Discussion about likeliness of this assumption is discussed in Chapter 2.

<sup>76</sup> Pauly (1988) argued that patients can be regarded as being well-informed for about 25% of the healthcare they are provided with – this includes the routine care and care of chronic illnesses. As discussed above, for further analysis we will assume that patient is able to observe these „uncontractible“ aspects of health care provision and will appreciate them by raising the prestige and reputation of his health care provider.

<sup>77</sup> By an objectivisation the author means that we substituted individual capability of judging the appropriateness of treatment procedure – which enters the individual utility function although it is very

appropriateness of health care (see Chapter 2.3.3.). The graphs in the model consider an aggregate utility function connected to the particular health care provider, which is created by adding all the individual utility functions of the patients registered at his office.

### ***Third-party purchasers***

As concerns the purchasers we will suppose that the third-party payers have developed control measures, which enable them and, implicit in that, their principals (patients) to judge the appropriateness of the services provided. Just a reminder, as discussed above in the assumptions about the health care providers, that the health care providers are well aware of the level of appropriateness of the health care they are providing to their patients.

## **4.2. Graphical analysis of particular payment mechanisms**

For a graphical analysis we use several basic graphs which enable to show some specifics of payment mechanisms and their impact on provider's behaviour especially with respect to delivery/production of services, existence of waiting lists, cost efficiency, and prevention<sup>78</sup>.

In the following section we will analyse some of the payment mechanisms described in the Chapter 3. The author chose the particular mechanisms to be analysed with respect to the experience of the health system in the Czech Republic, where many changes in the payment system were introduced during the last two decades in order to find the best mechanism for the health system, taking into consideration its objectives and values treasured by the society. For outpatient care the author chose *fee-for-service*, *capitation*, *salary*, for the inpatient care the comparison focuses on *per case payment*, *per diem* and *prospective global budget*.

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limited – by a generally established (in practice guidelines, standards, ...) appropriateness variable – which is supposed to be observable for the purchaser, who plays the role of an agent of the patient. This step signifies, in fact, replacement of the individual utility maximisation goal by the individual health status maximisation objective.

<sup>78</sup> By prevention we can understand the fact that, the patient will not come back to the provider with the same health problem caused by under-treatment. In other words, whether a payment mechanism enhances prevention will be given by his/her incentive to cure his patients properly by providing them all the necessary service they need.

#### ***4.2.1. Comparison of payment mechanisms for out-patient care***

For out-patient care we will assume that cost function is increasing with the amount of health services, while we omit the possibility of decreasing marginal costs. The author is aware that this assumption reflects a simplification of the reality, however, the cost function shape is a matter of wide discussion<sup>79</sup>, which can be found in a variety of literature and which is beyond the extent of this thesis. The influence of payment schemes on providers' behaviour in out-patient care will be displayed in *Figure 6*.

In addition to the graphs in *Figure 6*, we will assume a decreasing level of quality for volume of health care  $HC > HC^*$ , which is larger than the optimum amount of health services. Intuitively, the larger amount of services the provider supplies, the less time (effort) he will invest with provision of each unit of the services<sup>80</sup>, therefore the level of quality falls when compared to its "optimum" level<sup>81</sup>  $q^*$ . We will suppose that the provider will not be willing to provide services of a higher-level of quality than  $q^*$ <sup>82</sup>.

#### ***Fee-for-service (FFS)***

The basic principle of this payment method is, simply said, that the provider is paid for each service he supplies, therefore we can suppose that the gross revenue of the provider increases with the increased amount of health services he supplies. This is depicted in *Figure 3*. Since in the model we assume provision of only one type of service we do not face the problem of different prices of various health care services.

In order to add to his net revenue ( $NR_{FFS}$ ) under this payment mechanism, the provider tends to supply increased amounts of services, as we can see in the *Figure 6 graph (a)*. The  $HC^*$  stands for the amount of health services which are necessary for successful<sup>83</sup> (efficient) treatment and which ensures the provider with some amount of profit which enables him to keep up with growing medical and technological progress (see

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<sup>79</sup> McPake, Kumaranayake, & Normand, 2002.

<sup>80</sup> To remind, we need to take into consideration assumption made in the Chapter 4.1., where we suppose that the time "saving" the decrease of quality gives us (by one unit) is smaller than the time needed for providing one additional unit of health care service. Therefore we can expect that the decrease in quality will only partially outweigh the additional time needed for larger provision of health care and this may lead to existence of waiting lists.

<sup>81</sup> It is the level which is necessary for a successful treatment.

<sup>82</sup> Higher level would constitute too much effort for him without an appropriate appreciation (as assumed above) from the side of the patient.

<sup>83</sup> Successful in this sense signifies health status improving or maintaining, see Chapter 2.3.2.

Chapter 2.3.). If we subscribe to the possibility that the decision-making of a provider is driven only by profit maximisation, we can assume that the provider will continue augmenting the amount of services up to the minimum level of quality<sup>84</sup> ( $q_{\min}^{FFS}$ ), which no provider is willing to fall below. In the graph (b) we can then observe the trade-off we suppose to be between net revenue and quality which enters the decision-making of the health care provider. We suppose that each provider is choosing a certain level of profit to go along with the level of quality of health services he will be delivering. Each combination of the level of net revenue and the level of quality generates a certain level of health services ( $HC_{FFS}$ ) the provider will supply in order to maximise his own utility (combination of profit maximisation and the patient's health status maximisation). This amount of services supplied by the provider ( $HC_{FFS}$ ) will determine the level of appropriateness of health care (A) faced by the patient. This is shown in graph (c). Both, the level of appropriateness of care (A) as well as the quality of care (q) produced by the provider will influence the number of patients who will wish to be treated by the particular health care provider in the next period. To conclude, the quality and appropriateness of care have an impact on the provider's future net revenue as we can see in the graph (d), where the indifference curves represent the likeliness of the client (patient) staying and recommending the health care provider to other consumers. Simply said, likeliness of provider's net revenue rises in the next period - the closer to the centre of the indifference curves the more likely the revenue of the provider will increase in the future.

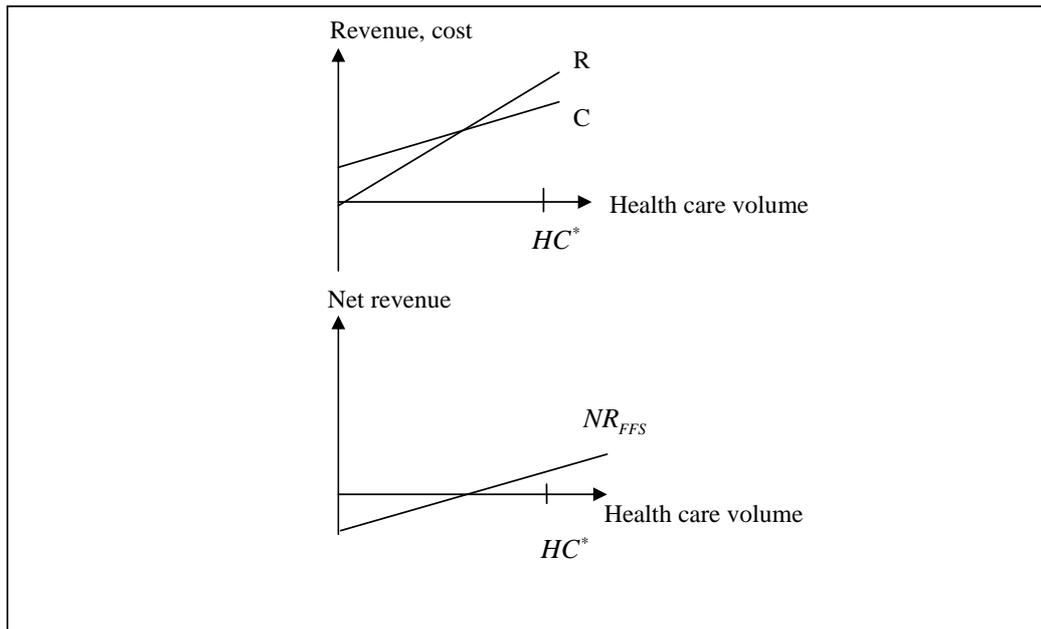
If we assume that each provider wishes to make higher profit than  $NR_{\min}$  as well as not settle for provision of services with the level of quality being only  $q_{\min}$ , we can expect that most provider's utility functions will be somewhere in between these two extremes – such as the utility function  $U_{Pr.}$ , depicted in the graph (b). Taking into consideration a provider who faces the utility function  $U_{Pr.}$ , we can conclude, that the payment method fee-for-service leads the individual provider to higher provision of health services than  $HC^*$ , which means that each patient will have to settle for lower than optimal appropriateness of care, which imposes a financial pressure on the health system. The choice of lower quality level than  $q^*$  saved the provider some working time, however, the

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<sup>84</sup> The minimum level of quality signifies the level where we take into consideration his personal belief in the importance of maximisation of the patient's health status as well as the level the quality influence his future net revenue.

amount of this time is negligible when compared with the additional time demanded by the rise of health care service volume he is supplying. This implies a conclusion that treating the same number of patients will cost the provider more time, therefore, the number of his working weeks will rise ( $W_1 > W_0$ ) which gives existence to the waiting lists. As to the question of prevention, in the basic form of this payment mechanism, the provider is not incentivised to prevention, since the fact that the patient has to see him more often, even when dealing with the same health problems, brings him higher income.

**Figure 3: Cost-revenue analysis – FFS**

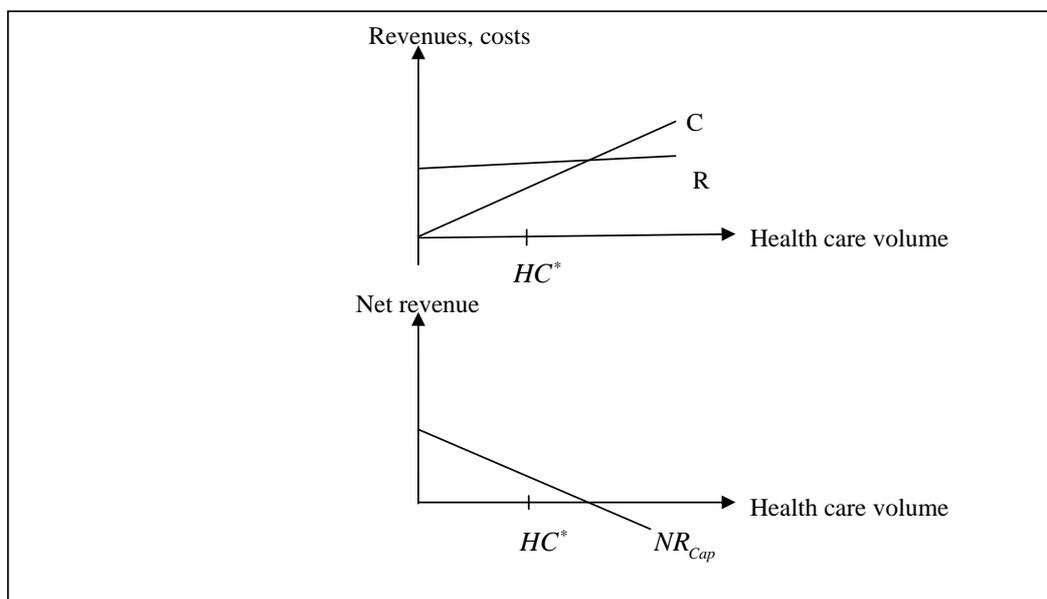


### **Capitation**

The basics of the per capita payment mechanism is that each particular healthcare service provider is paid a fixed amount for each enrolled patient (as discussed in Chapter 3, the fee is usually established with respect to the risk factor of each cohort), irrespective of whether the person was or was not seeking care in that period. If we suppose that all patients in our model face the same risk of becoming ill, we get a gross revenue function

(as featured in *Figure 4*) which is constant<sup>85</sup>, no matter how many health care services are provided. This leads to declining function of net revenue.

**Figure 4: Cost-revenue analysis – Capitation**



Consulting the *Figure 6*, we can observe a different situation than in the case of fee-for-service, where the profit maximisation motive led the provider to provide more health care services. In the case of fee per capita we see the contrary; the net revenue of the provider is largest when the provider provides the minimum level of services (these mandatory services are usually determined within capitation scheme), it means  $HC < HC^*$ . This mechanism has an opposite effect to the fee-for-service payment mechanism as to the production, because it motivates the provider to lower production of health care (see graph (a)) under the same quality level. If we suppose the provider will choose to supply lower amount of health services than  $HC^*$ , it will imply a lower quality of his care provision (see graph (b)). The decrease in the amount of health services will also influence the appropriateness of care, which will fall when compared to its maximum level. Since the

<sup>85</sup> Taking into consideration that usually the capitation method is accompanied by a list of mandatory services (e.g. prevention), which have to be provided, as discussed in Chapter 3.

provider provides less health care services to every patient<sup>86</sup>, it allows him to spend less time with each patient. This time gain – at least at the first period, when the patients do not have an access to any comparison of providers – enables the provider to treat more patients within the first  $W_0$  weeks of each period – however, the patients suffer from under-treatment given by under-provision of health care. In comparison to the previously discussed method, per capita payment does not create risk of waiting lists, however it gives rise to a problem of under-provision of health care, which can be very harmful to the patient's health status. On the other hand, the provider is motivated and mostly also forced (by the conditions set within the capitation payment mechanism) to prevention, since it can contribute to better long-term health of their patients and therefore less health problems to be treated – which means for the provider lower costs per patient – by the same reasoning we can suppose that this method might motivate the providers to cost efficiency.

### *Salary*

Let's assume that when individual physicians are paid by salary, it requires the physicians to provide health care according to some minimum norms of treatment known and fulfilled by all the physicians.

If we take into account an assumption of no performance-based incentives (such as special awards, etc.), the behaviour of such a health care provider is not driven by profit maximisation, because his revenue is fixed under all circumstances. Therefore, one can suppose that the physician will be - more than under other payment mechanisms - concerned with the "ethical" part of his motivation, which is the patient's health status improvement. On the other hand, we shall take into consideration his labor-leisure preferences, which have been omitted in the analysis so far and replaced by the simple rent-seeking incentives.

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<sup>86</sup> Under the assumption he does not want to lose his patients, therefore, he wants to treat all the patients subscribed at his office. Lower level of health services provided then leads to lower average amount of services per patient.

**Figure 5: Cost-revenue analysis – Salary**

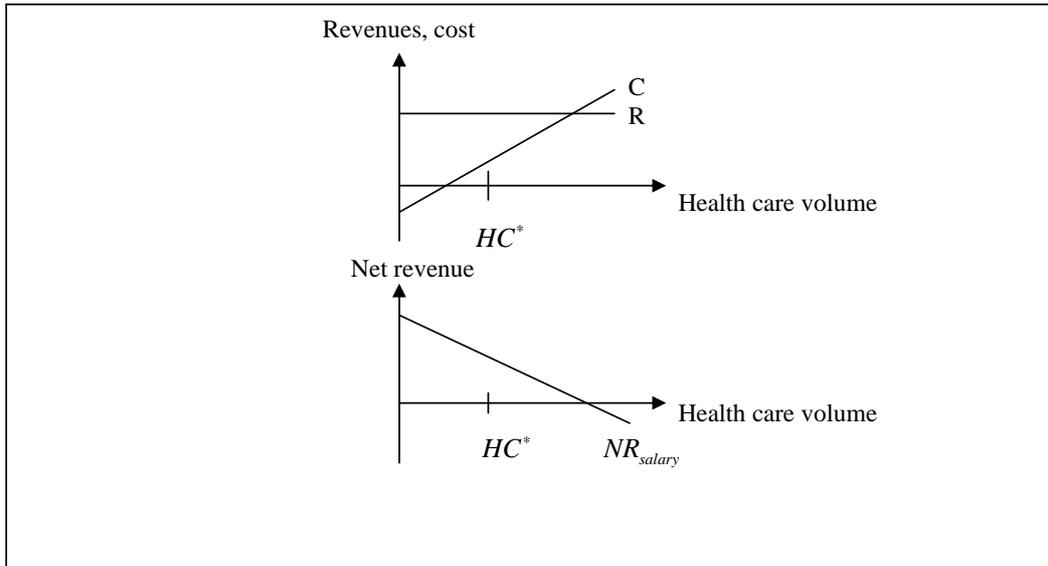
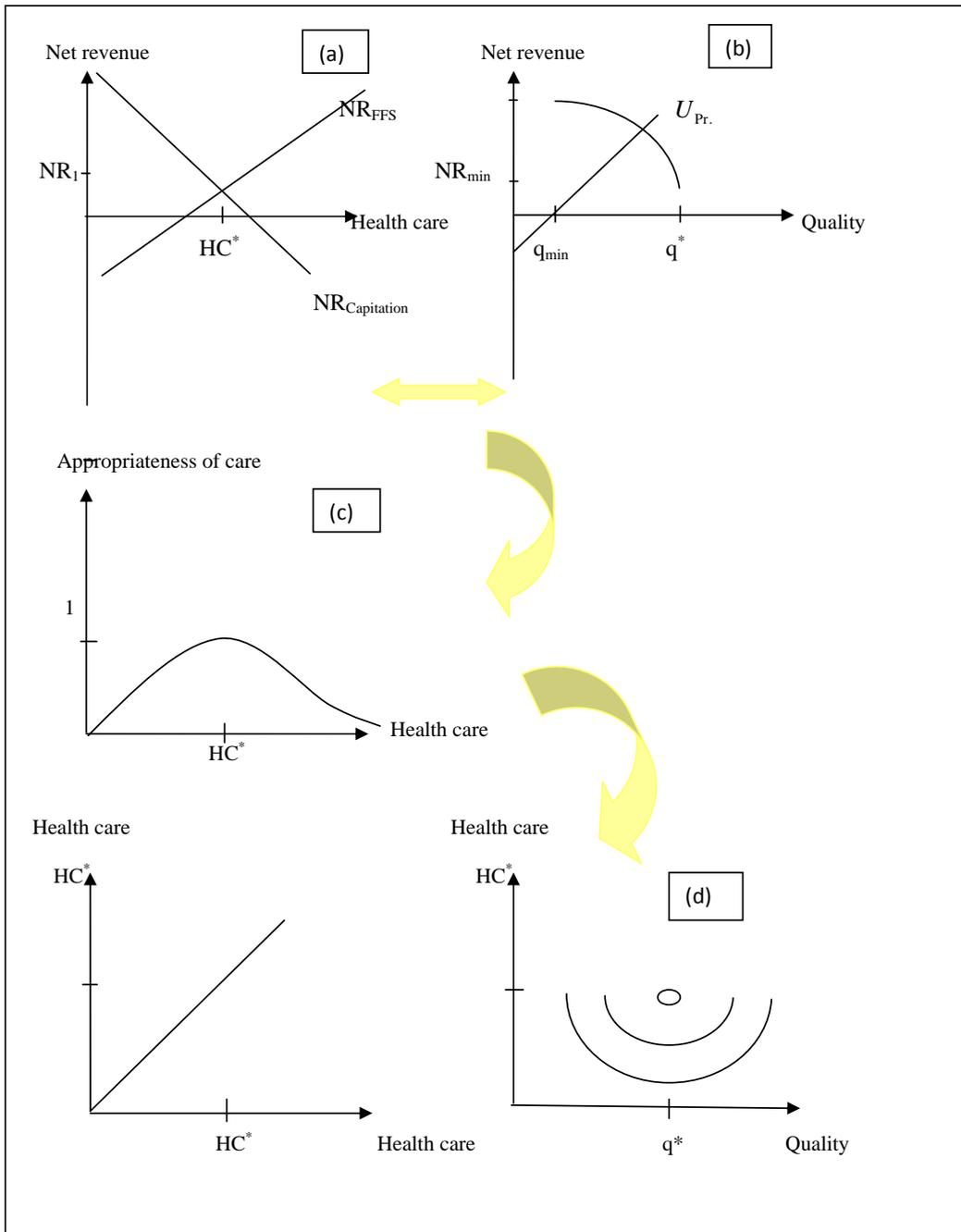


Figure 5 displays the net revenue function implied by the revenues and costs which the health care providers face under salary payment mechanism.

If we suppose that there are two providers who face the same influence of ethics on their decision-making, with one of them being reimbursed by salary, while the other is being paid by per capita payment mechanism. We can assume similar resulting behaviour of both physicians. Both will tend towards the under-provision of health care services, however each case will be based on different motivations. By contrast to strictly profit-seeking incentives in the case of capitation, the physician paid by salary will most likely rather prefer to under-provide health care in order to diminish his working time. This method does not provide motivation towards a higher overall health care production, and in addition, it may lead to a risk of insufficient care provision to each patient. In fact, we could say that since the provider will most likely have a tendency towards working less while treating the same number of the patients, he will be providing each patient with a lower than optimal level of health care  $HC^*$ . Therefore the patient will face less appropriate health care. We might use the same reasoning also for a potential choice of a lower quality level of services by the provider – in order to spend as little time (and effort) as possible by the treatment of each patient. We cannot say much about its impact on prevention unless it is a part of the norms the providers have to follow. As to the cost

efficiency, the payment mechanism as itself has rather neutral impact, as well as taking into consideration the waiting lists creation.

**Figure 6: Comparison of payment mechanisms for out-patient care**



#### 4.2.2. Comparison of payment mechanisms for inpatient care

In the case of inpatient care, which is usually provided in hospitals or other health care facilities, we shall pay attention – compared to the out-patient care case – to two aspects. The first one is the cost function. For an inpatient care we consider the cost functions to have decreasing marginal costs with the growing time of hospitalisation. Written in formalisms, we can specify the features of this function as follows:  $C'_i > 0$ ,  $C''_i < 0$ ; the cost function is concave in time of hospitalisation. For the following analysis we therefore replaced the graph depicting relationship between net revenue and volume of health care by the relationship between net revenue and time of hospitalisation. The second aspect is the relationship between time of hospitalisation and health care volume. Since we suppose (in the case of out-patient care) that cost function is growing with health care volume, with constant marginal costs ( $C'_{HC} = const.$ ), the relationship between time and health care volume will have very similar shape to the curve picturing relationship of time and costs, as depicted in the *Figure 9, graph (c)*. In other words, we can suppose that longer hospitalisation means that the patient will get more health care, however, the daily amount of care will decrease with every additional day of hospitalisation.

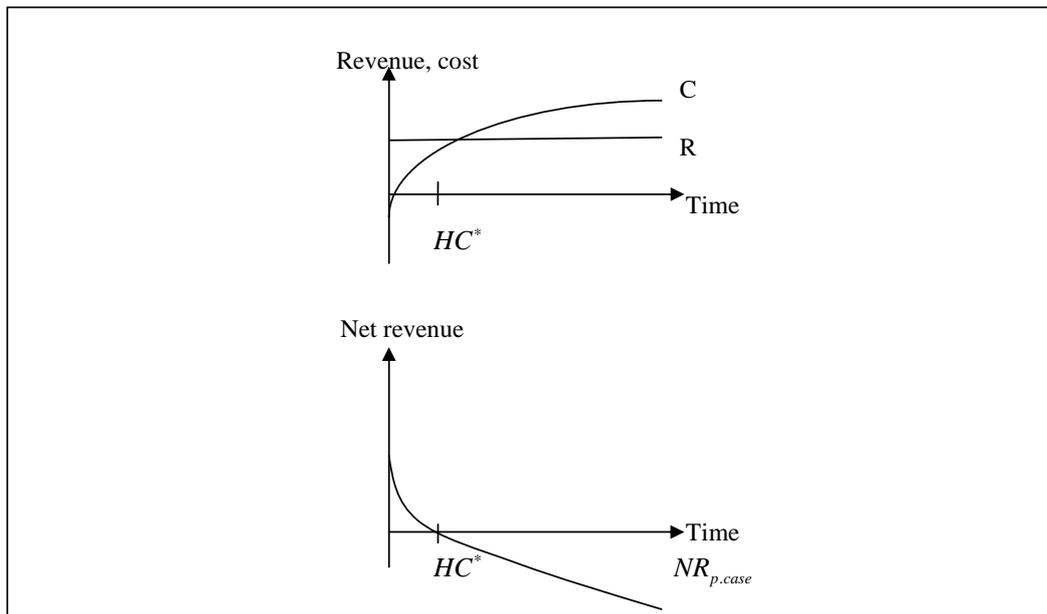
The following paragraphs will analyse three payment mechanisms often used to pay for inpatient care with the help of graphs displayed in the *Figure 9*.

##### **Per case**

At first, we will assume a basic form of per case payment mechanism, when each case (diagnosis) is reimbursed by the same standard payment. Further on, in the following paragraphs, the assumptions will be slightly strengthened and it will be supposed that per episode rate is identical for each health care facility and all patients have the same diagnosis. As depicted in *Figure 7*, the revenues of the facility are the same, no matter how long the patient is hospitalised. This fact implies decreasing net revenues with growing time of hospitalisation. Under the assumption that the provider prefers higher profit to  $NR_{\min}$ , he will keep the patient in hospital for a shorter time than  $t^*$  ( $t^* < t$ ). As we see in *Figure 9, graph (b)*, the quality will fall under the level of “optimal” quality  $q^*$ . With a shorter time of hospitalisation, the provider will supply the patient with a lower amount of

health care services (see *graph (c)*), which means that the patient faces lower than maximum appropriateness of care (*graph (d)*) and therefore is less likely to recommend this health care provider to other patients in the next periods and by this, augment the provider's future net revenue (*graph (e)*).

**Figure 7: Cost-revenue analysis – Per case**



To conclude, this payment mechanism, in its basic form, incentivises the provider to rather under-provision than over-provision of health care, while on the other hand, it does not create waiting lists by unnecessary filling up of the health care facility capacities. However, since the patients are discharged from hospital too early, they might face the risk of being not fully treated and might have to return to the hospital later. This fact can serve as an incentive for the health care providers to shorten the time of hospitalisation of patients, expecting them to return. This negative risk presents a threat not only to the patient and his health but also it puts a financial pressure on the whole health system.

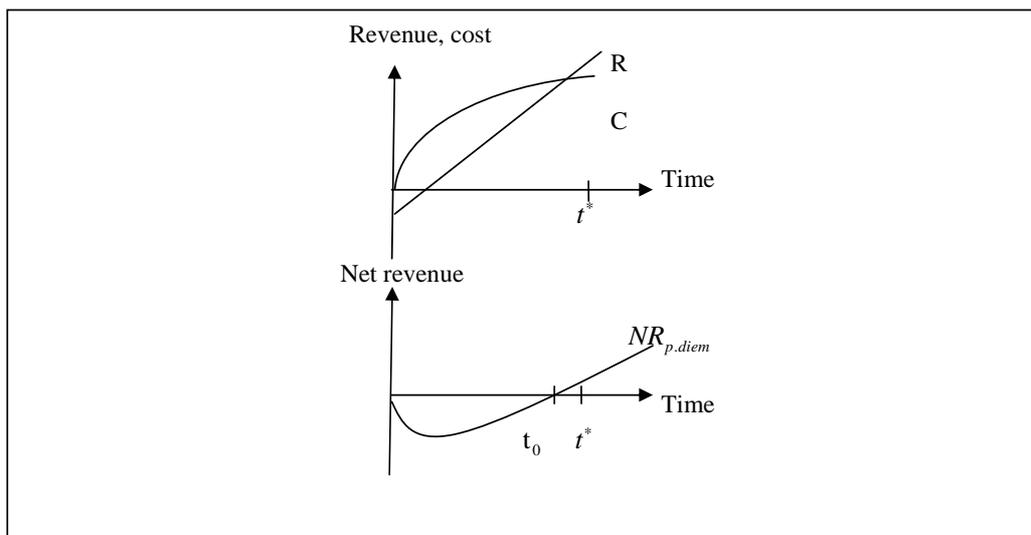
Next we will suppose a restriction imposed on the particular patient diagnostic visit to a healthcare facility. This constraint shall help to prevent the patients from being discharged too early, since it combines the profit-seeking (in this case cost-containment) and health status maximising incentives in one. In this case, the provider is motivated to maximise the patient's health status as well as to cost-efficiency in order to diminish the costs connected with his treatment and his possible return to the hospital caused by under-

treatment<sup>87</sup>. This method of payment motivates the providers to cost efficiency, since it can be one of the ways to increase their net revenues, with the gross revenues being fixed. As to the prevention, the payment mechanism does not motivate directly to prevention, however, given the above reasoning of the financial “harm” caused by under-treatment or imperfect treatment of a case which can lead to return of a patient to the hospital and augment the hospital’s costs relative to revenues, we could assume that this payment mechanism may incentivise some kind of prevention.

**Per diem**

Similarly as the payment method per case, the *per diem* mechanism also is used to reimburse health care provision to the provider institutions for inpatient care. In this case, the health care facility receives a fixed amount for every day of a patient’s hospitalisation. We can then suppose that revenue function grows with time of hospitalisation, as showed in *Figure 8*.

**Figure 8: Cost-revenue analysis – Per diem**



<sup>87</sup> Since the provider receives only one payment for the particular patient, it is more profitable to keep him in hospital a little longer during his first visit, since the marginal costs are diminishing in time, then under-treat him and face high initial costs during his next visit in the health care facility.

Subtracting costs and revenues gives us the net revenue function which is convex, while it is positive and growing if the patient spends a period of time in hospital longer than  $t_0 > 0$ . Given this relationship, we can assume that in order to maximise his revenue, the provider will tend to keep the patient hospitalised as long as possible, because the longer the stay, the larger his net revenue (*Figure 9, graph (a)*). If we suppose the provider prefers profit higher to  $NR_{\min}$ , than he will choose to keep the patient hospitalised for the time  $t > t^*$  and, implied by the trade-off between quality and net revenue (*graph (b)*), will provide health care of lower quality than  $q^*$ . Longer than “optimal time”  $t^*$  spent in hospital implies that the patient will get more treatment than  $HC^*$ , which is illustrated in the *graph (c)*. The *graph (d)* then shows, that this deviation from the optimal amount of health care for the patient’s treatment ( $HC^*$ ), will lead to lower appropriateness of care faced by the patient. In the *graph (e)* we may see the impact that the provider’s choices today have on likeliness of the increase of his net revenue in the future (likeliness rises towards the centre point of the indifference curves).

To conclude, the per diem payments motivate to larger production, given the assumption of diminishing marginal costs with the time of hospitalisation. Even though, the health care providers have fixed amount of money per each patient and day, which might lead to a thought of cost-efficiency, in the overall (for the whole treatment of a particular patient) the providers are not limited as to the financial resources, as more expensive treatment may be paid off by prolongation of the time of stay in the hospital. Based on this theoretical reasoning, we may assume that the per diem method does not have a great impact on cost-efficiency. As well, we can assume that, in general, this mechanism does not increase motivation to prevention, since the patient’s return caused by omission of prevention does not cause any harm to the provider. The extensive prolongation of the hospital stay might cause lack of hospital capacities and lead to creation of waiting lists, given that the old patients occupy beds unnecessarily long time.

### ***Global budget (prospective)***

This method fixes price as well as volume<sup>88</sup> for all inpatient or outpatient services. A hospital then receives a lump sum to cover all specified services during a given period. At the end of the period, the hospital keeps all the surpluses, but on the other hand, it must cover any eventual shortfalls.

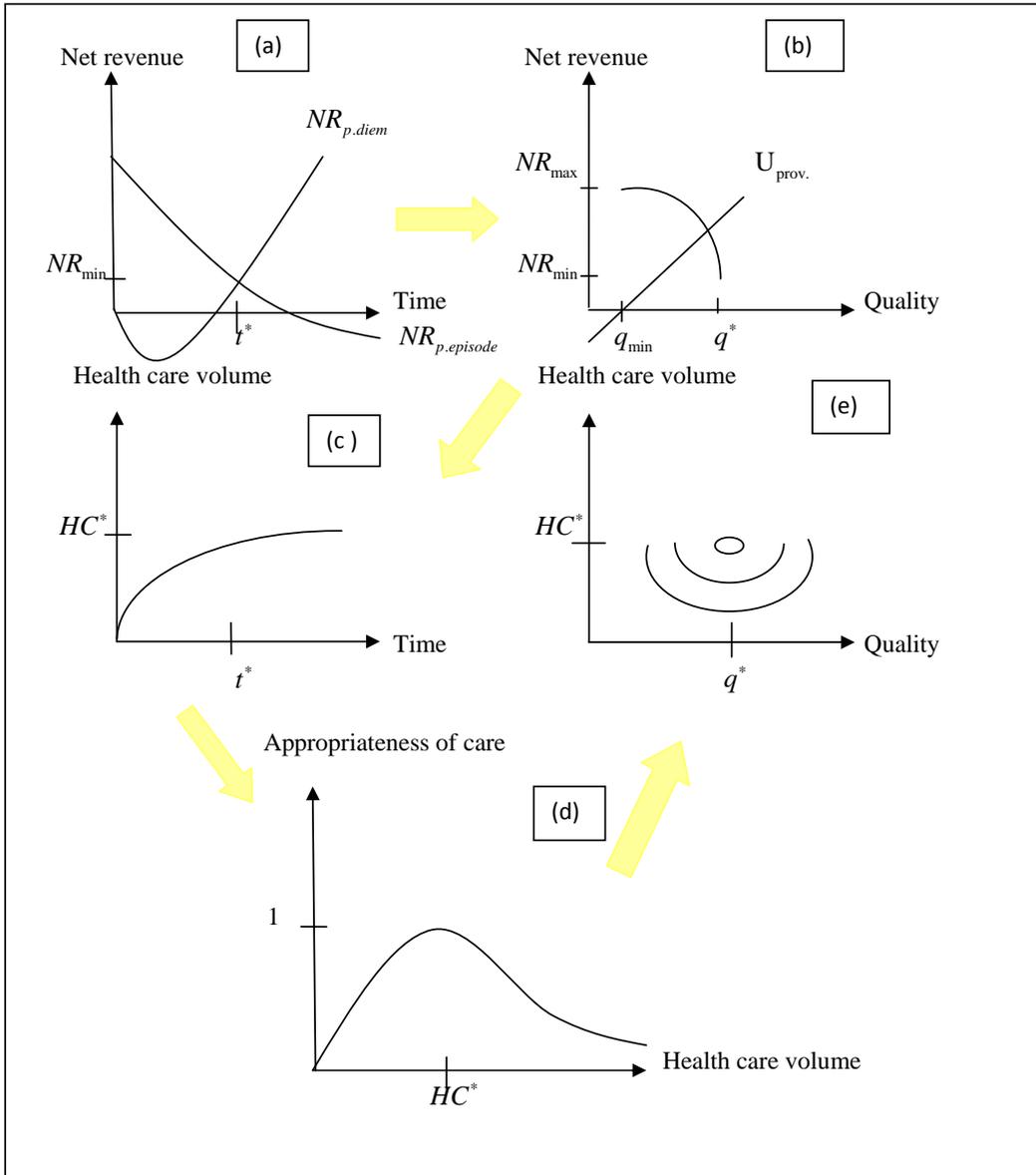
The fixed price along with the fixed volume of health care to be provided by particular provider institution gives the health care facility a fixed amount of gross revenue. The only way to maximise the net revenue then stems from cost efficiency. The facility is incentivised to keep the costs connected with the health care provision as low as possible in order to raise their net revenue. Since we did not consider any relationship between cost-efficiency and quality, we can suppose that in reality cost efficiency does not have a negative effect on quality and does not imply its deterioration<sup>89</sup>, although, given the assumption of the same productivity for certain level of quality, it will not be the case. This is the type of payment which will force the provider institution to make the decisions with respect to all its patients, realizing that providing care to one patient can mean having to deny care to another one, which could lead to sending patients from one facility to another. The provider institution is then led to weighing the relative benefits the health care brings to each patient and therefore maximising the health status of the whole society (all patients enrolled in its health care facility). As to the necessity of choosing the patients to treat according to their relative severity may lead the providers to enhancement of prevention, however, in fact it depends on the conditions and requirements assigned to the particular global budget concerning the volume of prevention services, therefore we may say that this payment mechanism is neutral with respect to this aspect. Fixed volume of health services, if well set up, may contribute to more realistic provision of health care as to the amount, therefore we may suppose it does not, in principle, cause neither over nor under-provision of health care.

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<sup>88</sup> This statement is stronger than a common practice, usually the volume of health services is given by some threshold, which (when surpassed) implies lower reimbursement above this level of health services (see Chapter 3).

<sup>89</sup> We can base this assumption on the fact, that the provider facility cannot influence the level of its gross revenue, because it will have the same amount of gross revenue for any level of health care amount  $HC > HC^*$  and therefore the volume of provision does not really play a role in provider's decision-making.

**Figure 9: Comparison of provider institution payment mechanism**



## CONCLUSION

### Model conclusions

The model introduced in Chapter 4 works with three main actors; health care providers, patients (health care consumers) and third-party purchasers. As it was discussed in Chapter 3, the payment mechanisms influence the behaviour of health care providers which may have important effects on the overall health of the society and on the functioning of health systems with respect to their objectives as well as their limited financial resources.

We shall accentuate especially eight of the model's crucial assumptions. All of them are concerned with capabilities and intentions of the three players who enter the health systems and on which the model focuses. The first deals with the goals and objectives of the health care providers given by their individual utility functions, which were described in Chapter 1.1. It implies that *the provider's maximisation problem consists of maximisation of his net revenue and the level of the health status of each of his patients*, this is connected especially with the ethical part of the provider's agency role. The second assumption emphasises that *the provider has a perfect knowledge about the amount of services* which need to be supplied to a patient in order to maximise his/her health status. The third assumption states that *all the providers dispose of the same level of capabilities and equipment*. These last two assumptions imply, that the choice of the amount of health services (their appropriateness) provided as well as their quality (within certain margins) is given by the provider's decision. The fourth assumption we made was that *all providers supply services under the same level of productivity (amount of services per hour) within particular level of quality*. This point implies that there exists a certain trade-off between the level of health services provided and the level of quality of their provision. While the

following is supposed:  $\frac{\partial t}{\partial q} = \alpha < 1$ . As to the fifth assumption it shall be mentioned that  $\frac{\partial t}{\partial HC}$

*the higher quality of health care provision today raises the likeliness of elevation of the net income tomorrow*, since it increases the prestige of the particular health care provider among the patients. The sixth important assumption deals with the cost function which the

health care providers face. The general model supposes that *the cost function is the same every period, and withal it is identical for all health care providers supplying the same health services*. These last three assumptions, when put together, imply that the providers may raise their relative revenues by provision of larger amount of health services (or by increasing the quality – influences only the future income). The seventh assumption focuses on *patients* (consumers) who *are supposed to be able to recognize the level of quality of the health services provided to them*. The last fundamental assumption to be stressed is the *development of control measures*, which enable the third-party purchasers and consequently also the patients to judge the level of appropriateness of the health services supplied.

Under the assumptions mentioned above, the author analysed the influence of six payment mechanisms on the provider's behaviour, especially emphasising impact of their use on four aspects important for health care provision: *production of health services, waiting times, cost efficiency* and *prevention*. First part of the analysis focused on the outpatient care, where the absolute amount of health services per one treatment of a patient played an important role. In the second part, three mechanisms representing the group of payment mechanisms used in inpatient care reimbursement were analysed with an emphasis on the length of a stay of a patient.

**Table 2: Impact of payment mechanisms on provider's behaviour**

	<b>Delivery/production of services</b>	<b>Creation of waiting times</b>	<b>Increases cost efficiency</b>	<b>Incentivises prevention</b>
<b>FFS</b>	↗	↗		↔
<b>Capitation</b>	↘	↘	↗	↗
<b>Salary</b>	↘	↔	↗	
<b>Per case</b>	↘	↘	↗	↔ <sup>90</sup>
<b>Per diem</b>	↗	↗	↔	↔
<b>Global budget</b>	↔		↗	↔

<sup>90</sup> If we consider a slight adjustment of the basic form of the payment mechanism introduced in Chapter 4.

The *Table 2* provides an overview of the results coming from the model presented, taking into consideration mostly basic forms of the six payment mechanisms. The first three lines of the table stand for the payment mechanisms analysed in the model as used for outpatient care. The last three lines represent mechanisms used for reimbursement of inpatient health care. The sign  $\nearrow$  means, that the particular payment mechanism motivates the health care provider to the particular aspect observed. The sign  $\searrow$  means, that the mechanism incentivises the opposite to the aspect displayed in the table and the sign  $\leftrightarrow$  stands for neutrality of the mechanism considering the particular factor. The blank places stands for the fact that we are not able to judge the impact of the payment method on the particular aspect based on the model introduced in Chapter 4.

When reading *Table 2*, the reader needs to take into consideration meaning of each of the four aspects, the table focuses on, in the context of health care sector. For instance, production of services is a twofold problem, on one hand there is overproduction, on the other hand underproduction and each one of these when led into extreme constitutes a great problem not only for the health system functioning and its finances, but above all on the patients and their health status. Therefore, it is difficult to say whether it is better and for who when the payment mechanism enhances the health care providers to high or to low production of health services. Along with that, the term cost efficiency constitutes a problem as well if it is not properly defined (see Chapter 1.1.). These two examples remind us of the necessity of judging and evaluating the impacts of particular tools with respect to the wide range of objectives the societies and policy makers place into health care and health systems (see Chapter 1).

The *Table 2* shows, that particular payment methods differ greatly with respect to the influence they have on health care providers, however, it is very difficult to unambiguously state which one of the mechanisms is the best, especially vis-a-vis other possible criteria under which we could judge the mechanisms, such as access, quality enhancement, etc.

Langenbrunner & Liu (2004) and Figueras, Robinson, & Jakubowski (2005) also use similar table in their work, however, they focus on some different criteria for evaluating the payment mechanisms impact and in some cases do not contain reasoning for their conclusions.

## Possible extensions of the model

As stated in the *Chapter 4*, some of the assumptions of the model introduced are perhaps too strong or too remote from the reality. This fact gives the model potential for further extensions, which might contribute to its larger complexity, yet also complicity.

Given the limited resources the health systems have to deal with, we could assume that there exists some cap on the maximum amount of health services (in the case of outpatient care) or some maximum number of days of hospitalisation (in the case of inpatient care) for particular health care provider. This assumption would influence the interval within which the level of quality shall be placed, as well as we would ensure certain interval of the level of appropriateness of health care in the cases of those payment mechanisms, which tend to overproduction. At the same time, this restriction might contribute to elimination of waiting lists, which – in our model – are caused by overproduction of health services to each patient.

Another one of the possible extensions concerns the cost function. Impossibility of changing the cost function, assumed in the model, prevents the providers from one of the possible ways to augment their net revenue, as discussed for instance in the case of fee per case. By allowing the possibility of shifting the cost function we could consider the eventuality that each provider can attempt to lower his costs under each level of health care production and therefore raise his/her net revenue.

One could also relax the assumption about the productivity of the providers in order to introduce another extension of the model. We may assume that in the real world the capabilities as well as equipment differ among the health care providers, which brings up the possibility of each provider having different productivity within a particular level of quality. The providers in general are “operating” within a certain interval of amount of health care services to be supplied within a certain quality level, without creating waiting lists. Their incomes may then also differ due to the differences of their aptitudes.

Introduction of cost-sharing, direct payments from patients towards health care providers, also constitutes one of the alternative extensions of the model. This step would first of all influence the behaviour of patients in the sense that most probably they would get more interested and strict about the health care and its quality they receive. Moreover, since the model looks at the costs in general, without taking into account the problem of the sources of their reimbursement, we can assume that it would not have a significant

impact on the providers' behaviour. It can be supposed, that in principle, the providers would behave in the same manners as before, but the ranges within which they operate would get most probably narrower.

### **Concluding remarks**

The weak and the strong points of the payment mechanisms are widely discussed in a spectrum of literature<sup>91</sup>, however little theoretical analysis has been made. The simple graphical analysis presented within the model introduced in the Chapter 4 proved some of the experience stemming from practice of many health systems.

Nowadays, when health systems gain in importance in debates of all policy-makers in order to find the best - in the sense of whole complex of objectives set by the society and the policy makers - way of operating them. The systems face immense inefficiencies and failures which are caused by various factors and actors. An important aspect influencing health systems' functioning is the provider's behaviour, as we discussed in Chapter 2 and Chapter 3, which may be often one of the causes leading to the lack of sustainability of the health systems.

The distinction between purchaser, provider and patient role in most of the health systems was an important step, giving the third-party purchasers tools in order to influence the provider's behaviour and contribute to better functioning health systems. This paper focused mostly on payment systems and contracts when analysing the third-party purchasers' tools and their impact on provider decision-making. However, payment systems are just one of the elements among the mix of factors that will determine the extent to which the purchaser can influence the provider's behaviour. Another important factor, not to be forgotten, is for instance the nature of the provider organizations themselves. Their form of ownership, their degree of autonomy and scope for decision making and the type of market structure within which they operate all influence the way in which they act as the patient's agent.

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<sup>91</sup> Docteur & Oxley (2004); Figueras, Robinson, & Jakubowski (2005); Gauri (2004) ; Langenbrunner & Liu (2004); Gauri (2004).

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