COMPARITIV EXAMINATION OF HOW DIFFERENT PAYMENT SYSTEMS AFFECT THE LEVEL OF MEDICAL CARE PROVIDED

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Preface

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All errors are mine.

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1 Introduction

Learning and understanding health economics is very important. First, health is important to us as individuals and for society because health is essential for prosperity of a society. The availability of health care can determine the quality of our lives and our prospects for survival. Health affects time available to produce wealth. Thus, ill health reduces people’s ability to earn money. Also, it affects one’s happiness. No one likes to suffer from pain and be useless for society.

Secondly, the health care sector of the economy is very large. Governments intervene in health care markets to a great degree by regulating who may provide services, what providers can charge or what profits they may earn, subsidizing healthcare (partly or fully) and/or directly providing health care (i.e. public hospitals) (Morris, 2007). Public sector pays a substantial proportion of expenditure on healthcare services in many countries all over the world. Nowadays government expenditures on healthcare constitute an important and rising share of Gross Domestic Product (GDP).

In this thesis my concern is with the relation between health care resources and health care performance and physicians behaviour under three different systems: fee-for-services (payments for every item of care provided), capitation (where healthcare providers (physicians) are paid a predetermined amount for each person assigned or enrolled to their practice, whether or not that person seeks care, per period of time.) and mixed payment systems (which combine elements from both fee-for-services and capitation payment system).

Health has an important impact on our welfare as human beings. Healthcare is one of the inputs in achieving better health and is very substantial.

In health economics health care is considered as an economic good. Production of health care, like production of any other good, requires human resources, capital and raw materials. Nevertheless, healthcare has some specific characteristics which distinguish it
from other goods. First of all, it is impossible to physically observe the good (health care) before buying it. Secondly, health care is untradeable. Being bought by one individual it cannot be sold further to another one. It cannot be traded for some other goods. Thirdly, the satisfaction (utility) of consuming health care is usually determined in a long run through its effect on consumer’s health.

Moreover, one of the characteristics which are specific to the market for medical care is uncertainty. To start with, there is uncertainty about demand of health care goods and services because individuals cannot predict when and how much medical care they will demand because of the nature of disease and its incidence are uncertain. There is as well an uncertainty about access to the medical care required, i.e. there might be a need to travel abroad in order to get an appropriate treatment. By “appropriate” I mean that healthcare providers supply their patients with the right medical treatment, and handle them with sympathy and understanding etc. I would refer to these aspects of care as the quality of medical services provided. Besides that health care expenditures may require individuals to spend a significant share of their available income illness may also reduce their ability to work. As a result of uncertainty about timing and amount of medical treatment costs the consumers of health care are influenced by financial risk at any time.

Risk averse consumers of medical care want to transfer the risk burden to a third-party payer such as an insurance company or the government. In this case third-party payers are responsible for managing the financial risk associated with the purchase of health care treatment. An individual who dislikes risk, buys an insurance contract paying an agreed price, premium, in exchange for a payout the insurance company is going to make if the insured becomes ill. Thus, health insurance removes, in a way, uncertainty facing individuals with respect to the magnitude of health care expenditure.

Health insurance changes the economic incentives facing both the consumers and the providers of health care. One of these changes is moral hazard on demand side, which means that being insured lots of consumers tend to use excess amount of medical services. Another problem is incomplete coverage. This means that some low income groups of population might find it difficult for them to afford health insurance.
Another specific characteristic of a medical care market is information asymmetry between consumers, suppliers of medical care and a third-party (government, insurance company etc.). To be able to provide medical care, suppliers must obtain a certain level of medical knowledge. This means that in order to be able to participate on the medical care market they need to obtain required medical license. Being better informed medical care providers have an advantage over consumers in judging the quality of medical care. Considering the fact that it is very difficult for patients to possess information about an appropriate medical treatment for their condition and following professional norms and ethics, care providers should make their specialist knowledge available to the patients thus building a trustful relationship between them and maximizing consumer`s utility. Nevertheless, the supply of health care can be dictated by the selfish interests of the provider. In this case, health care providers are concerned only about maximizing their own utility inducing patients to consume medical services at a level beyond needed or provide quality below agreed standards. They are thus failing to maximize patient`s utility.

It worth mentioning the concept of a health care system because they are designed to meet the health care needs of populations. The World Health Organization (WHO) defines a health care system as the arrangement of all organizations, institutions and resources devoted to produce actions whose primary intent is to improve health. Health care systems vary in performance all over the world. Nevertheless, it is possible to illustrate the three elements common to all health care systems: financing, reimbursement, and production or delivery (see the Figure below).

Being different health care systems should still be orientated on how best to raise sufficient funds for health, how to pool them together to spread the financial risks of ill health, and how to ensure that they are used effectively, efficiently, and equitably.
The WHO developed three primary goals for what a good health system performance:

- **Good health**: “making the health status of the entire population as good as possible” across the whole life cycle (increasing the average health status, reducing health inequalities etc.).

- **Responsiveness** includes respect for patients and client orientation.

- **Fairness in financing**: ensuring financial protection for everyone, with costs distributed according to one’s ability to pay. Contribution to the health system should reflect the difference in disposable income between rich and poor.
In this thesis my concern is with the relation between health care resources and health care performance and how different payment mechanism are likely to affect provider behavior and patient’s consumption of health care treatment referring to the literature on payment mechanisms.

In the first part of the thesis I will focus on the theoretical foundations of different payment mechanisms used to finance healthcare providers (physicians), and incentives they create for physician’s professional behavior and patient’s well-being. I specifically discuss how as information asymmetry, provider altruism, competition between providers, physician monitoring may change healthcare provider’s behavior.

In the empirical part I will investigate the theoretical results with relevant empirical evidence available.

Theoretical part of the thesis is given in Chapter 2 till Chapter 4.

In the second chapter we presented on a general model of health care consumption and provision. We showed that the demand for health care is determined by patient’s illness severity and declining in prices for medical care. We also described that being budget constrained individuals due to the uncertainty about the magnitude of health care expenditure anxious about catastrophic future healthcare costs and thus enter the insurance market to protect themselves from future financial losses. The theory showed that being fully insured individuals face no cost of health treatment and thus wish to consume care beyond efficient level. The problem of over-consumption is known as a moral hazard problem. We mentioned one of the ways to illuminate moral hazard by make insurance contract illness-contingent.

In the third chapter we showed that the excessive consumption can be also reduced by making individuals pay a portion of their healthcare expenditures. Nevertheless, under this mechanism patients lose some benefits that full insurance gives them because they face greater financial risk when the co-payment rate increases due to uncertainty prevailing on the healthcare market. We examined how information asymmetry alters physicians’ behavior about care provision. In particular, it creates incentives towards provision of
medical treatment beyond the efficient for patient’s health level due to information asymmetry between care providers and consumers.

In the third chapter we introduced a payment mechanism named capitation and showed that being paid under this payment mechanism generated opposite incentives than fee-for-services payment mechanism does. That is, physicians are willing to under-provide care in order to maximize their revenue. We discussed that under-provision of care can be, nevertheless, limited by monitoring, medical malpractice litigation, competition between providers as well as by physician’s altruism and future reputation.

In the forth chapter we discussed that a mix-payment mechanism, which combines elements of both capitation and fee-for-services payment mechanisms, can do a better job in promoting both social goals of risk protection and efficient care provision.

In the fifth chapter we were investigating the theoretical results reviewing some empirical evidence. According to available data and Xe et al (2007) research, we were able to see the correlation between the amount of people facing catastrophic health expenditure and out-of-pocket payments, especially in low-income countries where people are tight in their financial budget. In this part of the thesis we took into consideration the work of Or et al (2005) who were trying to show the correlation between the amount of physicians available and mortality based on her analysis of 21 OECD countries over 3 decades. We also looked at some evidence about health care system performance across some countries in achieving the main three goals set by the WHO.
2 General model of health care provision and consumption.

Before trying to examine all three previously mentioned payment systems it would be rational to study a general basic model of medical care provision and consumption to be able to adapt this general framework to different physician payment mechanisms in order to compare them (Lèger, 2008).

In order to show the main principle of medical care provision we simplify the analysis by making some assumptions. One of them is that we consider a situation with only one type of provider of medical services, physicians. Another is that patients pay for all care services with their own money, i.e. the first party system. Furthermore we let physicians have perfect diagnostic abilities and we exclude prevention and innovation from the consideration.

As we all know people are born with a certain stock of health. Unfortunately not everyone is born 100 percent healthy. Lots of people are allocated with a stock of health below the “healthy” level, i.e. are born with some sickness or disability. Almost every single member of the world`s population gets sick or injured through time. Every sickness that comes along decreases the stock of one`s health. Besides that a stock of health allocated at birth depreciates with age. Depreciated health can be augmented by investments in medical services as well as due to personal effort in achieving better health (quality of one`s life, which has an undeniable influence on health). By investments in medical services I mean consumption of medical treatment which cost money. Due to a huge variety of diseases, sicknesses and injures the level of necessary medical care required is different in each mishap. Thus we can conclude that consumption of medical services depends on illness severity. A person who seeks for and receives medical attention, care or treatment, including the one who is visiting a physician for a routine check-up will be viewed as a patient. Thus the patient`s health is a decreasing function of illness severity ($\delta$) and an increasing function of medical treatment ($\tau$). That is,

$$H = h(\delta, \tau)$$

(1.1)
Where $\frac{\partial h}{\partial \delta} < 0$ reflects negative effect, i.e. decrease in person`s initial health stock due to sickness, and $\frac{\partial h}{\partial \tau} > 0$ reflects positive correlation between medical care and health.

We assume that patients in our model consume to types of goods, that is medical services and non-medical goods like everyday utilities, which yield a certain level of satisfaction, i.e. utility. Every person has some preferences over its health and consumption. This means that the utility function is totally subjective. We can express patient`s utility as a function of health and consumption:

$$U(H, C_{nm})$$  

where (H) – health, (C_{nm}) – consumption of non-medical goods and $U_H > 0$, $U_{HH} < 0$, $U_{C_{nm}} > 0$, $U_{C_{nm}C_{nm}} < 0$ and $U_{H_{C_{nm}}} > 0$. This reflects the diminishing marginal utility of consumption, which means that each additional visit to a doctor (as well as consumption of non-medical goods) yields a smaller increase in total utility than the previous one.

It is not feasible to predict when the sickness will take place. On this base it will be convenient to use a probability distribution to reflect the randomness (uncertainty) of bad health occurrence. Let us assume that the probability to stay healthy is (d) and the probability to get sick is (1-d).

Due to uncertainty about becoming ill and at what cost, patients receiving healthcare services under the first party system (i.e. paid by patients, the first party) face financial risks at any time. Thus, their consumption of medical services and non-medical goods will depend on the illness severity that they might suffer. To be able to purchase medical-care services at a per-unit price (p) the patient should have some income (I). We can now represent the patient`s expected utility function by:

$$EU = d*U(H^0, C_{nm}) + (1-d)*U(h(\delta, \tau), C_{nm})$$

The amount of medical care and other goods which are feasible for every patient to obtain is constrained by its income and the prices of healthcare and other goods.

$$I = C_{nm} + (1 - d) * p \tau$$

(1.3)
Equation (1.3) represents patient’s budget constraint, i.e. what the consumer can afford to buy at prevailing prices and income available. Where we assume that the price of consumption of non-medical goods ($C_{nm}$) is normalized to 1 (Lèger, 2008).

As we mentioned above, medical care is one of the inputs in increasing health and health itself generates utility. Individuals desire to remain healthy because they receive utility from an overall improvement in the quality of life. Being healthy they have more time available to work and enjoy leisure time activities. There is a positive correlation between an individual’s stock of health and total utility. Nevertheless, each additional improvement in health generates an ever smaller increase in utility (known in economics as a law of diminishing marginal utility). Thus, given consumer’s available income each consumer will try to choose a bundle of goods and services that maximizes his/her utility. The utility will be maximized when the marginal utility gained from the last dollar spent on each product is equal across all goods and services purchased, assuming that all prices are known and law of diminishing marginal utility works for all goods. Thus, if a patient is ill he/she would like to improve his/her health by buying a certain amount of medical services. A maximum utility for a consumer who suffers from an illness of severity $\delta$ will be achieved by choosing a quantity ($\tau$) of medical services such that:

$$\left(\frac{\partial U}{\partial h}\right)\left(\frac{\partial h}{\partial \tau}\right) = p\left(\frac{\partial U}{\partial C_{nm}}\right)$$

or we can rearrange the equation to define the price

$$\left(\frac{\partial U}{\partial \tau}\right)\left(\frac{\partial h}{\partial C_{nm}}\right) = p$$

This equation states that an individual is willing to sacrifice consumption of non-medical goods in order to increase consumption of medical care until the point when marginal rate of substitution equals to the price of health care.

The last function can be used to define a demand function of medical services if we assume that there exists a unique utility-maximizing quantity of medical services for each illness-severity price pair:

$$\tau = \tau (\delta, p)$$
According to demand theory the amount of medical services demanded will decrease in their prices $\left( \frac{\partial \tau}{\partial p} < 0 \right)$ and increase in illness severity $\left( \frac{\partial \tau}{\partial \delta} > 0 \right)$. In other words, the demand curve is downward-sloping in prices, that is we move along the line when prices change, and shifts outwards when illness severity increases. We can illustrate with a graph how the demand function of medical services changes in prices and illness severity.

$$p^* = mc$$

**Fig. 1.1** Efficient consumption of medical services.

The intersection of the demand curve and the marginal-cost curve ($mc$) gives us the efficient consumption level of medical services for a patient who suffers from illness severity ($\delta$) and is denoted as $\tau^*(\delta, p^*)$ or just $\tau^*$ (Lèger, 2008).

Being uninsured leads to significant financial risks due to uncertainty in the market of medical care. Thus risk-averse patients would like to purchase health insurance in order to increase their expected utility. Health insurance allows patients to receive medical services at either reduced costs or free of charge in exchange for payments paid in advance.

Let assume that individuals can purchase an insurance policy which covers all medical expenses. That is in order to get an insurance the customer must pay an up-front premium.
(α) which exactly equals his/her expected medical expenses (income lost). The fair premium is equal to the probability of becoming ill multiplied by the individual’s lost income if he/she becomes ill (i.e. by the amount of income that they would expect to lose on average if they were uninsured). Such a policy is called a fair premium policy. Mathematically, (α) is defined by:

\[ \alpha = (1 - d)p^* \tau(\delta, p) \]  

(1.6)

As a result of insurance policy existence, we can rewrite the patient’s budget constraint previously given by the Eq. (1.3)

\[ I = C_{nm} + \alpha \]

Being insured our patients will not face financial risks any longer since after the insurance premium is paid they will get full medical treatment free of charge. This will give certainty to people about being able to receive medical care “as needed” when sickness strikes them and they will keep the consumption of non-medical goods constant across illness severity.

Furthermore, the insured patient will now choose the quantity of medical services to satisfy the first order condition derived by Eq. (1.4) but now the price of medical services will be set to zero to reflect the free of charge medical treatment that a patient receives:

\[ \frac{\partial U}{\partial h} \frac{\partial h}{\partial \tau} = 0 \]  

(1.7)

This equation states that being fully-insured a patient will consume medical services until the moment when the marginal benefit of health care services would equal zero. Thus, the existence of an insurance policy at a fair premium alter consumer’s behavior and leads to over-consumption of medical services. This situation is known as the moral-hazard problem (McGuire, 1993).
It is very useful to illustrate and analyze this problem by graph:

\[ p^* = mc \]

![Diagram showing demand curve for given illness severity: \( \tau(p) \), efficient consumption, over consumption,\( p^* = mc \), and quantities of medical services.](image)

**Fig. 1.2** Consumption of medical services under a fair insurance policy.

It is obvious from the graph and the analysis above that fair health insurance results in over-consumption of medical services. The actuarially fair insurance premium should take this occurring overconsumption into account. Since the quantity of the care units consumed under insurance policy \( \tau^{**} \) is greater than the efficient amount \( \tau^* \), the fair insurance premium will be also greater than the one the patient would have paid if he/she was forced to consume and will be given by:

\[
\alpha^{**} = (1 - d)p^*\tau^{**}(\delta, p) > \alpha^* = (1 - d)p^*\tau^*(\delta, p)
\]

The consumer’s expected utility would be greater under the efficient provision of care \( \tau^*(\delta, p^*) \) and its corresponding insurance premium \( \alpha^* \) than it would be if he/she were allowed to choose his/her own level of consumption of medical services \( \tau^{**}(\delta) \) but faced a higher insurance premium \( \alpha^{**} \) (Lèger, 2008).

A transition from uninsured to insured changes the consumer’s behavior because they no longer face the full cost of medical care received such leading to a moral hazard problem.
One of the ways to illuminate moral hazard is to make insurance contract illness-contingent. That is, an insurance contract should specify a reimbursement schedule, which means that a certain amount of money should be transferred to the patient depending on his/her illness severity. i.e.

\[ \text{Reimbursement} = \tau(\delta) \]

Arrow (1963) argues that it is possible to eliminate ex-post moral-hazard if a patient with illness severity \( \delta \) and receiving a reimbursement in the amount of \( \tau(\delta) \), could purchase health care services at market price \( p^* \). He means that such a policy would maintain the benefits of full insurance (i.e., the consumer would not face any financial risk associated with illness) while maintaining the correct incentives for consumption (i.e., eliminate the ex-post moral-hazard) (Arrow, 1963).

From a theoretical standpoint such an insurance contract would be an optimal form, nevertheless in practice it is not feasible because it is almost impossible and very expensive for an insurance provider to verify the patient’s illness severity with precision prior to reimbursement.

Since illness-contingent contracts are not feasible, different policies were developed in order to reduce the over-consumption of medical services. One of the ways is a demand-side cost sharing such as co-payments.

In the next chapter we focus on how demand-side cost sharing mechanism theoretically affects the provision of medical care units, incentives it creates for physician’s referral decisions and patient selection.
2.1 Demand-side cost sharing

Since we allowed for an access to the insurance market and introduced a fair premium policy we faced a problem of over consumption of medical care units. We showed that such a policy creates incentives for consumption of medical services which exceeds the efficient level. It was considered that it is possible to reduce consumption to more efficient level by forcing patients to pay for a portion \((\gamma p)\) of their medical expenses, where \((\gamma)\) is a percentage of their healthcare expenditures. Thus we will try to illustrate by a graph how co-payments might help to control consumption of medical treatment.

Let us look at the graph below:

![Graph of demand and supply](image)

**Fig.1.3** Consumption of medical services under partial insurance.

We can see that being forced to pay some portion of medical costs patients will consume less than under a full insurance \((\text{when, } \gamma = 0)\). Nevertheless over consumption will still take place.

Demand-side cost sharing has some disadvantages even though it may help to reduce the over-consumption of health care units. Under this system patients lose some benefits that full insurance gives them because they face greater financial risk when the co-payment rate
increases due to uncertainty about timing of illness occurrence and magnitude of future medical expenses. Furthermore, even though a co-paid portion might rise it does not necessarily mean that patients will decrease their consumption of medical units because they might lack information about their illness severity and fully trust their physicians and delegate their decision-making responsibilities to them.

### 3 Supply-Side Cost Reimbursement and Cost Sharing

Reimbursement of healthcare services has undergone an evolutionary change. From the very beginning health care services were reimbursed with the first party system. That is by a pure fee-for services mechanism, when patients, the first party, were paying for all the healthcare services with their own money when medical care was delivered. As our society moved into the 1900’s, health care improved dramatically. More sophisticated surgical techniques, drugs and effective treatments for severe diseases were developed. As a consequence of these improvements prices for medical services increased significantly. Medical services were no longer achievable for the average citizen. Low-income population faced the threat of catastrophic illness. In order to limit the risk of severe sicknesses, health care insurance was evolved. Thus health market moved to a third party reimbursement system. Now insured individuals suffering from severe health problems could seek care “as needed” knowing that the cost of treatment will be covered by their insurance carrier.
3.1 Fee-For-Services (FFS)

Physicians in many countries all over the world are paid by a Fee-For-Services (FFS) or out-of-pocket cost-reimbursement mechanism, when physicians are paid for each service they provide such as office visit, test, procedure or others and bare no financial risk. Under such a payment mechanism uninsured or not fully insured patients might face catastrophic health expenditures because they are budget constrained and have to pay providers directly for their services at a delivery point and then can submit claims to their insurance company for reimbursement.

We will focus on how such a payment mechanism alters physicians’ behavior. When patients are paying for each medical service they receive incentive arise for the physicians to provide as more services as possible in order to increase their own revenue taking into consideration the existence of information asymmetry between care deliverers and consumers.

Production of medical care is associated with costs. We assume that every physician has some monetary cost of providing medical treatment that consists of fixed cost $F$ and variable cost $v$ (Chalkley, 2000). Healthcare supplier bares fixed cost independently of the amount of care provided while variable cost is increasing in number of patients treated $n$ and the quality of treatment $q$ and decreasing with cost-reducing effort $\epsilon$. Thus we can express the physician’s per-patient revenue by the following equation:

$$\pi^{FFS} = R\tau - v\tau - F = (R - v)\tau - F$$

As we can see physicians’ revenue equals the difference between the fee paid by a patient for a service ($R$) and the variable cost per service ($v$) times the amount of medical units provided ($\tau$) and fixed cost. In such a setting, as long as $F > v$ every income-orientated healthcare provider will be concerned about its financial surplus and would like to supply as many services as possible in order to increase their revenue even though such an amount of services brings no benefit to patient’s health (Evans, 1974).
Our interest of study is how physicians are able to persuade their patients to consume excessive units of medical services in order to increase their own revenue.

In real world, due to asymmetry in information prevailing on a market for medical services between consumers and providers of medical treatment, physicians have privileged information about the sophisticated medical treatments available and expertise which they can easily use to encourage patients to consume an inefficiently large amount of medical services. A physician might manipulate with information about the patient’s illness severity and the expected returns associated with medical treatment and thus influence the demand for medical services. In other words, physicians may to alter the patient’s preferences towards their own self interest in order to achieve higher revenue (Culyer, 2000), (Stano, 1989). This situation is known as supplier-induced demand (SID).

Patient do not have access or do not possess sufficient information about healthcare services prevailing on the healthcare market and thus cannot evaluate what is appropriate treatment for each of the sick outcomes. It is more likely that in this case an individual will accept the physician’s diagnosis and treatment he prescribes. By manipulating information about a patient’s health condition, physicians shift patient’s demand curve outwards thus increasing physician's income as shown on the graph below.

![Diagram showing the effect of supplier-induced demand on medical services consumption.](image-url)

**Fig. 1.4** Consumption of medical services with supplier-induces demand.
As is shown in Fig. 1.4 a physician reports to his/her patient a diagnosis that does not coincide with the patient’s true illness severity and thus by shifting patient’s demand curve up the physician increases his/her income from $(R - v)\tau^*$ to $(R - v)\tau^{**}$ due to over consumption.

Given that the physician’s revenue function is increasing in quantity of medical services provided to their patients, a completely selfish physician would aim on getting highest possible income by exaggerating the patient’s illness severity without limits. Nevertheless, in practice such a desire is in fact limited. There are physicians that respect professional norms and ethics and thus aware of the fact that excessive medical treatment might be harmful to the patient’s health. Another reason is that manipulating information requires some physician’s effort and the benefit from doing so might be less than the costs associated with information manipulation (Van de Val, 2000). We cannot neglect the fact that physicians might be cautious about a patient’s attempt to seek for a second opinion from another physician and thus face a risk of losing their patients especially when patients have access to information and communication technologies about medical care services. One of the reasons for induced manipulation can also be anxiety about losing income. In other words, when the supply of physicians is low and/or the demand for medical services is very high physicians would not need to manipulate information in order to increase their income. However, when there are many physicians working on the market and the demand for services decreases, the benefits of inducing demand become greater (Blomqvist, 2005).

### 3.2 Capitation and Prospective payment systems

We mentioned above that in conditions of uncertainty third-party payers (the government, social insurance funds or private insurance companies) play an essential role on the medical care market. Under capitation health care providers (physicians) are prepaid by the government a set amount of money for each patient assigned or enrolled to their practice, referred to as “per-member-per-period” rate, regardless of the number or nature of
services provided, i.e. prior to the patient’s realization of illness. In return, healthcare providers are obliged to supply all necessary care to their patients for the predetermined period, without any extra cost reimbursement (Murray, 2000). This “per-member-per-period” rate is based on the patient’s average expected medical utilization for a predetermined period of time (more compensation for patients with medical history). Healthcare service providers are remunerated whether or not the person enrolled in his/her practice seeks care. The amount of that remuneration is usually adjusted for age, gender, illness, race, type of employment and geographical location. The common upon these factors is age. The senior population (above age 65) will be expected to utilize more health care services that the population under this age. Since physicians are paid in advance for all future expenditures associated with provision of medical services, they are responsible for all medical expenses incurred by the patient. As a result, healthcare providers (physicians) face the entire financial risk of healthcare provision and consequently will wish to control costs in order to increase their income.

Providers of medical care working under capitation plans will probably practice more on providing preventive healthcare services as it is less expensive to prevent diseases and injuries that patients might get rather than curing them compared with the traditional fee-for-service reimbursement, where there is a tendency to over-prescribe, over-diagnose, and over-treat to secure more revenue since physicians earn a net profit on each visit, and procedure (Selden, 1990).

To start the analysis of how capitation affects healthcare provider decisions associated with provision of care we assume that patients are randomly assigned to physicians. This means that healthcare provider has no effect on the type of individuals that he will treat according to his/her preferences. Otherwise risky type of population will be left outside of health system.

Suppose now that there is a probability \( (1 - d) \) that a patient gets sick with an illness severity \( (\delta) \). We also assume that illness severity is bounded by \( \delta^L \) and \( \delta^H \) such that \( \delta \in [\delta^L; \delta^H] \) and that there is a certain level of care for each illness severity \( t^E(\delta) \). Physician’s expected cost associated with treating a patient will be:

\[
E(\nu t) = (1 - d) \int_{\delta^L}^{\delta^H} \nu t^E(\delta)
\]
where \( \nu \) as before denotes the per-unit variable cost of medical service’s provision.

A net per-patient payment that a physician who enlists a patient into their practice receives equals:

\[
\pi_{\text{capitation}} = R - \nu \tau - F
\]

(1.9)

where \( R \) denotes the capitation payment per-patient.

The physician’s per-patient expected income under appropriate treatment is given by

\[
E(\pi_{\text{capitation}}) = R - E(\nu \tau)
\]

(1.10)

Looking at the equation above we can state that prospectively paid providers seek to attract a low-cost group of patients since their income is depended on the amount of medical units provided to the patients. This creates incentives for information manipulation about patient’s illness severity in order to receive higher revenue. An optimal strategy for a purely selfish physicians would be to tell their patients that they suffer from the lowest illness severity \( \delta_L \) and to recommend the corresponding level of treatment \( \tau^E(\delta_L) \). Consequently, physicians will receive per-patient net payment such that

\[
\pi_{\text{capitation}} = R - c\nu(\delta_L) > \pi_{\text{capitation}} = R - \nu \tau^E(\delta^{true})
\]

(1.11)

If we relax the assumption we made above about patients being randomly selected and allow physicians to choose patients themselves then we can conclude the following. Since physicians are medically educated they might observe some characteristics that are unobservable to insurance provider and thus will try to attract (i.e. encourage to join) people who are observably more healthy in order to receive more income while discouraging the others from joining.

Although theoretical analysis suggests that under capitation physicians can under-provide medical services drastically, in practice we can experience that physicians may provide more services that our analysis predicted. Why is that?

There are both physicians that ignore their patient’s benefits from treatment in order to increase income and physicians with altruistic motives or medical ethics. Nevertheless, many have argued that physicians are likely to value both their own revenue and their
patient’s well-being. Many profit-maximizing suppliers are concern about their future reputation. Thus by investing in higher quality/quantity of medical services now, they get higher patient demand in the future (Chalkley, 2000).

A physician can be both altruistic and income orientated. It is hard to predict to which extended a healthcare providers valuates his own benefits and/or is concentrated about patients well-being thus provides them with care “as needed”. As a result we assume that the degree of physician’s altruism is represented by $\beta \in [0,1]$ which denotes a weight that a healthcare supplier puts on its revenue. We can rewrite the physician’s revenue function in terms of utility, which is a function of both the physician’s net revenue and the patient’s health:

$$V = \beta(R - vt - F) + (1 - \beta)h(\delta, \tau)$$  \hspace{1cm} (1.12)

As we can see from this equation, a physician with $\beta = 0$ will be considered fully altruistic, that is, a perfect physician who works only in the patient’s best interest. And opposite, a purely selfish physician (with $\beta = 1$) is only orientated on income increase and excessive provision of medical care. Thus we can conclude that the more physicians are altruistic towards their patients, the less they will under-provide medical treatment.

Secondly, even though prepayment schemes encourage the under-provision of care physicians may be cautious that medical malpractice litigation and physician monitoring may be used in order to limit the under-provision of care. In the article by Blomqvist and Lèger (2005) physicians are fined a given amount of money if their patient’s post-treatment health outcome is different from his/her expected outcome (known as ”outcome-oriented” criteria). Furthermore, each physician is subject to constant monitoring and post-treatment health is costlessly observed.

Very close to capitation is a prospective payment system. The main difference between prospective payments and capitation is that prospective payments are paid after the realization of illness but prior to treatment and are based on the patient’s illness. According to P.T Lèger (2008), physicians receive a prospective payment based on the patient’s expected cost for his/her condition, but in return are responsible for providing care without any further compensation. In other words, prospective reimbursement implies that payments are agreed in advance and are not directly related to the actual costs incurred. This does not
mean that the payment is agreed in advance, only that the size of the payment is determined in advance. In this case physicians being the residual claimants bear all financial risks associated with care. Since payment is not directly related to the actual costs incurred, incentives to reduce costs are greater, but payers may need to monitor the quality of care provided and access to services. If the health care provider receives the same income regardless of quality, there is a financial incentive to provide low-quality care minimum effort and minimum cost (Morris, 2007).

Providers paid under a fully prospective system, would wish to "dump" high-severity patients. That is, they will turn away patients with high expected expenses. On the other hand, they will over-provide care to low-severity patients in order to attract them (known as a “cream-skimming” method) and provide too few services (skim) to relatively high-severity patients.

To summary the chapter three, capitated physicians will provide fewer services to all types of patients compared to the traditional cost-based reimbursement scheme such as FFS.

Blomqvist and Lèger (2005) allowed for different types of providers of medical care as in their article. They predicted that physicians paid by capitation will downplay the patient’s illness severity when patient’s illness is not serious enough to justify in-hospital specialty care but exaggerate the patient’s illness severity if there is ambiguity as to whether or not the patient should receive in-hospital care. These finding were consistent with empirical evidence which suggests that physicians paid on the basis of FFS were less likely to refer patients to other providers than physicians paid by capitation.
4 Mixed-Payment Systems

Resuming the analysis above, we were studying physicians behavior, i.e. incentives to provide medical services under the payment mechanism which was either entirely based on a Fee-For-Services (FFS) system, or a capitation or fully prospective system. We examined that being paid under FFS, a form of retrospective payment system, physicians bared no financial risk concerning with treatment provision and thus had incentives to over-provide medical services in order to increase their income. On the other hand, self-centered physicians paid by capitation faced incentives towards reduction of medical services because after receiving pre-paid amount for expected medical expenses they were not further reimbursed when treatment was taking place and thus were facing all extra costs associated with treatment.

In this chapter we look at a mixed-payment system which combines both prospective and retrospective components and try to examine how being paid under this system may encourage physicians to provide medical services.

To start with, we assume that the physician’s utility function is given by:

\[ V = \beta(T + R\tau - v\tau - F) + (1 - \beta)h(\delta, \tau) \]  

(1.13)

where, as before \( T \) stands for a capitation payment, \( R \) - reimbursement (or FFS rate) per unit of \( \tau \), \( v \) – the variable cost of treatment, \( F \) - fixed cost and \( \beta \) - the physician’s altruism parameter.

Then we will assume that the patient’s utility function diverts in to health and consumption:

\[ U(H, C) = h(\delta, \tau) + C \]

and that a budget constraint is given as before in a case where insurance is absent:

\[ I = C + p\tau \]

where \( p \) is a price of medical services and is equal to the marginal cost.
In this case, a patient will consume health care until its marginal benefit equals to its marginal cost:

$$\frac{\partial h}{\partial \tau} = v = p \quad (1.14)$$

If we assume that the patients are fully insured, (i.e. $= I - \alpha$) and physicians are moderately altruistic (i.e. $\beta \in [0,1]$) and can decide on patient’s behalf how much medical care a patient should consume, then we can conclude that physicians will choose the quantity that maximizes physician’s utility function $[Eq. (1.13)]$ and satisfies the following condition:

$$\beta (R - v) + (1 - \beta) \frac{\partial h}{\partial \tau} = 0 \quad (1.15)$$

We can notice that the equation (1.15) will hold only when $\frac{\partial h}{\partial \tau}$ is less than 0 given that $R > v$. That is, physicians make the patient over consume to the point where the marginal benefit of care is actually negative. The utility maximizing quantity equals $\frac{\partial h}{\partial \tau} = 0$ when physicians are fully altruistic (i.e. $\beta = 0$). Either way, the physician’s utility maximizing quantity is greater than the efficient level (Lèger, 2008).

In order for the quantity $[Eq. (1.15)]$ that maximizes physician’s utility to coincide with the efficient quantity$[Eq. (1.14)]$, the following condition must hold:

$$\beta (R - v) + (1 - \beta) v = 0 \quad (1.16)$$

which implies that $R < v$. In other words, when physicians make a loss on every unit of medical care provided, then physicians will provide the efficient level of medical services. However, given that physicians will make negative profits under such a marginal policy, physicians will need to receive an up-front payment to ensure their participation. Thus, when $R < v, T > 0$. Also noticeable from $[Eq. (1.16)]$ the difference between the marginal payment and the marginal cost is increasing in physician’s altruism parameter. Therefore, in order to stimulate the efficient provision of medical services, not self-centered physicians must face a greater loss for each unit of medical care they provide (yet, must also receive a larger up-front payment).

In the analysis above we considered medical services as unidimensional, which could be obtained at a market price $p$. In reality, some types of care cannot be reimbursed on a per-
unit basis because they are just too difficult to monitor. To reflect the multidimensionality of care, several recent reports have separated health care into medical services \( \tau \) (for example, actual treatments and procedures, diagnostic testing) and physician non-contractible effort \( \epsilon \) (Lèger, 2008).

To reflect the multidimensionality of care we augment the patient’s health production function \([Eq. (1.2)]):\n
\[
H = h(\delta, \tau, \epsilon)
\]

As a result the following function presents the dependence of a patient’s health on the degree of illness severity, units of medical treatment received and effort that physician puts into healthcare provision as needed.

Patients appreciate physician’s effort that the last exert in services provided even though physicians may not be compensated for it.

In the following analysis we will try to examine several models which integrate the idea of multidimensional care.

First, we look at physicians decisions on medical care and effort.

In this model we assume that physicians choose the effort and the quantity of medical units to provide and that the physician’s choice is assumed to be observable to the patients prior to his/her choice of physician. As a result, \( \tau \) and \( \epsilon \) directly effect the number of patients that a physician will attract. In this case, a revenue-maximizing physician will choose \( \tau \) and \( \epsilon \) to maximize \([Eq. (1.15)]) and the mixed-payment system \([Eq. (1.16)])\n
In McGuire (2000), the number of patients \( n \) that physician attracts is directly related to the net benefit \( NB \) that they provide to their patients. Time costs, inconveniences, and other costs and benefits of using medical care experienced by the individual are incorporated in \( B(\tau, \epsilon) \) (which is a function of the quantity of medical services and effort received). Patient’s net benefit can be written as

\[
NB = B(\tau, \epsilon) - p\tau
\]  
(1.17)
Thus the net benefit received by a representative patient is assumed to be the difference between the benefits ($B$) of medical care received and the cost of treatment. In this equation $p$ stands for the price paid by the patient per-unit of medical care $\tau$ consumed (McGuire, 2000).

As a result, the physician’s net revenue ($\pi^{total}$) is given by the number of patients multiplied by the net per-patient revenue ($\pi^{per-patient}$):

$$
\pi^{total} = n(NB) \cdot \pi^{per-patient}
$$

(1.18)

The physician’s net per-patient revenue under a mixed-payment system which allows for both a prospective ($T$) and retrospective ($R\tau$) components is thus:

$$
\pi^{per-patient} = T + R\tau - v\tau - F
$$

(1.19)

where $v$ represents the per-unit variable cost of medical services. In such a setting, a fully prospective payment, such as capitation, is given by $T > 0$ and $R = 0$. A fully retrospective payment, such as FFS is given by $T = 0$ and $R > c$. A mixed-payment system will occur when $T > 0$ and $R < c$.

In a fully prospective system, ($T > 0$ and $R = 0$), the physician must provide enough quantity and effort to attract patients. Although more quantity, $\tau$, increases the number of patients they attract, they receive no marginal reimbursement for its provision. As a result, physicians will provide too much cost-reducing effort and too little quantity and quality of medical services.

Under a fully retrospective system ($T = 0$ and $R > v$), the opposite will hold. That is, physicians will not be interested in keeping the costs of treatment down and thus will under-provide cost-reducing effort and over-provide medical services focusing on obtaining higher revenue.

Using a mixed-system where $T > 0$ and $R < v$ the level of effort physicians provide can be increased when an increase in the prospective payment. Furthermore, by decreasing the level of reimbursement, the amount of medical treatment will decrease. Thus we can conclude, that by using these two instruments, it will be possible to achieve the targeted levels of both observable and unobservable components of care.
The simplifying assumption that McGuire makes about potential patients ability to perfectly observe each physician’s choice of quantity and effort prior to selecting their provider is unlikely to hold in the reality.

In a seminal article, Ma and McGuire (1997) build a model in which the authors assume that a patient chooses ($\tau$) according to a physician’s choice of ($\epsilon$), and that the reported quantity of medical services need not correspond to the true amount provided[10].

In the model, a physician chooses effort to maximize his/her utility given by:

$$ V = (1 - d)[T + R\tau^{reported} - cv - \Lambda(\epsilon)] - F $$  \hspace{1cm} (1.20)

where $(1 - d)$ denotes a patient’s illness probability, $T$ – the prospective payment, $R$ – patient’s out of pocket payment per unit of reported treatment $\tau^{reported}$, $v$ – the per unit variable cost of treatment, $\tau^{actual}$ – the actual amount of treatment provided, $F$ – fixed cost of treatment and $\Lambda(\epsilon)$ – the cost of providing $\epsilon$ units of effort. Finally, by allowing $R = v + c$, we can interpret ($c$) to be the margin over cost which a physician receives per unit of reported treatment.

A patient will choose treatment to maximize his/her expected utility given by:

$$ EU = (1 - d)U\left(I - \alpha - \gamma p\tau^{reported} - \delta + B(\tau^{true},\epsilon)\right) + dU(1 - \alpha) $$  \hspace{1cm} (1.21)

where $I$ denotes as before a patient’s income, $\alpha$ – the insurance premium, $\gamma$ – the co-payment rate, $\delta$ – the monetary equivalent of the health shock, $p$ – the price of a medical care unit, $B(\tau^{true},\epsilon)$ denotes the benefit associated with treatment $\tau$ and effort $\epsilon$.

In this model, a physician announces his/her level of effort, which is followed by the patient’s choice of treatment. Once these choices have been made, a patient and a physician must agree on the level of treatment to report to the authorities. A physician who receives a positive payment for each unit of treatment reported (i.e. $v + c \geq 0$) would like to over-report the quantity of care they actually provide (i.e. $\tau^{reported} > \tau^{true}$). However, such a report would never be accepted by a patient, given the presence of a co-payment rate $\gamma$(in fact, a patient would like to under-report the true level of treatment). Thus, when $v + c \geq 0$, the true level of treatment will be reported (i.e. $\tau^{reported} = \tau^{true} = \tau$) and a physician’s utility will be reduced to:
\[ V = (1 - d)[F + c \tau - A(\epsilon)] \]

In order to derive the optimal payment mechanism Lèger (2008) examines two distinct scenarios. First, a case where effort and treatment are complementary and second, the case where they are substitutes. In the first case, where effort and treatment are complementary and physicians make a positive return on each treatment they provide (i.e. \( \nu + c \geq 0 \)) in order to increase their patient’s demand for treatment, a physician must increase the level of effort they provide. Thus, by increasing the margin a social planner (or an insurance provider) can induce a physician to provide valued, yet not remunerated effort. If treatment and effort are substitutes, then physician would wish to decrease their level of effort in order to induce positive consumption of treatment. To counteract this incentive, physician cost-sharing would be necessary (i.e. \( c < 0 \)). Obviously, the level of physician cost-sharing is limited by the truth-telling constraint (i.e. \( c < 0 \) but must also satisfy \( c \geq -\nu \)).

Thus we can conclude that mixed-payment systems can be used to encourage the efficient level of “observable” types of care such as procedures, tests, while also encouraging the efficient provision of unobservable types of care such as physician time and effort. Mixed-payment systems appear to reduce the quantity of services provided while increasing the quality of care provided (Lèger, 2008).
5 Empirical evidence on health care system performance

5.1 Health outcomes

Being one of the main aspects of any healthcare system, financing is one of the main concerns for people and government all over the world because, as we studied above, it affects both providers of medical care and consumers and results in different health outcomes not only across countries but within one country as well.

In the theoretical part of the thesis we were studying different payment mechanisms and the effect they have on the health care provision and consequently on health care outcomes. We also showed the necessity of the third-party payers in the health care market due to people’s anxiety about future health expenditures. The third-party payers are the people’s guardians against financial risk associated with obtaining health care when needed.

In the introduction the concept of health care system performance was defined with respect to a set of fundamental goals for health systems:

- Improving health status of population and reducing health inequalities.

- Responsiveness includes respect for persons and client orientation.

- Fairness of financial contribution means that every household pays a fair share of the total health bill for a country (which may mean that very poor households pay nothing at all). This implies that everyone is protected from financial risks due to health care.

However, estimating the efficiency or performance of each country’s health care system is not straightforward. The most straightforward way to compare the impact of health care across countries would be to examine health care outcomes. Health outcomes data are not yet available at an international level. Meanwhile, the indicators of health status can be used (life expectancy, mortality rate etc.) (Or et al, 2005).

It is assumed that the more the government invests into the health care system the better health outcomes will be. Nevertheless, reality does not always prove such a conclusion.
Even though US has highest portion of its GDP spent on health sector 15.3 percent (WHO, 2009) it does not result in the best health outcomes having life expectancy at 78.11, infant mortality rate at 6.26 (CIA World Factbook, 2009) while its neighbor Canada spending 10.0 percent of its GDP on health (WHO, 2009) has the same indicators at 81.23 and 5.04 respectively (CIA World Factbook, 2009), Norway dedicates 8.7 percent of its GDP to health (WHO, 2009) and has mentioned indicators at 79.95 and 3.58 respectively (CIA World Factbook, 2009). Spending 8.1 percent of GDP on healthcare (WHO, 2009) Japan achieved levels of life expectancy at 82.12 and infant mortality at 2.79 (CIA World Factbook, 2009). The reason for focusing on the percentage of GDP spent on health care is what economists call opportunity costs: the larger the proportion of GDP spent on health care services, the smaller the proportion that is available for other goods and services.

Variation in health outcomes across countries may not result only from different levels of health sector recourses but also from differences in how efficiently these resources are used. For example, health production may not be influenced only by the amount of doctors but also by the technical support they are given, the way that doctors are motivated financially, or the way that patient access to them is controlled (by out-of-pockets payments, for instance). High health spending can mean that resources dedicated to health care are inefficiently used, i.e. high administrative costs, rising costs of new medical technologies and so on. Exogenous factors affecting health system performance are different between countries. Thus, we cannot limit us to analyzing how much of GDP is involved into healthcare sector but also include into consideration some other factors that are likely to affect health outcomes.
5.2 Determinants affecting health status across countries

Effect of health costs on health outcomes is affected by a number of both medical and non-medical factors in a complex way:

- access to health care for groups differing in income, in geographical nearness to physician services etc. and environmental factors such as

- access to water, air pollution etc.

- distribution of health care in a country, as a factor that might be as important for health outcomes as the overall level of expenditure on, or consumption of health services (Or et al, 2005).

Collecting and combing information about health status of the population, access to care, equity and quality of service provision, and financial protection is not simple. That is why Or et al (2005) adopt in their paper a partial approach concentrating on one aspect of health (mortality reduction) and one specific health resource (number of doctors).

Assessing health system performance requires distinguishing the effect of health care from the effect of other determinants.

Income contributes to improve health status because people can afford better nutrition, sanitation and housing and safer physical and work environment. That is why low-income individuals are considered as a high-risk group because they acquire bad health with a higher probability than high-income population. Without public financing of health care, low income groups may be left without medical care due to their budget constraint and prices for achieving treatment and insurance security.

Education is a strong determinant of health in developed and developing countries. Indeed, the studies reviewed by Grossman and Kaestner (1997) suggest that years of formal
schooling completed have strong correlation with good health (measured by mortality rates, morbidity rates, self-evaluation of health status, or physiological indicators of health). More educated persons are more efficient producers of health. This means that they can obtain a larger health output from given amount of endogenous (choice) inputs. This is known as a productive efficiency from schooling. Allocative efficiency means that schooling increases information about the true effects of the inputs in health. That is, educated person has more knowledge about the harmful effects smoking or about constitutes of appropriate diet. Allocative efficiency will improve health to the extent that leads to the selection of a better input mix. (Culyer and Newhouse, 2003).

Education allows for more informed and better choices to be made about the importance of good health and the appropriate measures to achieve it. Education brings you to awareness about the importance of personal input in the form of “life style” in achieving better health. There is, indeed, a strong relationship between health and life styles. By “life style” I mean all the factors over which individuals have some control, such as alcohol, tobacco and drugs consumption, physical exercise, personal hygiene, healthy diet etc.

Education brings to knowledge about different disease and how to prevent them thus reducing the probability of illness occurrence and leading to better health outcomes as well as reducing health care costs.

Moreover, education helps to reduce the information gap between health providers and consumers (prevailing due to information asymmetry), what is very important in order to reduce the possibility of being a target for supplier-induced demand.

Doctors are a key input for the production of health care. Health care systems vary widely in their performance all over the world. One of the determinants of health care system performance is how health systems use health care resources to improve health. The variation in health status can be explained by country-specific variation in efficiency with respect to a specific health input. Health expenditure series can be used as a measure of total resources spent on health care.

Or et al (2000) were trying to estimate the determinants of health outcomes across countries and over time. In particular, they were taking into consideration the effect of such
variable as total health expenditure per capita for medical consumption, share of public expenditure in total health expenditure, GDP per capita, share of white-collar workers in total work force, pollution per capita ($NO_x$ emissions), consumption of alcoholic beverages, liters per head of population, consumption expenditure on tobacco per head of population, butter consumption per head (kg), sugar consumption per head (kg) on the PYLLs, which were calculated from unpublished mortality statistics provided by WHO and cover deaths from all causes except suicides. They were looking at the data set consisting of a pooled sample of 21 OECD countries for the period 1970-1992. In total of 483 observations.

They found that in terms of the actual reduction in premature mortality, there is a considerable variation across countries. In most countries, the rise in the employment share of white-collar workers plays the greatest role in reduction of premature mortality. The improvement in health due to the rise in “work status” is more than double the contribution from the rise in per capita income. The second most important factor behind improvements in health outcomes appeared to be the rise in per capita income. It is reasonable to think that economic development would improve housing conditions, road quality, public hygiene, which has a direct impact on health. There appeared to be a significant positive relation between the health expenditure and health, particularly for women. That the way health expenditure is financed also appears to affect health outcomes. Lower rates of premature mortality for both sexes were associated with a larger share of public financing of health care. Environmental factor included in their regression (air pollution) had a positive and significant relation with premature mortality as well as both alcohol and tobacco consumption, sugar and butter consumption. The result of their study strongly suggest that environmental factors are more important than medical inputs in explaining variations in premature mortality in industrialized countries. Among these, occupational status appeared to play the most important role (Or, 2000).

Usage of expenditure series is limited given the absence of reliable price indices to obtain equivalent measures of health expenditures across countries.

Doctor numbers are the second best choice and are a reliable measure of health care resources in a country. One of the Or (2001) earlier findings were that physician numbers are an important determinant of mortality across OECD countries. Or et at (2005) in their paper
aim to examine if the cross-country variation in health status can be attributed to variation in efficiency of health care as provided by medical doctors. In particular, the effect of the number of physicians on the mortality rate because preventing premature death is an important aspect of health. Their research was based on cross-country analysis of 21 OECD countries over 3 decades and assumption that the impact of doctors on health status is linear. The finding of their study in 2005 suggests that there is a margin for improvement in physician "efficiency" in certain countries. One of the results of their study is that the availability of advanced medical technology appears to play a significant role in improving the efficiency of health care provided by doctors (to reduce mortality) across countries.

Grubaugh and Santerre (1994) also find that there is a positive impact on health of the number of doctors and hospital beds inputs.

The good example confirming this statement is Cuba’s achievement in this area. Cuba has one of the highest life expectancy rates in the region, with the average citizen living in 2006 to 78 years. Cuba's infant mortality rate is just seven in a thousand - better than in many American cities. Only 7.1 per 1000 children died before the age of five. Cuba has the best doctor to patient ratio in the world, while about 10% of annual state spending goes on health. Cuba now has one doctor per 200 citizens, compared to one per 400 in the US (Bulletin of the World Health Organization, 2009). Cuba has achieved these results despite significant economic difficulties - GDP per capita is 2006 was only $362. While in the US per capita spending of health equals $6719 (World Health Statistics, 2009).
5.3 **Empirical evidence on payment mechanisms**

It is difficult to investigate the relation between payment mechanisms and aggregate health outcomes.

In the second level of analysis Or et al (2005) question of interest was the relationship between major system characteristics and the "efficiency". In particular, what is the effect (if any) of different payment systems for doctors and hospitals, and the public-private mix of funding in the country. They were using following dummy variables: fee-for-services as dominant means of payment in primary care, fee-for-services as dominant means of payment in hospital care, capitation as dominant means of payment in primary care, wage/salary as dominant means of payment in primary care and a dummy variable of physicians acting as gatekeepers.

The result from their analysis suggests that the public/private mix does not play a significant role in improving medical-care efficiency, although it has a direct effect on female life expectancy.

They also found that there is a positive relationship between fee-for-services impact of physician efficiency on reducing mortality. The reliability of their results is a subject to the quality of underlying data and few numbers of observations (21 countries). Medical technology has an impact on improving the efficiency of health care provided by doctors (to reduce mortality) across countries. But because of the measurement problems which frequently arise when using aggregate cross-country data it remains unclear whether both variables are associated with better performance or just fee-for-services is driving the uptake of technology.
5.4 Disparity in access to health care

Describing the general model of health care provision and consumption we learned that individuals are budget constrained and can face significant financial risks concerning healthcare consumption due to uncertainty prevailing on the health care market about timing of illness occurrence and magnitude of health expenditure. Risk-averse individuals would like to purchase health insurance to reduce future catastrophic expenditure. According to this conclusion it will be rational to look at the data that reflects how people are protected from catastrophic health expenditure due to access to insurance. One of the indicators we can look at is the proportion of uninsured individuals. According to the U.S. Census Bureau (2009), nearly 47 million Americans (46.34 million) or 15.4 percent of the population under the age of 65 were without health insurance in 2008. Even though government of USA dedicates a lot to health care systems there are many unprotected individuals in the country. Norway, Sweden, Denmark, Finland, Australia, Czech Republic, Korea, Luxembourg, Poland, Portugal, Switzerland, United Kingdom and Canada, for instance, have 100.0 percent of population with government-insured health insurance. Only 33 percent of the US population (43.0 million) had health insurance coverage assured by the government at that time (OECH Health data 98). We can see from figure 1 above that even in year 2000 the US was still the last one with public expenditure on health representing only 44 percent of total health care expenditure while being the country with the highest per capita health expenditure at $4570. Nowadays the US is still on the top spending $6719 per capita (in 2006) and having only 45.8 percent of government expenditure on health. (World Health Statistics, 2009).

We showed in theoretical the part that having insurance alters consumer’s behavior towards consumption of excessive amount of medical treatment because they no longer face the actual cost of treatment (figure 1.2). In order to reduce over-consumption insurance companies developed illness-contingent policies. Moreover, insurers may have such a policy when in order to get health reimbursement when bad event happens insured has to pay a certain part of cost themselves (co-payments) (egenandel) thus reducing incentives to over consume just like theory we studied predicts (figure 1.3). Even though insurance companies are very important third-party payers on the health market due to their role of protecting
people from future health expenses, promoting the delivery of high-quality care and reducing excessive consumption of medical treatment not everyone can afford purchase of insurance, beside insurance not always provides full coverage from medical expenses. As a result, there exist differences in access to care.

In chapter three we described that under fee-for-services payment mechanism it is tempting for healthcare providers to manipulate the information about patients illness severity due to information asymmetry and as a consequence to provide excessive amount of medical services (supplier-induces demand) thus increasing health care expenditure in order to get higher revenue (Figure 1.4). Being provided with medical care under such a payment mechanism and not having full insurance coverage leads many low-income individuals to significant financial expenses, exclusion of medical treatment and, in worst cases, to poverty because the cost reimbursement for services takes plays at the moment of their delivery. Despite of the disadvantages of making people to pay for medical treatment though out-of-pocket many countries are still using this type of payment for medical services (see the figure 1 below).

![Health expenditure by source of health financing, 2000](image)

As we all know, there exists diversification in income among population not only
worldwide but among population of the same country as well and thus many low-income individuals being budget constrained cannot afford having such a luxury as insurance because having insurance obligates them to pay insurance premium in advance before illness occurrence and on this base leads to exclusion of many low-income and high-risk individuals from access to health care.

Consequently, low-income population cannot in many cases get basic health treatment needed because otherwise they will be pushed into deeper poverty or bankruptcy.

Thus, the problem associated with having incomplete insurance we just described (exclusion of medical treatment for some groups of population) in line with out-of-pocket payments leads to catastrophic health expenditures faced by many households across the world. Catastrophic health expenditure does not to coincide with high health care cost. Even a relatively small payment can mean financial catastrophe to a poor person, forcing him/her to reduce other basic expenses such as food, shelter, education and so on. Even having insurance but being not fully covered by it.

**Figure 2. Catastrophic expenditure related to out-of-pocket payment at the point of service**

*Source: The World Health Report 2008*
The figure shows that there is a positive correlation between the proportion of households with catastrophic health expenditures and the share of out-of-pocket payments in total health expenditure. As the volume of total health expenditure met by out-of-pocket payment increases, the range of catastrophic payments also increases.

Xe et al (2003) explored variables associated with catastrophic health expenditure in 59 countries. The defined expenditure as being catastrophic if a household’s financial contributions to the health system exceed 40% of income remaining after subsistence needs have been met.

In their analysis health expenditures requiring out-of-pocket payments included all types of health-related expenses incurred at the time the household received the service, including consultation fees, purchase of medications, and hospital bills. They deducted any reimbursement from health insurance schemes.

Their findings were: the proportion of households facing catastrophic payments from out-of-pocket health expenses varied widely between countries; that catastrophic payments are, unfortunately, common in middle-income countries, countries in transition, and in several low-income countries. They also identified three key preconditions for catastrophic payments were identified: the availability of health services requiring payment, low capacity to pay, and the lack of prepayment or health insurance.
5.5 Health care system performance

A health care system consists of the organizational arrangement and processes through which a society makes choices concerning the production, consumption and distribution of health care services. (Santerre, 2007).

We are talking a lot about numbers and how they reflect the health care systems performance. But one of the most important points of consideration is how individuals evaluate the existing in their country healthcare system, how well it satisfies people’s expectations about meeting their health care needs. Because those who live in that country might have a different insight on the concept of a “good” performance than the WHO experts have according statistics and parameters.

Blendon et al (2001) were looking at seventeen industrialized countries for which data were available in order to find the level of people’s satisfaction with the existing health system in their country. They compared rankings of citizens’ satisfaction with their own health care systems to the rankings awarded by the WHO expert panels (according to an overall measure based on weights (25 percent level of health, 25 percent distribution of health, 12.5 percent level of responsiveness, 12.5 percent distribution of responsiveness, and 25 percent fairness of financial contribution).

They were focusing on a single question of how people in general satisfied or dissatisfied with the care system that runs in their country.

Indeed, the practice showed a striking difference between peoples view on the prevailing health care system in their country and ranking by WHO. Among the seventeen countries in this comparison, Italy is ranked second by WHO. But only 20 percent of its citizens say they are satisfied with their health care system. Denmark is ranked sixteenth in the WHO overall performance measure, yet 91 percent of Danish citizens say they are satisfied with their health system.

According to Blendon et al (2001), that there is a gap in what is seen as important by
one group versus the other. The general public has a basis for informed opinion, particularly in areas relating to barriers to care, financial difficulties, unresponsiveness of a health system, shortages of services, lack of respect for patients by professionals and administrators, inefficiencies, and corruption within the health care system. Citizens in each country are in a better position to assess these issues in their own countries than experts are.

We mentioned in the first chapter that fairness in financing is one of three important goals of any health care system. Fairness in financing means that everyone is protected from financial risk due to the cost of health care paying for medical treatment received according to their means. This may imply that poor individuals do not pay anything at all. This is why fairness in financing has very important consequences for much of the population, especially for those who are uninsured or underinsured, and for the poor, who can be driven even deeper into the poverty due to the lack of financial protection against ill-health. We mentioned above that there is a high portion of uninsured population in the US (15.4 percent), still a wide usage of out-of-pockets payments. Not surprisingly the US was the lowest (least fair) of all the OECD countries according to WHO’s international comparison in 1997 tied for 42.6 million, what is not significantly different from the latest data available at 46.34 million in year 2008), while Denmark was on place, Norway place, Sweden place.

Summarizing the information above we can conclude that health systems vary widely in performance, and countries with similar levels of income, education and health expenditure differ in their ability to attain key health goals, which are good health, responsiveness and fair in financing, what lead to health inequalities not only in across-countries dimension but within population of a country as well leaving many in need out of care.
6 References:


