Moral hazard and demand side cost sharing in health insurance: a closer look

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Abstract

Background: More and more social health insurance schemes include cost sharing, such as deductibles, to reduce moral hazard. Theoretical and empirical studies found evidence for the existence of moral hazard, and even indicate that this moral hazard is substantial. Several existing studies, however, indicate that a portion of moral hazard is desired. Ideally, cost sharing should only reduce the undesired moral hazard and not the desired. The question is how?

Methods: A literature review is performed in order to verify the distinction between desired and undesired moral hazard, and if it indicates that the suggestion holds, to identify what ingredients can be obtained from the literature to distinct desired from undesired moral hazard. In turn, this distinction is analyzed in order to describe how cost sharing can be targeted exclusively on undesired moral hazard. Finally, it is argued to what extent cost sharing applied in the Netherlands takes into account the difference between desired and undesired moral hazard.

Results: Results of the literature review indicate that still many economists hold on to the conventional theory, mainly to argument their decision to implement certain cost sharing policies. There are however strong suggestions for the existence of desired moral hazard, both from the theory of demand from John Nyman and empirical studies at the desirability of the consequences of cost sharing. The review of selected literature indicates that three overarching dimensions can be identified to distinguish desired moral hazard from undesired moral hazard: accessibility, necessity and efficiency of medical care. Desired moral hazard therefore can be defined as: medical care consumption that is efficient in terms of cost and value and medical necessary, which from a societal perspective should be accessible for everyone. One can speak of undesired moral hazard if it does not meet the definition of desired moral hazard.

Conclusion: Cost sharing should not be uniform, but should be differentiated based on the accessibility, necessity and efficiency of medical care. This indicates that there is room for improvement of the cost sharing design applied in the Netherlands. However, the information required for such cost sharing design raises questions regarding the feasibility of the implementation of this cost sharing design. Furthermore, the possible explanation of the occurrence of undesired moral hazard determines the way in which undesired moral hazard best can be reduced. Three possible explanations of the occurrence of undesired moral hazard are: price effect, information asymmetry or a combination of both. If undesired moral hazard is caused by the price effect it makes sense to apply demand side cost sharing which is targeted at undesired moral hazard, otherwise the addition of provider incentives are expected to be useful.

Introduction

More and more social health insurance schemes include cost sharing, such as deductibles (Ros e.a. 2000). Cost sharing is an instrument for cost containment introduced in response to the growing health care costs. A deductible is a form of demand side cost sharing which requires insured to pay a certain amount of money for consumption of medical care before they receive reimbursement. Mandatory deductibles are for example implemented in the Netherlands, Switzerland and the United States. An important goal of the implementation of such deductibles, and cost sharing in general, is to reduce moral hazard (Ros e.a. 2000). Moral hazard is referred to as the additional medical care consumed when persons become insured (Nyman 2004).

Cost sharing ignores the fact that moral hazard also may be desired. Think of the general perception that all people have a right to medical care regardless of their ability to pay (Andersen 1993). Introduction of cost sharing, however, decreases the opportunity for lower income people to consume necessary medical care. Lifesaving treatments are often very expensive, and are often not even affordable for the major part of the population. In addition, cost sharing can stimulate people to omit from early diagnostics, which might lead to more expensive treatment in later stage. Furthermore, due to information asymmetry individuals are often not able to determine which medical care is efficient and appropriate, uniform cost sharing does not include an incentive to consume efficient and appropriate medical care, and thus does not guide individuals to the 'right' medical care (Arrow 1963).

Theoretical and empirical studies found evidence for the existence of moral hazard, and even indicate that this moral hazard is substantial. Different theories about the desirability of moral hazard exist. Several existing empirical studies, however, indicate that a portion of moral hazard is desired. This shows that uniform cost sharing in some cases can be seen as a crude mechanism with unwanted side effects. Ideally, cost sharing should only reduce the undesired moral hazard and not the desired. The question is how?

This study contributes to the literature and policy debate about cost sharing and moral hazard in three dimensions. First, a distinction between desired and undesired moral hazard is made. Second, this study provides insight in how cost sharing can be targeted exclusively on undesired moral hazard. Third, it examines the extent to which the various forms of cost sharing introduced in the Netherlands are expected to reduce only the as undesired defined moral hazard. More concrete, the central research question and the different sub questions are described below.

CENTRAL RESEARCH QUESTION: What distinguishes desired moral hazard from undesired moral hazard and to what extent is this taken into account in the cost sharing design applied in the Netherlands?

SUB QUESTIONS

1. What is the relationship between health insurance and the demand for medical care?
2. What can be defined as undesired and desired moral hazard?
3. How can cost sharing in theory be targeted on undesired moral hazard (and not on desired moral hazard)?
4. To what extent does cost sharing in the Netherlands take into account the difference between desired and undesired moral hazard?

The outline of this study is as follows: the method of this study is described in chapter one. The theoretical framework is described in chapter two; this theoretical framework covers the first sub question, what is the relationship between health insurance and the demand for medical care. Sufficiently, the second sub question and simultaneously the core of this study, what can be defined as undesired and desired moral hazard, is treated in chapter three. In order to determine how undesired moral hazard can be reduced it is important to know what causes undesired moral hazard. Possible explanations for the occurrence of undesired moral hazard and the description of a cost sharing design that is targeted exclusively on undesired moral hazard (sub question 3), are described in chapters four and five respectively. An answer to the fourth and last sub question of this study is described in chapter six of this study, which indicates to what extent the cost sharing design applied in the Netherlands takes into account the difference between desired and undesired moral hazard. The conclusion of this study is described in chapter seven by answering the different sub questions and the central research question. The discussion is included in chapter eight. Finally, the references are included in chapter nine.

1. Method

This chapter describes the method used in order to answer the different sub questions and finally the central research question. Sub question 2, what can be defined as undesired and desired moral hazard, is the core of this study. This second sub question will be answered by performing a literature review. A literature review is an interpretation and synthesis of published work. Synthesis refers to bringing together material from different sources, and integrates it as a whole. In this literature review not all-available literature will be considered, only literature that satisfies certain conditions will be reviewed (Randolph 2009). The method of this study consists of a four steps procedure. The first step is describing both theoretical and empirical findings regarding the relationship between health insurance and the demand for medical care. The second step involves making a distinction between undesired and desired moral hazard. In the third step an analysis is made of how cost sharing can be targeted exclusively on undesired moral hazard. Finally, it will be argued to what extent cost sharing applied in the Netherlands takes into account the difference between desired and undesired moral hazard.

THE FIRST STEP of this study starts with the formation of a theoretical framework, included in chapter two of this study. This theoretical framework consists of theoretical and empirical evidence that describe the relationship between health insurance and the demand for medical care. Empirical studies about the effect of health insurance on the demand for health care mainly involve studies that determine how the demand for health care changes because of (higher) cost sharing. These empirical studies are assessed on their validity and reliability. For studies on the effect of cost sharing it is especially important to check for the following methodological problems; selection effects, simultaneous other changes and latent demand. Selection effects refer to the selection of (the amount of) health insurance coverage by insured or selection of individuals with 'good health' by health insurance companies. Furthermore it is important that the effects of cost sharing are not correlated with other simultaneous changes in factors that affect the results of a study. Latent demand refers to observing no changes in the demand for health care, but where in reality increased demand cannot be satisfied due to insufficient capacity (Schut and Rutten 2009; Evans 2004). This first step eventually provides an impression of the size of moral hazard.

IN THE SECOND STEP of this study a distinction between undesired and desired moral hazard is made by formulating definitions and examples of both concepts. The literature collected for sub question one is important for answering this second sub question. Within the literature of sub question one is searched for both the effects of cost sharing and the desirability of these

effects according to the authors. Especially the discussion parts of these articles are expected to be important to find this information. Therefore the abstract and discussion parts of articles have been used to assess the relevance of articles. The information obtained by the review of the literature from sub question one is supplemented with additional literature. Databases that have been used to find this additional literature in order to formulate concrete definitions and examples of desired and undesired moral hazard are Pubmed and ScienceDirect. Furthermore a Google scholar search is conducted to identify any other relevant documents or reports. To increase the likelihood of identifying all relevant studies, all references of relevant articles have been studied (Kable e.a. 2012).

Inclusion criteria for the literature review are: research studies that investigated whether the effect of demand side cost sharing implemented in the health insurance market on ex ante or ex post moral hazard was desired or undesired from a societal perspective. Furthermore, the documents need to be written in English or Dutch. For this literature search, literature will be excluded if it is focused on supply side cost sharing, cost sharing in a market other than the health insurance market, if it is not derivable when moral hazard is desired or undesired and if this distinction between desired and undesired moral hazard is not argued. The inclusion and exclusion criteria for the literature review are displayed in table 1.

Inclusion criteria	**Exclusion criteria**
Desirability of effects of demand side cost sharing	Focused on supply side cost sharing
Written in English	Focused on cost sharing in another market than the health insurance market
Written in Dutch	Distinction undesired/desired moral hazard not argued
	Desirability of effects of demand side cost sharing not clear

Table 1: Inclusion and exclusion criteria literature review

The keywords that have been used to search the databases are listed below. These keywords are used separately from each other to find relevant literature.

- Optimal health insurance moral hazard
- Optimal consumption of health care moral hazard health insurance
- Moral hazard revisited health insurance
- Cost sharing health impacts health insurance
- Impact cost sharing moral hazard health insurance
- Effect cost sharing moral hazard health insurance

- Definition appropriate use medical care moral hazard health insurance
- Moral hazard appropriate health insurance
- Moral hazard efficient health insurance
- Optimal cost sharing health insurance
- Compliance medicines cost sharing health insurance
- Welfare loss moral hazard health insurance
- Cost sharing access to health care health insurance

Since the database ScienceDirect yielded many results for each search, the articles are limited to those with the subject moral hazard or health insurance. Each of the articles found have been assessed for relevance by reading the abstract and discussion part using the inclusion and exclusion criteria to exclude those papers that are not relevant to this study. In succession relevant information resulting from selected articles are listed in a document, together with the author, name of the article, year and type of study. Then, the selected information of articles is analyzed to see if any patterns or similarities between different studies could be observed. Ultimately concrete definitions for undesired and desired moral hazard are formulated in order to make the distinction between the two concepts clear.

THE THIRD STEP of this study involves developing a cost sharing design that is exclusively targeted on undesired moral hazard and that does not affect or even encourage desired moral hazard. In order to formulate such cost sharing design it is important to have insight in the causes of undesired moral hazard. Possible explanations for the occurrence of undesired moral hazard have been obtained from the literature described in the first and second step of this study. Furthermore, the definitions and examples of desired and undesired moral hazard together with the positive and negative effects of cost sharing analyzed in the second step of this study, indicate which effects of cost sharing should be avoided and which effects should be encouraged. The cost sharing design targeted exclusively on undesired moral hazard is derived from the definitions and examples of undesired and desired moral hazard and the possible explanations for the occurrence of this undesired moral hazard. In addition, the feasibility of this cost sharing design and alternatives to reduce undesired moral hazard are described.

THE FOURTH AND LAST STEP of this study identifies to what extent cost sharing applied in the Netherlands takes the difference between desired and undesired moral hazard into account. There are various forms of cost sharing applied in the Netherlands; mandatory deductibles, voluntary deductibles and out-of-pocket payments for selected services (e.g. GGZ and medical devices). To what extent the various types of cost sharing implemented in the

Netherlands reduce undesired moral hazard (and let desired moral hazard unaffected), is argued by the definition of undesired and desired moral hazard and a comparison with the way in which cost sharing can only be targeted on undesired moral hazard, found respectively in step two and three of this study. Based on these results, recommendations for improvement of the cost sharing design applied in the Netherlands, in terms of targeting cost sharing more on undesired moral hazard and less on desired moral hazard, are made.

To summarize, the first step of this study provides insight in the relationship between health insurance and the demand for medical care. Empirical and theoretical evidence suggest that health insurance leads to the extra consumption of medical care, moral hazard. This study suggests that this moral hazard can be divided into a desired and undesired part. A concrete distinction between the two types of moral hazard is not formulated yet, step 2 of this study aims to further refine this distinction. Cost sharing has a negative effect on medical care consumption. Ideally, there should be no or low cost sharing for health care consumption resulting from desired moral hazard, whereas there should be high cost sharing for the health care consumption resulting from undesired moral hazard. How demand side cost sharing in theory can be targeted on undesired moral hazard (and not on desired moral hazard) is investigated in the third step of this study. The fourth step, eventually describes to what extent the different types of cost sharing applied in the Netherlands are consistent with the cost sharing design targeted exclusively on undesired moral hazard, formulated in step three of this study. The relationship between the different steps of this study is displayed in figure 1, in which the waved line between desired and undesired moral hazard illustrates that a clear distinction between desired and undesired moral hazard does not exist yet.

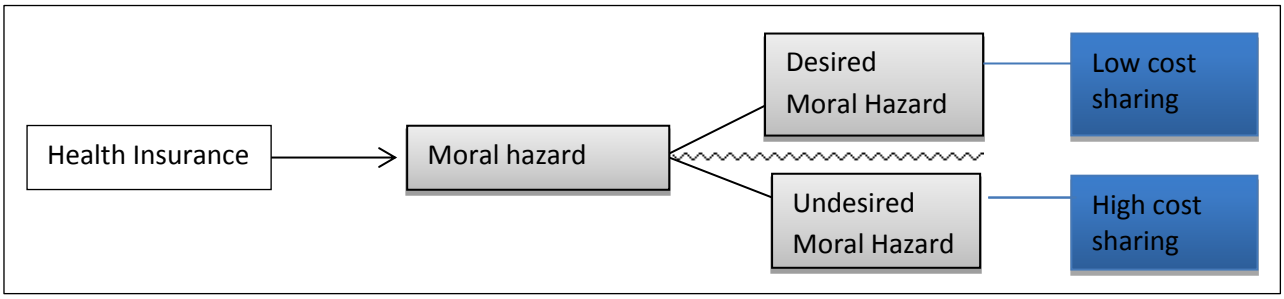

Figure 1: Illustration of the coherence of the different steps of this study

2. Theoretical framework

One of the initial goals of health insurance is ensuring accessibility to medical care. An often negatively viewed consequence of health insurance is the increase in medical care consumption, moral hazard. To determine whether and to what extend health insurance leads to a higher demand of medical care, starts this theoretical framework with describing the theoretical evidence for the relationship between health insurance and the demand for medical care (chapter 2.1). Chapter 2.2 describes the empirical evidence regarding this relationship. Eventually, chapter 2 provides an impression of the size of moral hazard. The conclusion is given in chapter 2.3.

2.1 Health insurance and the demand for medical care: Theoretical evidence

In theory two types of moral hazard are defined. Ex ante moral hazard refers to a negative change in lifestyle in response to health insurance coverage (Zweifel e.a. 2000). Whereas ex post moral hazard is defined as the additional medical care consumed due to health insurance coverage (Nyman 2004). Many theoretical models for describing the relationship between health insurance and the demand for medical care have been developed. These theoretical models aim to define the degree of ex post moral hazard. On the other hand, for the existence of ex ante moral hazard little evidence is available (Zweifel e.a. 2000). This chapter starts with one of the most well known theoretical models, Grossman's model of health production (1972). Different studies have indicated that Grossman's model has yielded considerable insight into the determinants of health and into health related activities (Folland e.a. 2012). In succession theoretical frameworks derived from the Grossman model will be discussed.

Central in Grossman's model is the assumption that health can be viewed as a durable capital stock which decreases with age and can be raised by investment. Following Grossman's model, the demand for medical care is derived from the demand for health itself and a person's health state (Grossman 1972:223; Folland e.a. 2012). The investment in health capital is a consideration of the consumer between investment in health capital and investment in other goods. This is referred to as opportunity costs, since money or time spent on investment in health capital cannot be spent in other ways. Furthermore the model suggests that individuals pursuit utility maximization (Grossman 1972; Folland e.a. 2012). The trade-off between investment in health capital and investment in other goods is determined by the consumer's preferences and the consumer's budget constraint. With health insurance the budget constraint will change in a way that the price for medical care faced by the consumer decreases. Therefore, the insured can buy more medical care

compared to a situation in which he would have no health insurance, this leads to a new equilibrium that provides the insured a higher utility which was not faceable in the situation without insurance (Grossman 1972; Folland e.a. 2012).

In contrast, with introduction of cost sharing the price of medical care faced by insured increases, which is expected to result in a decrease in medical care consumption. Cost sharing designs limited to certain services will cause a substitution effect, where insured will substitute the services with higher out-of-pocket expenditures to those with lower out-of-pocket expenditures. The demand for medical care is for example expected to differ by coinsurance rate, which is a type of cost sharing. The change in demand for different coinsurance rates is illustrated in figure 2.

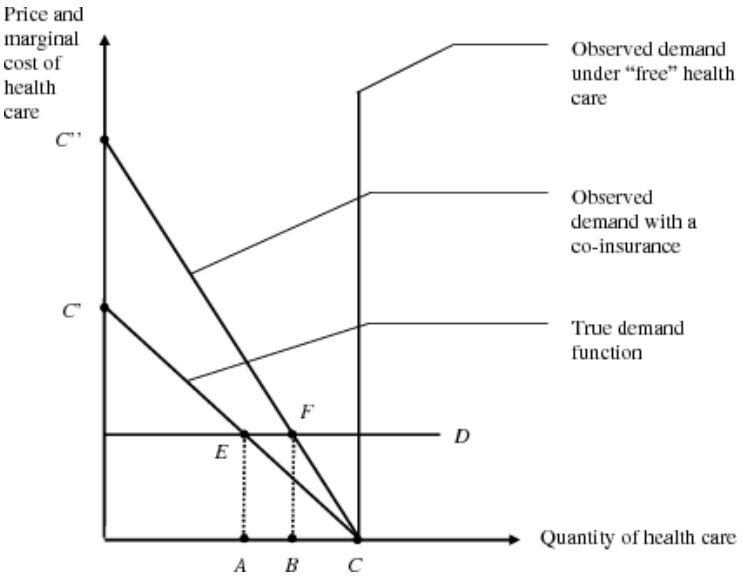

Figure 2: Change in demand by different coinsurance rates (Zweifel 2007)

There is criticism on the model developed by Grossman, since it did not include an uncertainty or risk factor for the demand for medical care (Cameron e.a. 1988; Liljas 2000; Muurinen 1982). Cameron et al. (1988) obtained the equation for the demand for medical care shown in formula 1 in which this uncertainty/risk factor is added (Riphahn e.a. 2002).

$$E[e_k(s)] = \exp\left(Z'\beta_k + \sum_{j=1}^{J} \eta_{jk} D_j + \varepsilon_k\right)$$ Formula (1)

In formula 1 '*s'* reflects the uncertain health state or event on which the demand for medical care *'e'* depends, '*k'* is the amount of dimensions of health services, '*Z'* the vector of covariates, '*Dj'* dummy variables for the insurance policy '*j'* and an error term ε. From the demand equation one suggests that the lower the price of medical care, the higher the

demand (incentive effect) (Camaron e.a. 1988; Riphahn e.a. 2002; Gardiol e.a. 2005). In other words, one would expect that *'jk'* is larger for those policies *'j'* that are more generous. This is referred to as the well-known moral hazard effect of health insurance. Second, the model by Cameron et al. points towards the endogeneity of the insurance choice. Consumers will calculate their expected utility under the different policies and choose that insurance company which provides the highest utility (Gardiol e.a. 2005).

Both the traditional Grossman model and the extended Grossman model suggest that health insurance will increase the demand for medical care. This is consistent with theoretical findings described by Besley (1998) and Mclaughlin and Chernew (2001) who both illustrated the change in medical care consumption due to a reduction in the price for medical care faced by the consumer. The demand curve illustrated in figure 3 shows how much medical care will be demanded for any given price. If the price of medical care falls from P^p to P^c due to reimbursement, the demand for health care is expected to increase from q* to q**. In other words, people can buy more health care for a particular price, i.e. the price of the additional demand (P^p-P^c) is higher than consumers are willing to pay. The triangle BDC then represents the cost higher than the cost consumers are willing to pay, which is called the loss in consumers' surplus or the welfare loss (Schut and Rutten 2009; Mclaughlin & Chernew 2001). On the other hand, when the value of care to the consumer exceeds the cost of that medical care, i.e. the consumer is willing to pay more than the cost of a product; we speak of consumer surplus (ABP^p). The size of the triangle BDC is inversely related to the price elasticity of demand for medical care. The larger the triangle BDC, the flatter the demand curve, i.e. the more elastic the demand for medical care. In other words, the welfare loss due to reimbursement increases as the elasticity of demand for health care increases (Besley 1998).

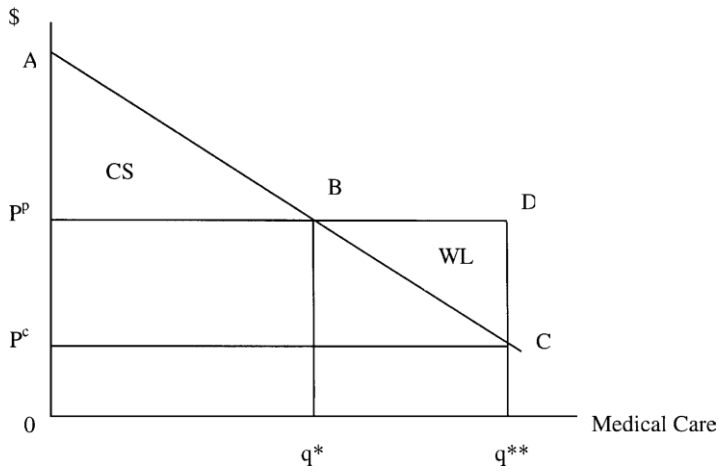

Figure 3: Demand curve for health care (Besley 1998)

In short, the theoretical models regarding the relationship between health insurance and the demand for medical care described above, all suggest that the demand for medical care increases with health insurance and decreases with the introduction of cost sharing.

2.2 Health insurance and the demand for medical care: Empirical evidence

After the description of the theoretical relationship between health insurance and the demand for medical care, it is important to have insight in the relationship observed within empirical studies. Many studies have tried to prove the effect of health insurance on medical care consumption and moral hazard. Moral hazard refers to a higher demand of medical care (ex post moral hazard) and a negative change in lifestyle in response to higher insurance coverage (ex ante moral hazard). In literature this hypothesis has been tested numerous times for ex post moral hazard (Long e.a. 1998, Coulson e.a. 1995, Manning e.a. 1987, Newhouse e.a. 1993). The most widely accepted study is the RAND Health Insurance Experiment (RAND-experiment), which is conducted in the period from 1974 to 1982. The RAND-experiment is widely regarded as the basis for the most reliable estimates of price sensitivity of demand for medical services (Deb & Trivedi 2002). One of the main goals of the RAND-experiment was to study how cost sharing of health insurance affected individuals' use of health care services (Newhouse 1995).

The RAND-experiment indicated that cost sharing reduces the consumption of medical care. This effect is expected to be somewhat stronger for acute and preventive care compared to chronic care. Where cost sharing has a significant negative effect on the probability of an episode of care, it did not significantly affect the number of contacts within these episodes (Newhouse e.a. 1993). A possible explanation for this finding could be that the intensity of treatment is not only determined by the patient, but also largely depends on the health care provider. The effects of cost sharing have been found to be larger for the poor, especially for children, compared to the nonpoor (Newhouse e.a. 1993, Lohr e.a. 1986).

The responsiveness of the consumer's demand to changes in price is measured using price elasticity. The RAND-experiment found price elasticity equal to -0,2 for the prescription of drugs, emergency room visits, and other general health care and did not vary appreciably by income or health status. One of the exceptions is less responsiveness to cost sharing for very urgent care compared to other services (Newhouse e.a. 1993). An overview of the price elasticity's for different types of health care found by the RAND-experiment is

given in table 2.

	Out-of-pocket payments	
	0-25%	25-95%
Acute care	-0.16	-0.32
Chronic care	-0.20	-0.23
Preventive care	-0.14	-0.43
Total outpatient care	-0.17	-0.14
Hospital services	-0.17	-0.14
Total medical care	-0.17	-0.22
Dental care	-0.12	-0.39

Table 2: Price elasticity's of health expenditures for different types of medical care found by the RAND-experiment (Newhouse e.a. 1993).

Price elasticity found by Keeler and Rolph (1983) are consistent with the ones found in the RAND-experiment. They noticed as well that the number of episodes decreased, whereas cost sharing did not affect the intensity of care within these episodes of illness. Varying price elasticity's of the demand for medical care have been found by other studies; -0.5 (Feldstein 1973), -0.14 (Phelps & Newhouse 1972) and -1.5 (Rosett & Huang 1973). Manning et al. (1987) reported an overall price elasticity for medical care of -0.17. The demand for hospital services was estimated to be least elastic (-0.14). Price elasticity's are expected to be somewhat higher for other services than those of hospitals and physicians (Smith and Garner 1974; Lamberton e.a. 1986).

The highest elasticity has been found for well visits (-0.43). Different results also have been found for the decrease in medical care consumption caused by the introduction of cost sharing. Previous studies suggest that having health insurance increases medical care consumption with 50% (Hadley 2003). The RAND experiment found that people with full insurance consume 45% more medical care, compared to people with a high income-based deductible (Newhouse e.a. 1993). When the co-payment rate decreases from 10% to 0%, where 0% is equal to full insurance, marginal consumption is multiplied by a factor of 2.5 (Gardiol e.a. 2005). Wagstaff and Lindelow (2008) suggest that health insurance increases the risk of high and catastrophic spending. Little empirical evidence is available for ex ante moral hazard. Dave and Kaestner found evidence that obtaining health insurance increases unhealthy behaviors among elderly men (2009). Research on the estimated size of moral hazard in terms of expenditures suggests that the welfare loss resulting from full insurance compared to insurance with high co-payments is around a quarter of the total healthcare expenditures (Manning e.a. 1987, Bakker 1997).

Besides above experiments, there is evidence from natural experiments, where there was an abrupt change in the level of copayment or coinsurance, which made it possible to study the effect of cost sharing in practice. In one of the natural experiments the coinsurance rate changed from 30% to 0%, which lead to both an increase in the number of admissions and the length of hospital stays of 12%. A natural experiment related to physician services showed a decline of 25% for physician visits and physician expenditures caused by an increase in coinsurance rate from 0 (free care) to 0,25 (Scitovsky and Snyder 1972). Last, in a Canadian province they added a copayment of 1,50 Canadian dollars for doctor visits and 2 Canadian dollars for home visits in 1986. They found a six à seven percent decrease in all physician services, and 18 percent decrease among the poor. The largest decreases were found in general physician services. There was no significant reduction in services provided by specialists found (Zweifel & Manning 2000).

To summarize, the empirical studies discussed above suggest that ex-post moral hazard caused by health insurance is substantial. The most important empirical study regarding the relationship between health insurance and the demand for medical care is the RAND-experiment. The price elasticity found varied by type of medical care. The RAND-experiment suggests that consumers are less responsive to price differences for acute and preventive care, whereas the elasticity for chronic care is found to be somewhat larger. In addition, cost sharing appeared to have an effect on the number of episodes, whereas cost sharing did not affect the intensity of care within these episodes of illness.

2.3 Conclusion

In this chapter the empirical and theoretical evidence concerning the relationship between health insurance and the demand for medical care is described (sub question 1). The theoretical models described in chapter 2.1 suggest that ex-post moral hazard caused by health insurance is substantial. The empirical evidence described in chapter 2.2 confirms this suggestion. There is little evidence about the relationship between health insurance and ex ante moral hazard. The RAND-experiment found varying price elasticity by type of medical care. The effect of cost sharing on the reduction of the consumption of medical care is expected to be somewhat stronger for acute and preventive medical care, compared to chronic care. In addition, cost sharing appeared to have an effect on the number of episodes, whereas cost sharing did not affect the intensity of care within these episodes of illness. The theoretical and empirical findings are summarized in figure 4, which illustrates that the consumption of medical care increases with the introduction of health insurance, referred to

as moral hazard. First, the lower part of the model in figure 4 illustrates the demand for medical care without health insurance. This amount of medical care consumption is equal to the amount of medical care consumed when individuals face full cost or total cost sharing for medical care. The upper part of the conceptual model illustrates the extra medical care consumption resulting from health insurance, moral hazard. Empirical studies, including the RAND-experiment, suggest that insured consume 45 to 50 percent more medical care compared to non-insured or insured with high cost sharing.

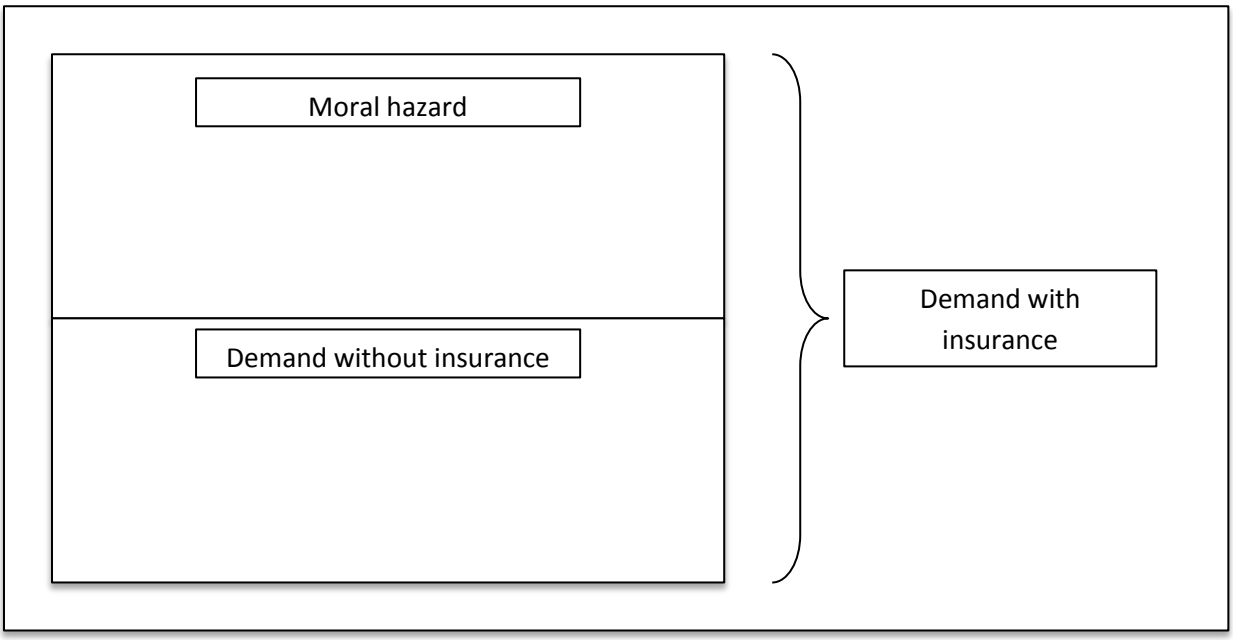

Figure 4: Conceptual illustration of the difference in demand for medical care between insured and not insured

3 Desired VS undesired moral hazard

Evidence described in chapter two of this study suggests that the extra medical care consumption caused by health insurance, defined as moral hazard, is substantial. In this study it is hypothesized that moral hazard can be divided into desired and undesired moral hazard. From a welfare perspective, one could reason that moral hazard is desired when the value of the extra medical care consumption outweighs the cost of that consumption. The value of the extra medical care depends on the necessity and efficiency of that medical care. This chapter describes the results of the literature review regarding the distinction between desired and undesired moral hazard. First, the number of selected articles resulting from the literature review is described in chapter 3.1. Successively, the results of the literature review are discussed divided into a theoretical and empirical part.

3.1 Results literature review

A literature review is performed in order to verify the distinction between desired and undesired moral hazard, and if it indicates that the suggestion holds, to identify what ingredients can be obtained from the literature to distinct desired from undesired moral hazard. The keywords that are listed in the method of this study (chapter one) yielded 168 results. After assessing the results according to the inclusion and exclusion criteria, 50 relevant sources remained. These are divided into 18 theoretical sources and 32 empirical sources, illustrated by the flowchart in figure 5. The results of this literature review will be discussed in this chapter, wherein the results are divided into theoretical studies (chapter 3.2) and empirical studies (chapter 3.3) on the distinction between desired and undesired moral hazard. Finally, the conclusion is described in chapter 3.4.

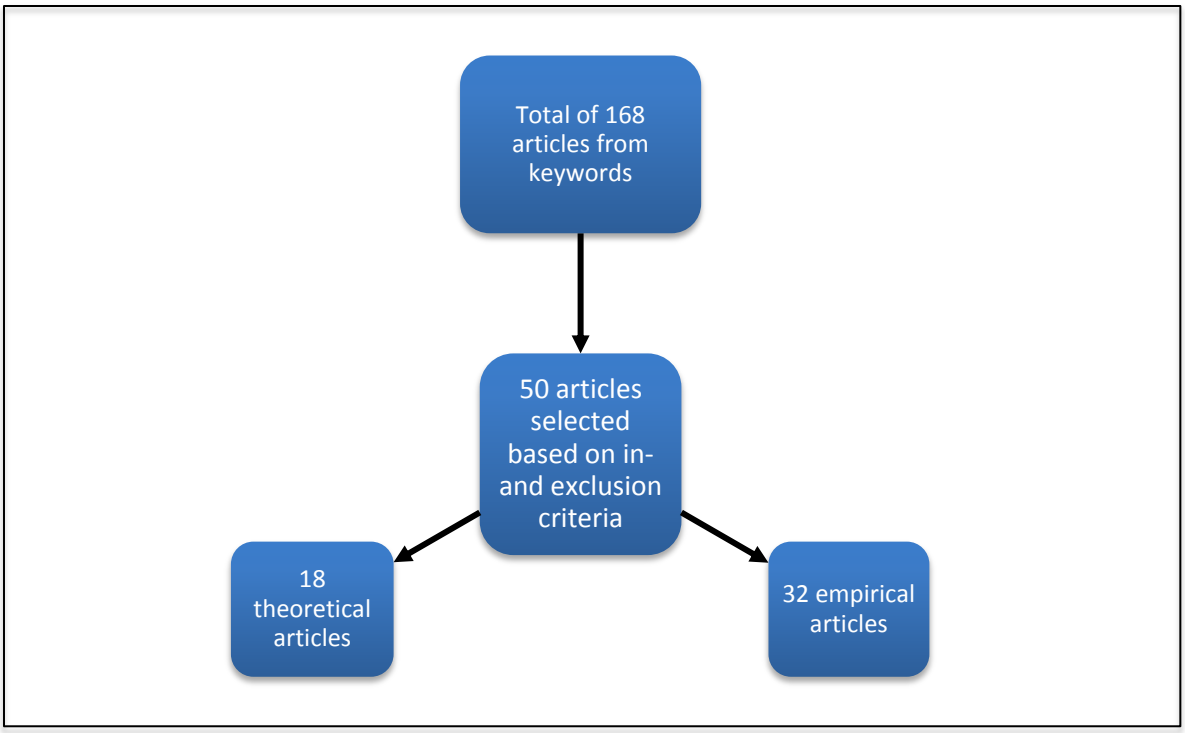

Figure 5: Flowchart selected and analyzed articles

3.2 Theoretical studies on the distinction between desired and undesired moral hazard

Two main theoretical trends about the desirability of moral hazard resulted from the literature review. The first one is the conventional theory in which all moral hazard is seen as an undesirable consequence of health insurance. Chapter 3.2.1 discusses this conventional theory. Criticism on the conventional theory has been found in the literature, which led to a second theoretical trend that makes a distinction between desired and undesired moral hazard. The most well known alternative of the conventional theory examined is the theory of demand for health insurance from John Nyman, which is described in chapter 3.2.2.

3.2.1 Conventional theory

Literature indicates that health economists under the conventional theory suggest all moral hazard to be undesirable and to represent a welfare loss to society. As shown in figure 3, insured are able to buy more medical care for a certain amount of money, whereby non-insurance is taken as reference (Bardey & Lesur 2006). The conventional theory then argues that this extra demand of medical care is of less value to consumers, since they would not have consumed this medical care in a situation without health insurance. The difference between the cost to produce this medical care and its low apparent value to insured consumers (reflected in the reduced price for consumers) represents according to the

selected literature, an inefficiency in the market for health insurance, moral hazard welfare loss or insured taking advantage of the insurance company (Pauly 1974; Koc 2005; Gray 2006). The size of this undesired moral hazard is illustrated by the triangle BCD illustrated in figure 3 and is related to the price elasticity of the demand for health care. As described in chapter 2.1, a flatter demand curve, i.e. a more elastic demand for health care, leads to more undesired moral hazard represented by a larger triangle BCD. Undesired moral hazard under the conventional theory is therefore suggested to be higher for medical services where the demand is more price responsive (i.e. higher price elasticity) (Feldstein 1973, Koc 2011).

Does this line of thought seem reasonable? Insurance is defined as an instrument to share the risk around future uncertainties with an insurance company in exchange for payment of a premium (Schut and Rutten 2009). People pay this insurance premium whether they become ill or not. When a person becomes ill, there is an income transfer from the people who stay healthy to those who become ill. No one gets direct money, but there is reimbursement for (a selection of) the consumed medical care. In other words, what is the benefit of consuming medical care only because the health insurance company covers it? Does anyone like to undergo a surgery or go to the hospital? In addition, the conventional theory does not consider the financial state, and therefore the ability to pay for health care, of an individual.

Mark Pauly (1983), one of the founders of the conventional theory, recognized this ambiguity of moral hazard. He pointed out that the conventional theory was intended to apply only to “routine physician’s visits, prescriptions, dental care, and the like” and that “the relevant theory, empirical evidence and policy analysis for moral hazard in the case of serious illness has not been developed’’ (Pauly & Held 1990). After the recognition of the fallacy of the conventional theory, Pauly started to look at moral hazard from a new perspective in which the extra consumption resulting from health insurance could also be cost-effective. Pauly defines a treatment as cost-effective when the expected future medical costs decrease with more than the cost of the treatment (Pauly & Held 1990). With this statement one of the founders of the conventional theory recognizes that the conventional theory does not satisfy, at least not for all types of medical care, and that moral hazard can include cost-effective medical care that is suggested to be desired from a societal perspective. These results therefore indicate that the aforementioned assumption of the conventional theory that all moral hazard is undesirable does not hold.

Also John Nyman, founder of the theory of demand for health insurance which will be discussed in chapter 3.2.2 argues that: ‘’the conventional theory makes sense for health care such as cosmetic surgery, drugs to improve sexual functioning or designer-style prescription sunglasses, but not for serious treatments such as coronary bypass operations or organ transplants’’ (Nyman 2004). From different articles it appears that still many economists hold

on to the conventional theory, mainly to argument their decision to implement certain cost sharing policies (Nyman 2004; Gray 2006).

3.2.2 The theory of demand for health insurance

Literature studied shows that the theory of demand for health insurance by John Nyman puts new light on the desirability of moral hazard, wherein a portion of the moral hazard is seen as desirable. Nyman (2004) argues that the theory of demand for health insurance implies that people buy health insurance to obtain additional income in case he or she gets ill. When a person purchases health insurance, he pays a premium into an insurance pool in return for a contract that obligates the insurer to pay for his or her medical care out of that insurance pool. Because not all insured become ill, the premium an insured has to pay reflects only a fraction of the total cost of medical care he or she will consume in the case of illness. In essence, the insurance contract obligates the insurance company to transfer income from the many people who pay into the pool and remain healthy to the few people who need medical care (Nyman 2004).

Nyman (2004) argues that in order to be able to make a concrete distinction between desired and undesired moral hazard, the health insurance company should physically hand insured cash prior to the actual use of medical care. Wherein the amount of cash is equal to the cost of the potential medical care consumption in contrast to the reimbursement of health care expenses after the medical treatment took place. When someone chooses to invest this additional income in medical care, this can be seen as desired moral hazard, since the person choose to spend his or her additional income on medical care instead of spending it on anything else. Nyman (2004) argues that the purchase of the extra medical care represents a moral hazard welfare gain to the extent of the additional income. Ambiguity around the desirability of moral hazard arises through the payoff mechanism, which makes it impossible to determine whether a person would have chosen to consume this extra medical care instead of using the money for something else. As a result, Nyman (2004) asserts that we cannot tell whether this moral hazard is desired or undesired.

In addition, Multiple authors criticize the fact that the conventional theory does not take into account the premium insured have to pay regardless of whether they consume medical care or not (Nyman 2004; Blomqvist 2001). Apparently the additional income received in case of illness is higher valued than the loss of income by paying a premium and remain healthy. Nyman (2004) therefore assumes that insured value the risk reduction resulting from health insurance more than they value the cost of a health insurance premium. Figure 6 helps to explain the importance of taking into account the premium insured have to pay in investigating the degree of moral hazard. Figure 6 presents two indifference curves.

An indifference curve reflects all possible options to distribute an individual's budget between investment in medical consumption (M) and investment in other goods (Y). The line W-W/P illustrated in figure 6 represents the indifference curve for an uninsured individual. An insured person pays a premium R, and is entitled to medical services for which a person in this case needs to pay coinsurance. The flatter line in figure 6 depicts the indifference curve of the insured (Nyman and Maude-Griffin 2001; Nyman 2003). The flatter curve of the insured, caused by the loss of income by paying a premium, indicates that the price responsiveness of insured and thus the price elasticity is less than thought under the conventional theory. Since not taking into account the payment of a premium would have led to an indifference curve that starts at point W (instead of point W-R) and would also end on the point W-R/cP. This indifference curve for insured under the conventional theory would thus be steeper than the indifference curve for insured depicted in figure 6. This steeper line in turn would reflect that economists under the conventional theory assumed higher price responsiveness and thus higher price elasticity for insured persons.

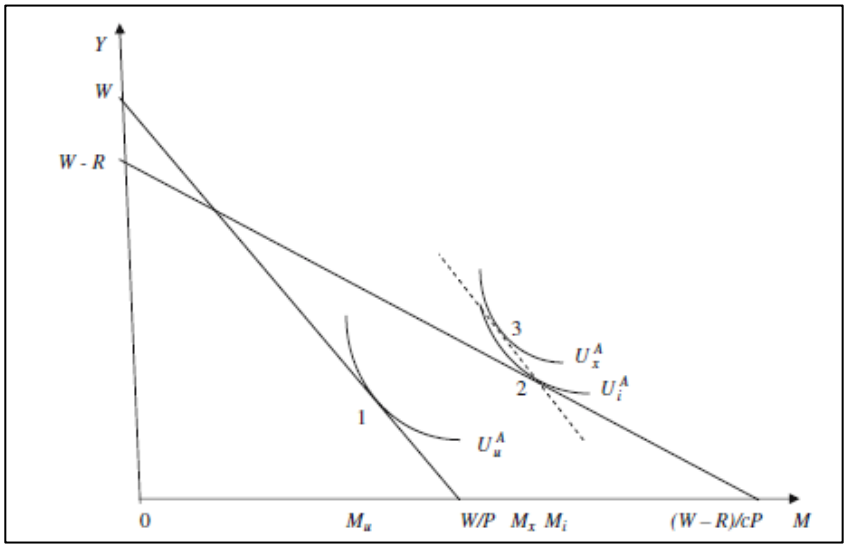

Figure 6: Efficient and inefficient moral hazard with relatively steep indifference curves (Eisenhauer 2006)

Assuming utility maximization, the optimum of an insured person under the conventional theory will be higher due to an indifference curve starting at a higher point compared to the theory of demand. This in turn leads to a higher amount of moral hazard under the conventional theory, compared to the amount of moral hazard that will be found under the theory of demand. This indicates that insured attach more value to additional medical care consumption than thought under the conventional theory, since the conventional theory did not correct for the loss of income due to payment of a premium. Nyman (2004) argues that ''many of the more serious procedures—organ transplants; trauma care; many cancer treatments; and, indeed, a large portion of the costly, life-saving medical care that people

could only afford to purchase with insurance would now be tallied in a welfare gain column instead of a welfare loss column when determining the value of insurance''.

Under the theory of demand, the highest utility level for an uninsured individual in the case of illness is at point 1, achieving a utility level U_u^A with Mu units of medical care. The flatter line in figure 6 indicates that an insured person moves to a higher utility level at point 2, achieving the utility level U_i^A with M_i units of medical care. The increase in medical care consumption from Mu to M_i represents total moral hazard. Nyman and Maude-Griffin (2001) and Nyman (2003) suggest that not all moral hazard is undesired and believe individuals would be willing to purchase some portion of the moral hazard if he or she had sufficient financial resources.

Asking how much additional care the consumer would have purchased in case of hypothetical cash transfer to make the extra medical treatment affordable can identify, as mentioned before, the portion of desired moral hazard. Nyman (2003) and Nyman and Maude-Griffin (2001) argue that adding such cash transfer would yield a different budget constraint, represented by the dashed line that runs parallel to the uninsured constraint in figure 6, and it would place the individual on indifference curve U_x^A with a hypothetical optimum at point 3, where M_x units of care would be utilized. The extra units of medical care consumed from $M_x - M_u$ is referred to as "desired" moral hazard, since this would be the amount of medical consumption an individual is willing to purchase if he or she would have sufficient financial resources. The remaining part of the moral hazard running from point M_i to M_x is the portion undesired moral hazard (Nyman 2003). This indicates that the portion desired moral hazard in this hypothetical figure is much larger than the portion undesired moral hazard and that this portion undesired moral hazard is relatively small.

The indifference curves depicted in figure 6 are relatively steep, which reflect a relatively strong preference for medical care (M) and relatively low preferences for other goods (Y). Following Nyman (2003) that is, however, not the only possible scenario. Nyman illustrated therefore a second scenario, depicted in figure 7, that shows indifference curves for individuals with relatively weaker preferences for medical care (M). Figures 6 and 7 show that in the situation where an individual has relatively high preference for medical care, health insurance results in higher moral hazard compared to the second situation where the individual has relatively low preference for medical care. In addition the amount of desired moral hazard exceeds the amount of undesired moral hazard in figure 6 to a large extent. The degree of desired moral hazard in the second situation, however, appears to be slightly smaller than the amount of undesired moral hazard (figure 7). From figures 6 and 7 it can be indicated that a stronger preference for medical care leads to a larger amount of moral hazard. Next, the portion of this moral hazard that is desired increases with the amount of moral hazard. Variables that could affect the degree of preference for medical care found in

the literature were severity of illness, medical knowledge and efficacy of medical treatment (Nyman 2003; Eisenhauer 2006).

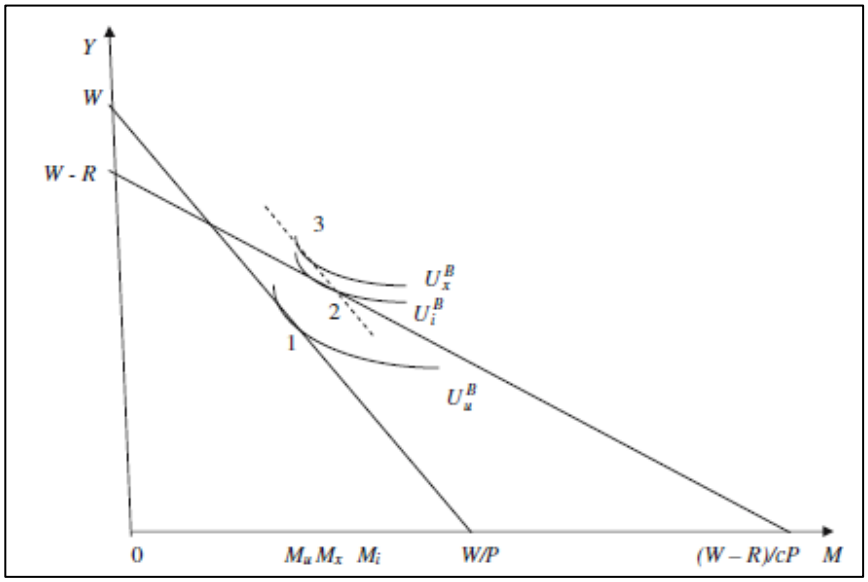

Figure 7: Efficient and inefficient moral hazard with relatively flat indifference curves (Eisenhauer 2006)

The designation of the theory of demand that health insurance for medical services with higher price elasticity leads to more desired moral hazard, compared to medical services with lower price elasticity, is in contradiction with the reasoning of conventional theory, which assumes that higher price elasticity leads to more undesired moral hazard (since all moral hazard is seen as undesired). Nyman (2003) suggests that the more moral hazard, the greater portion of it is desired.

To summarize, conventional economists consider all moral hazard to be undesired, because they assume that insured value these additional medical care less than its cost. The conventional theory however did not take into account the income transfer caused by health insurance and an individual's ability to pay. The theory of demand introduced by John Nyman argues that some of the moral hazard considered undesired under the conventional theory must be reclassified as desired moral hazard. The portion desired moral hazard increases with the amount of moral hazard, which in turn increases with the price elasticity of demand for medical care. Also the suggestion that insured value the risk reduction more than they value the cost of a health insurance premium indicates that people value health insurance more than thought under the conventional theory.

3.3 Empirical studies on the distinction between desired and undesired moral hazard

The review of the theoretical studies on the distinction between desired and undesired moral hazard described in chapter 3.2 indicate that not all of the additional demand due to health insurance can be seen as undesired moral hazard. One of the main instruments used in order to decrease moral hazard is cost sharing, since it increases the out-of-pocket payments in case of medical care consumption. The empirical studies found, all studied the effects of (higher) cost sharing on medical care consumption. This chapter describes the results of the literature review of the empirical studies regarding the desirability of the consequences of cost sharing.

The literature review indicates that these consequences all can be grouped under three overarching dimensions, which are simultaneously three important aims of the introduction of health insurance: accessibility, necessity and efficiency. These overarching dimensions are used in order to describe the important empirical results found during the literature review, in which each paragraph describes the findings regarding one of the dimensions. An important goal of health insurance is providing access to health care that would otherwise be unaffordable (Nyman 1999:141). The theory of demand described in chapter 3.2.2 indicates that the desirability of moral hazard should be seen in relation to the accessibility to that medical care or the ability to pay. Investigated empirical research regarding this relationship will be discussed in chapter 3.3.1. Accessibility is especially important for the medical necessity care (chapter 3.3.2). Efficiency refers to a comparison between cost and value of health care interventions to ensure that resources are allocated in a way that health gains are maximized (chapter 3.3.3).

3.3.1 Accessibility to medical care

One fundamental objective of health insurance is to reduce financial barriers for medical care consumption (Moreno-Serra e.a. 2012). Results of the literature review indicate that one of the effects of cost sharing is lower access to medical care. This chapter provides insight into the results of the literature review regarding the empirical findings of the relationship between cost sharing and accessibility and affordability of medical care.

The RAND-experiment showed that cost sharing tended to be associated with especially reductions in the probability of medical care use and outpatient visits among lower-income groups. These effects were strongest in relation to services for poor children (Newhouse e.a. 1993; Robinson 2002). The adverse effects of cost sharing on minority groups is consistent with findings of Rubin and Mendelson (1995), who found evidence for a

negative effect of cost sharing on the unemployed and homeless people. Geyman (2012) found that even small copayments force lower-income people to avoid or delay necessary care or skimp on medications, resulting in higher use of emergency rooms and more preventable hospitalizations (Geyman 2012).

Doyle (2001) suggests that uninsured people in severe car accidents received about 20% less medical care, compared to 5,2% for the people with private insurance. In addition, other findings suggest that the decrease in frequency of physician visits is higher among low-income groups (Lostao e.a. 2007). Regarding trauma care both uninsured and insured had the same probability to receive intensive care, but uninsured were less likely to have an operative procedure according to Hadley (2003). Heisler et al. (2004) found that cost sharing increased the risk of a decline in self-reported health, and for those with preexisting cardiovascular diseases with higher rates of anigina and nonfatal heart attacks or strokes for vulnerable groups. It suggests that cost sharing could lead to worse health outcomes among low-income and other vulnerable groups (Heisler e.a. 2004). Last, Baker et al. (2000) found that uninsured were less likely to have received medical care and more likely to say they did not receive care even though they thought it was needed.

In short, results of the literature review indicate that cost sharing leads to poorer outcomes in terms of accessibility and affordability of health care.

3.3.2 Necessary medical care

Multiple effects of (higher) cost sharing found in the literature review can be grouped under the effects of cost sharing on the consumption of necessary medical care. This paragraph provides an overview of the effects of cost sharing on the consumption of necessary medical care found in various empirical studies. The RAND-experiment, seen as the basis for the most reliable results of the effects of cost sharing on medical care consumption, did not found a significant different effect of cost sharing for unnecessary and necessary care. Nevertheless, other empirical studies found in the literature review suggest that cost sharing reduces the consumption of both necessary and unnecessary medical care. The first study, a follow-up study of the RAND-experiment indicated that doubling co-payments leads to a reduction in the use of prescription medications for asthma and diabetes, associated with a 17 percent increase in emergency room visits and a 10 percent increase in length of hospitalization (Geyman 2012).

Wong et al. (2001) found that insured with middle copayments, a type of cost sharing, were less likely to seek care for minor symptoms, whereas insured with high copayments even sought less medical care for severe symptoms. Tamblyn et al. (2001) showed that cost

sharing for drugs decreased the use of essential drugs among elderly and the use of drugs among welfare recipients by 15 till 22 percent, which led to a doubling of adverse events, including hospitalization, nursing home admission, death, as well as an increase in visits to emergency rooms (Tamblyn e.a. 2001). Multiple studies found that chronically ill people are less likely to take their medication if they face a higher out-of-pocket price, and vice-versa (Gellad e.a. 2006; Gibson e.a. 2005; Goldman e.a. 2004).

To summarize, results of the literature review show that the RAND experiment did not found that cost sharing reduced necessary medical care. Other studies, including a follow-up study of the RAND experiment on the other hand, found that cost sharing reduces both necessary and unnecessary medical care.

3.3.3 Efficiency

Whereas the above paragraph describes the reviewed empirical findings regarding the consequences of cost sharing on the consumption of medical necessary care, this chapter describes the selected evidence regarding the consequences of cost sharing on economical efficiency in terms of value and cost. The RAND-experiment found that people are more likely to undergo routine preventative actions because of health insurance (Newhouse e.a. 1993; Trivedi e.a. 2008). This moral hazard is desired, since early detection of diseases can even save health expenditures (Newhouse1993; Koc 2005).

Furthermore the RAND-experiment did not found a significant different effect of cost sharing for inappropriate and appropriate medical care consumption. For all effectiveness categories the medical care consumed reduced with one-third, appropriate and inappropriate care also reduced with the same proportion. This is confirmed by studies conducted by Rice and Matsuoka (2004), Siu et al. (1986) and Tamblyn et al. (2001) who found that higher cost sharing leads to reductions in high-value and low-value services in the same proportion. The only exceptions found by the RAND-experiment are respondents suffering from a chronic illness and nonpoor children, where there has not been found a significant reduction in the consumption of highly effective care (Newhouse 1993, Lohr e.a. 1986). This again indicates that additional medical care consumption caused by health insurance can be divided into desired and undesired moral hazard.

More research confirmed the existence of desired moral hazard. Geyman (2012) found that participants with hypertension without copayment had better improvements in diastolic blood pressure than their counterparts in high-deductible plans. A study about the quality of life of men diagnosed with prostate cancer found that uninsured experienced significant reductions in physical function, emotional wellbeing and role limitations due to emotional problems (Penson e.a. 2001). Hadley (2003) found that uninsured non-elderly

adults and children were almost 50% more likely to experience a ruptured appendix compared to cases with private insurance coverage. In addition, multiple studies on the risk of dying during a hospital stay or within 20 days of discharge, found evidence that uninsured were significantly more likely to die, compared to the people who have private insurance (Canto e.a. 2000; Young and Cohen 1991; Haas and Goldman 1994).
Hsu et al. (2006) found that cost sharing for medication reduced the compliance for taking medicines and other recommended behavior, but also worsen physiologic health and causes an increase in consumption for other medical services. The increase for other medical services involved especially increased visits to emergency rooms and non-elective hospitalizations (Hsu e.a. 2006; Tamblyn e.a. 2001). This increase in medical expenditures for other services outweighs the decrease in expenditures for medicines, indicating that introduction of cost sharing for medicines does not result in less health care spending. Newhouse (2006) even suggested that over a longer period the health care expenditures will increase assuming compliance does not improve and physiologic health worsens.

Hsu et al. (2006) were not the only ones who found that higher out-of-pocket costs for one kind of medical care service led to an increase in medical care consumption elsewhere. Soumerai et al. (1991 & 1994) showed that limiting the number of drug prescriptions in a month for schizophrenic patients increases the spending on other medical services with 17 times compared to the savings achieved on drugs prescription. Besides the spillover effect of consumption of drugs to the consumption of other medical care services, Rosen et al. (2005) indicate that providing full coverage for a certain type of inhibitors for elderly diabetics increase efficiency in terms of an simultaneous increase in QALYs and decrease in health care cost. Finally, cost sharing aims to reduce only inappropriate and ineffective care, nevertheless it is indicated that consumers often are not able to make decisions consistent with the use of appropriate and effective health care (Frick & Chernew 2009; Arrow 1963). This confirms the findings that cost sharing leads to decreases in health and the consumption of efficient medical care.

In short, reviewed empirical findings indicate that cost sharing not only leads to a reduction in consumption of inefficient medical care, but also results in a reduction of efficient medical care consumption. The most convincing evidence for desired moral hazard is found for the extra consumption of drugs caused by health insurance. Not only the compliance for taking medicines decreases with cost sharing, cost sharing also results in a substitution effect towards the consumption of other medical care services. The increase in medical expenditures for other services outweighs the decrease in expenditures for medicines, indicating that introduction of cost sharing for medicines does not only reduce inefficient medical care consumption but also efficient medical care consumption.

3.4 Conclusion

The theoretical and empirical findings described in this chapter actually indicate that a portion of the total moral hazard caused by health insurance is desired, illustrated in figure 8. The ratio desired/undesired moral hazard is not yet known, reflected by the waved line between high value and low value moral hazard. Nyman indicates that the portion of desired moral hazard increases with the amount of moral hazard, which in turn increases with the price elasticity of demand for medical care. In addition, it is important to take the ability to pay for medical care into account in order to determine whether the consumption of extra medical care is desired, like indicated by the theory of demand. One of the aims of health insurance is to make otherwise not affordable medical care accessible. Empirical evidence suggests that with the introduction of cost sharing, aimed to reduce moral hazard, the acceptability and affordability of health care decreased most for the vulnerable groups. Besides the ability to pay, empirical findings indicate that both the consumption of necessary and unnecessary and efficient and inefficient medical care reduce with introduction of cost sharing.

The review of selected literature indicates that three overarching dimensions can be identified to distinguish desired moral hazard from undesired moral hazard: accessibility, necessity and efficiency or medical care. Desired moral hazard therefore can be defined as: medical care consumption that is efficient in terms of cost and value and medical necessary, which from a societal perspective should be accessible for everyone. One can speak of undesired moral hazard if it does not meet the definition of desired moral hazard.

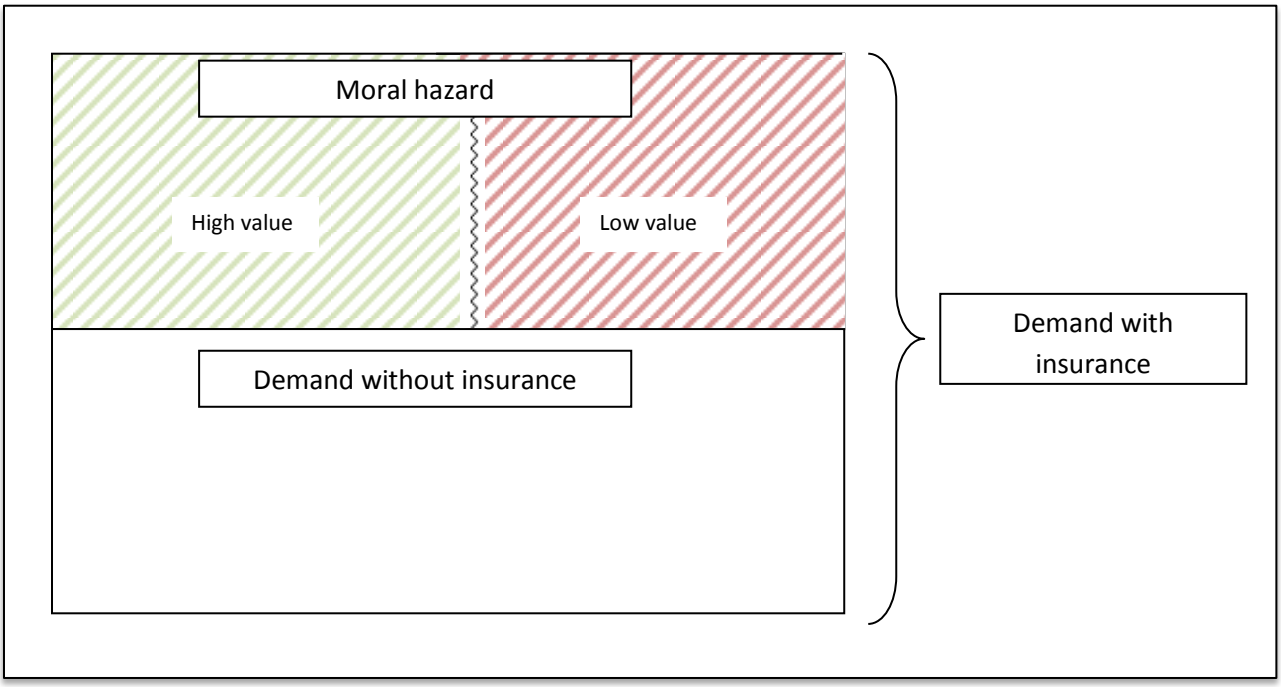

Figure 8: The extra medical care consumption due to health insurance consists of medical care with both high and low value

4. Explanation undesired moral hazard

Empirical and theoretical evidence selected during the literature review, including the theory of demand and the RAND-experiment, indicate that health insurance not only leads to undesired moral hazard, but also to desired moral hazard. It is important to identify the underlying cause of undesired moral hazard in order to determine how undesired moral hazard can be reduced. There are three possible explanations for the existence of undesired moral hazard which will be described in this chapter. These possible explanations are obtained from previous chapters. The three explanations will all lead to a different conceptual model, and affect the way in which undesired moral hazard best can be reduced. These explanations will be described in this chapter and will be supported by conceptual illustrations (chapter 4.1). The conclusion is described in chapter 4.2.

4.1 Possible explanations undesired moral hazard

Theoretical and empirical findings, including Nyman (2003) and the RAND-experiment (Newhouse e.a. 1993) give strong indications for the existence of a distinction between desired and undesired moral hazard, like mentioned in chapter three. There are different possible explanations for the existence of undesired moral hazard. The first possible explanation for the occurrence of the extra consumption of low value medical care with the introduction of health insurance is the price effect. This effect is described in chapter two of this studies and entails that people consume more medical care in a situation with health insurance compared to a situation without health insurance, because they face a lower price for that medical care. The lower price resulting in an improved value/price ratio which insured can persuade to consume extra medical care, whereas they would not have consumed it in a situation without health insurance because they value the medical care less than its cost. This can be displayed as shown in figure 8 (chapter 3.4).

Another possible explanation for the occurrence of undesired moral hazard is the information asymmetry between health care provider and patients (Arrow 1963; Chernew 2009). Like mentioned before, it is indicated that due to information asymmetry individuals are not always able to distinct high value medical care from low value medical care. Also the finding of the RAND-experiment that cost sharing reduces the number of care episodes, but not affect the intensity of care within these episodes, indicates that health care providers affect medical care consumption. If this explanation were true, consumption of low value medical care due to information asymmetry would not only occur within the extra medical care consumption due to health insurance, but will also lead to the consumption of low value medical care in the case of no insurance or full cost sharing. Therefore, this low value

medical care consumption is also present in the case of no insurance, illustrated by the red box in the lower part of the model depicted in figure 9. Again, the ratio low value/high value medical care consumption is not yet known.

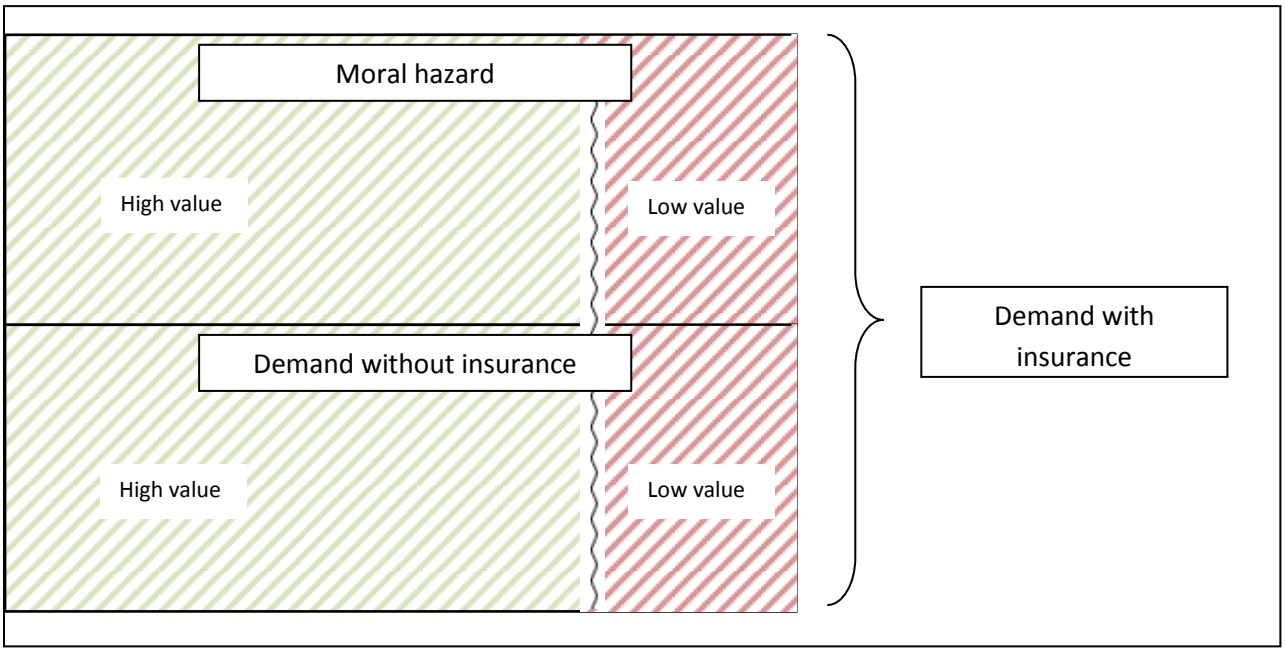

Figure 9: Conceptual model with information asymmetry as an explanation for the occurrence of low value medical care consumption.

The third possible explanation for the consumption of undesired moral hazard could be the combination of the price effect and information asymmetry between health care providers and patients. The consumption of low value medical care would then occur both in the upper and lower part of the model, due to information asymmetry. But a price effect causes more consumption of low value medical care in a situation with health insurance, compared to a situation without health insurance. Again, the distinctions between low value medical care and high value medical care, as well as the distinction between low value medical care resulting from information asymmetry and the price effect is conceptual and illustrated in figure 10.

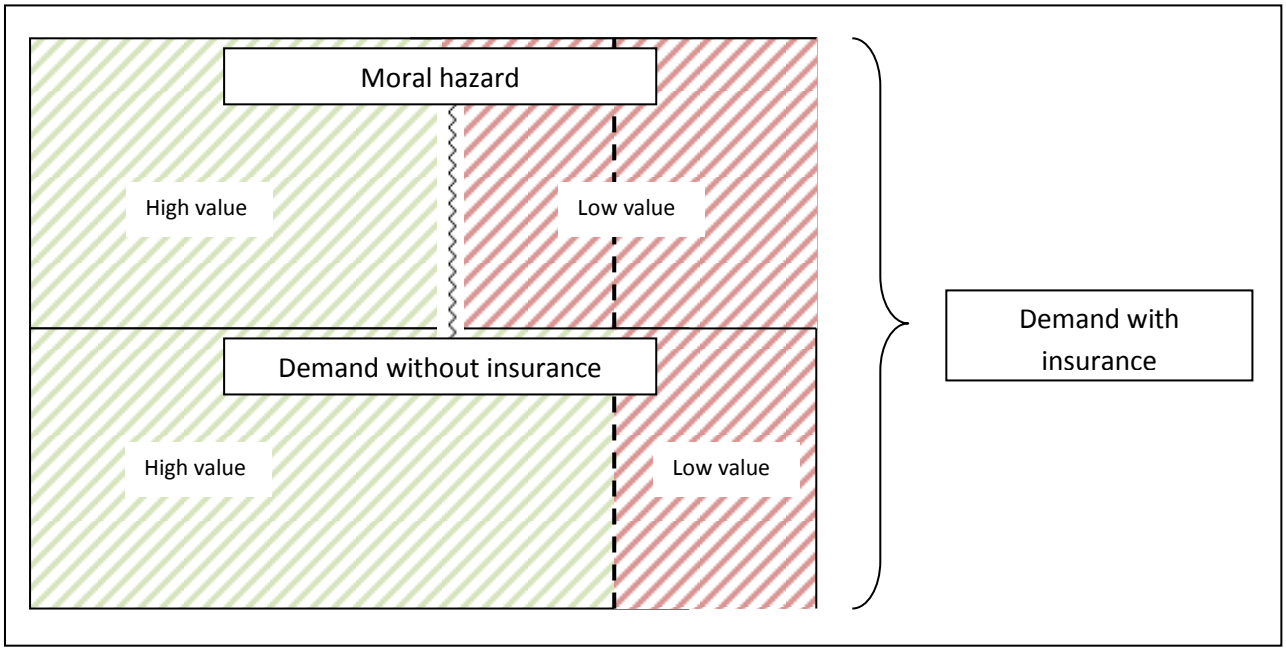

Figure 10: Conceptual model with both information asymmetry and price effect as explanation for the occurrence of low value medical care consumption.

4.2 Conclusion

Empirical and theoretical evidence selected during the literature review indicate that health insurance not only leads to undesired moral hazard, but also to desired moral hazard. There are three possible explanations for the occurrence of undesired moral hazard. The first is the pure price effect, which causes insured to consume more medical care, because of the improved value/price ratio resulting from health insurance. The second possible explanation is the information asymmetry between health care provider and patients; literature indicates that individuals are not always able to distinct high value medical care from low value medical care. Information asymmetry, however, does not only occur in a situation with health insurance but also in a situation without health insurance. Low value medical care resulting from information asymmetry therefore would also occur in case of no health insurance or full cost sharing. The third possible explanation is a combination of the price effect and information asymmetry. In this situation, low value medical care consumption would both be observed in a situation with and without health insurance, but the price effect results in more low value medical care consumption in the case of health insurance. Empirical results surrounding the distribution of high value/low value medical care do not exists yet.

5. Cost sharing targeted exclusively on undesired moral hazard

The aim of cost sharing, like mentioned before, is to reduce moral hazard. From chapter three it appears that there are strong indications for the existence of desired moral hazard. Consequently desired moral hazard should not be subject to cost sharing or should even be encouraged, the aim of cost sharing should be the reduction of only undesired moral hazard. The three dimensions that determine whether moral hazard is desired or undesired are: accessibility, necessity and efficiency of medical care, like mentioned in chapter three. Accordingly, cost sharing should not be uniform, but should vary for medical services depending on the accessibility, necessary and efficiency of that medical care. Also Blomqvist (1996), Newhouse (2006) and Manning et al. (1987) argue that a policy with uniform cost sharing may be far from optimal.

Chapter 5.1 describes the requirements for targeting cost sharing only on undesired moral hazard and not on desired moral hazard. Chapter 5.1 is divided into three parts, each part describing the differentiation of cost sharing on one of the dimensions that determine whether moral hazard is desired or undesired. In succession, chapter 5.2 describes the feasibility of this cost sharing design only targeted on undesired moral hazard. The explanation of the occurrence of low value medical care consumption determines the way in which low value medical care consumption can best be targeted. Demand side cost sharing is not for all possible explanations the most useful way to reduce low value medical care consumption. Therefore, the alternatives of demand side cost sharing and the way in which low value medical care consumption can best be targeted for each possible explanation are discussed in chapter 5.3. This chapter ends with a conclusion (chapter 5.4).

5.1 Cost sharing requirements

Cost sharing should only focus on undesired moral hazard, and encourages desired moral hazard. The distinction between desired and undesired moral hazard depends on the affordability, efficiency and necessity of medical care consumption. Therefore, cost sharing should be differentiated within these three dimensions. This chapter is divided into three paragraphs each describing how cost sharing ideally should vary within each of these three dimensions. The dimensions are discussed in the following order: accessibility to medical care (chapter 5.1.1), necessity of medical care (5.1.2) and efficiency of medical care (chapter 5.1.3).

5.1.1 Accessibility to medical care

Health insurance provides financial protection against high health care expenditures (Remler & Greene 2009). Cost sharing should not affect the access to efficient, appropriate and necessity care. Since the effects of cost sharing are especially affecting lower income people who are also more price sensitive, a cost sharing design should take the position of vulnerable groups into account. In other words, since the effects of cost sharing differ per subgroup, cost sharing should vary by type of subgroup. It is therefore indicated that cost sharing should vary by income, in which there is lower cost sharing for lower incomes, vice-versa.

Information that is required to differentiate cost sharing based on income is insight in household incomes. Furthermore, it must be decided whether the accessibility to medical care is ensured directly by asking lower cost sharing for low income individuals or indirect by offering financial support depending on income. In the first situation the health insurance company should have insight in household incomes. In the second situation the government should have insight in household incomes and can provide an indirect subsidy for out-of-pocket expenditures. Ideally, differentiation of cost sharing by income should be directly, since in this situation low income people do not have to spend the money first. This requires both information of household income and medical care consumption. To ensure that the financial barrier is not larger for low-income people compared to people with higher incomes, people should have prior insight in the out-of-pocket expenditures of medical care consumption.

There are different examples of differentiation of cost sharing based on income. In Germany they established an income-related maximum out-of-pocket payment. The out-of-pocket costs for low-income people are limited to 1 percent of the income to 2 percent for individuals with a higher income. Also in Australia income-based cost sharing is applied. In this country individuals have to pay 80 percent of the health care expenditures if the cost of medical consumption exceed a certain amount. The out-of-pocket expenditures for low-income people are less than 80 percent of the health care expenditures. Furthermore, the Netherlands and Switzerland provide financial assistance to individuals with a low income. Low-income people in the United Kingdom are exempt from cost sharing (Schoen e.a. 2010).

In short, cost sharing should vary by income to ensure accessibility of medical care. Ideally, cost sharing should be differentiated by income directly, in which the amount of cost sharing depends on the household income at time of medical care consumption. This in contrast to indirect financial support in which individuals receive additional income to compensate for health care expenditures depending on an individual's income. Health insurance companies should have insight in household income, and insured should have prior insight in the out-of-pocket costs of medical care consumption.

5.1.2 Necessity of medical care

Empirical evidence described in chapter three suggests that cost sharing, besides the consumption of unnecessary medical care, also effects the consumption of necessary medical care. Even for the chronically ill people, who are expected to have more medical knowledge about their disease(s), a reduction in consumption of necessary medical care has been observed due to higher out-of-pocket costs. Therefore it is indicated that cost sharing should not be uniform, but should vary depending on the necessity of medical care.

Medical necessity can be defined in terms of burden of disease. Burden of disease is defined as the percentage of the remaining health expectancy that a patient is expected to lose if his or her condition would not be treated, in which health is expressed in quality of life adjusted life years (QALY's). If the burden of disease equals one, all remaining QALY's are lost, if it equals zero none QALY's are lost (Poley e.a. 2002). This definition accounts for both the current health state and the health prospects of an individual. Both current health state and health prospects are important in assessing the necessity of medical care consumption. A gain of 1 QALY for an individual in good health is from a societal perspective of less value than a 1 QALY gain for an individual in worse health. In addition, people are in general more willing to give 1 QALY to a child, compared to giving it to elderly people. In succession, different treatments should be grouped according their medical necessity.

Information required in order to differentiate cost sharing by necessity of medical care are the QALY's gained per medical treatment and the quality of life of each individual. Subsequently, cost sharing should be lower for medical treatments that gain more QALY's and higher for medical treatments that gain less QALY's. Furthermore the current health state of an individual should be taken into account, where there should be lower cost sharing for individuals in poorer health, vice-versa. Furthermore treatments for severe illnesses can be fully covered, because it is very unlikely that someone would undergo a serious treatment just because of a decreased price (Gray 2006). This is in line with the suggestions of Bardey and Lesur (2005): ''cost sharing may be optimal for small diseases, but for strong diseases full coverage is optimal''.

Belgium implemented a cost sharing design differentiated by necessity of drugs consumption, where essential drugs (e.g. insulin for diabetic patients) are fully covered. Less essential drugs for non-life-threatening diseases are reimbursed at lower levels and lifestyle drugs are not reimbursed at all (Maarse & Paulus 2003). The gatekeeping role of a GP can also play an important role in the assessment of the necessity of medical care consumption and can therefore reduce unnecessary health care costs. It is suggested to be important that cost sharing does not apply for a GP consultation, since cost sharing for a GP visit could even encourage people to look for unneeded expensive medical care if they have to pay the same or even less out-of-pocket for that type of medical service.

In short, demand side cost sharing should be differentiated by the necessity of medical care. More concrete, demand side cost sharing should be lower for medical treatments that gain more QALY's and cost sharing should be higher for medical treatments that gain less QALY's. Furthermore, the current health state of an individual should be taken into account, where there should be lower cost sharing for individuals in poorer health, vice-versa. This requires information of the amount of QALY's gained per medical treatment and the current health state of an individual.

5.1.3 Efficiency

The amount of cost sharing should vary by the efficiency of a medical treatment. Treatments that reduce expected future cost with more than the cost of that treatment should have lower cost sharing or even be fully covered. It can be reasoned that prevention should be fully reimbursed, since it is not clear what the effect of cost sharing is on prevention, and prevention can lead to early detection of a disease and can even save health care expenditures. The RAND-experiment showed that with introduction of cost sharing treatments in all effectiveness categories decrease. The only exceptions found by the RAND-experiment are chronic ill people and nonpoor children. A possible explanation for this finding is that chronic ill people on average have more medical knowledge about their body and their disease.

In addition, since people often are not able to assess the value of a treatment, cost sharing ideally should not be applied to the most cost-effective treatment of all available treatments for a certain health problem. In this way, patients can be sent to the most cost-effective treatment. Cost sharing should also anticipate on a possible substitution effect to other medical services if cost sharing is introduced for a medical treatment. A spillover effect to other more expensive and less effective medical care services can be prevented by applying lower cost sharing for more efficient medical services.

A way in which the efficiency of medical care, in terms of value and cost, can be measured is by cost-effectiveness studies. A cost-effectiveness study assesses both cost and value of a medical treatment. One type of a cost-effectiveness study is a cost-utility analysis, in which the effects of a medical treatment are expressed in QALY's. A lower cost-utility ratio refers to higher efficiency (since the cost per QALY gained are lower). As in the dimension of necessity of medical care, information about the amount of QALY's gained per medical treatment and the current health state of an individual are required. In addition, information on the costs of a medical treatment is needed in order to calculate the cost-utility

of a medical treatment. In other words, the information needed for the dimension of necessity of a medical treatment should be supplemented with the cost of this treatment.

An example of a design in which the degree of cost sharing depends on the value of a medical service and its cost is Value-Based Insurance Design (VBID). VBID advocates that the amount of cost sharing should be based on the value of clinical services (benefits and cost) and not exclusively on the cost (Chernew e.a. 2007). Braithwaite & Rosen (2007) argue that medical services of high value, such as treatments for diabetic patients, should not be subject to cost sharing. Whereas for low-value services, such as brand-name drugs for which there also exists generics, cost sharing could apply. VBID relaxes the questionable assumption that when faced with cost sharing, consumers will balance costs and clinical value optimally (Chernew e.a. 2007). There are two approaches for VBID; the first one reduces cost sharing for clinically valuable services. Nevertheless, the same treatment could be used for different diseases and have different values for those diseases. The second approach, where this problem does not apply, involves the determination of the amount of cost sharing based on the value of medical services for specific indication areas. A disadvantage of this second approach is that it requires more-sophisticated data systems to implement cost sharing based on indication area (Chernew e.a. 2007).

In short, demand side cost sharing should be differentiated by the efficiency, in terms of value and cost, of medical care. More concrete, demand side cost sharing should be lower for medical treatments with a lower cost-utility ratio and cost sharing should be higher for medical treatments with a higher cost-utility ratio. Information required for the differentiation of cost sharing on efficiency is equal to the information needed to assess the medical necessity of a treatment, the amount of QALY's gained per medical treatment and the current health state of an individual, supplemented by the cost of that medical treatment.

5.2 Feasibility

In chapter 5.1 it is concluded that a cost sharing design targeted only at undesired moral hazard should consists of cost sharing which is not uniform, but should differ by affordability (income based), necessity and efficiency of a medical care service. This chapter describes the feasibility of such cost sharing design. This chapter follows the same outline as the previous chapter, in which the feasibility of income based cost sharing is discussed first (chapter 5.2.1), followed by the feasibility of differentiating cost sharing by necessity (chapter 5.2.2) and efficiency (chapter 5.2.3) of a medical service.

5.2.1 Feasibility cost sharing differentiated by income

It is expected that it is administrative difficult to differentiate cost sharing based on income. As described in chapter 5.1.1, ideally cost sharing should differ by income directly, in which the amount of cost sharing charged is lower for low-income people. To make this work in practice, health insurance companies should have insight in household income, which is currently not the case. Furthermore, to ensure that the financial barrier is not larger for low-income people, compared to people with higher incomes, people should have prior insight in the out-of-pocket expenditures of medical care consumption. This is complicated by the fact that the cost of a medical treatment is often not known in advance. The moment at which an individual seeks for medical help is the medical treatment needed not yet known.

In addition, the transparency reduces when different income groups pay another amount of cost sharing. This, in turn, can lead to resistance of insured. For example, it can be expected that insured disagree with the amount they have to pay. In addition, it can be reasoned that ability to pay depends on the view of an individual. More concrete, two individuals with the same income can think differently about their ability to pay a certain amount of cost sharing. It can be questioned whether demand side cost sharing is a good instrument to reduce undesired moral hazard. In the Netherlands more and more people need to have a payment arrangement with their health insurance company since they cannot pay for their premium, deductible or out-of-pocket payment (Schut & Varkevisser 2013).

In short, it is expected that it is difficult to differentiate cost sharing based on income. First of all, health insurance companies do not have insight in household income. Secondly, to ensure an equal financial barrier for low- and higher-income individuals, insured should have prior insight in the out-of-pocket expenditures of medical care consumption. However, at the time an individual seeks medical care it is not yet known which treatment is needed. In addition, two individuals with the same income do not have to think the same way about their ability to pay a certain amount of cost sharing. In the Netherlands more and more people need to make payment arrangements with their health insurance company since they cannot

pay their out-of-pocket expenditures. It therefore can be questioned if cost sharing is a useful way to reduce undesired moral hazard at all.

5.2.2 Feasibility cost sharing differentiated by medical necessity

The second dimension of cost sharing only targeted at undesired moral hazard is differentiating cost sharing based on the necessity of medical care. To make this work in practice, information about the amount of QALY's gained per medical treatment and the current health state of an individual is required, like mentioned in chapter 5.1.2. There exist different methods to determine the QALY's gained per medical treatment, however there is no consensus on the best method to do this. Although the availability of effectiveness analyzes increases, such analysis is not available for each existing treatment yet. In addition, the lag in availability of effectiveness data for new medical treatments results in a situation in which a decision maker sometimes have to take decisions without having effectiveness data available (Stoykova e.a. 2003).

Furthermore, measuring the health state of an individual is difficult. There exist different methods to measure the health state of an individual, but also here there is no consensus on the best method. The current health state could be assessed by the individual themselves, or by society. Both lead to biases and it is very time consuming to determine the health state of each insured or subgroup (Schut and Rutten 2009). In addition, it entails many administrative difficulties that affect the feasibility negatively. Again, differentiation of cost sharing based on this dimension can lead to less transparency, especially in the case of differentiating based on indication area.

To summarize, information about the amount of QALY's gained is not available for every treatment. Obtaining this data is expensive and time-consuming. Furthermore, information of the current health state of each insured is required, which is also very time-consuming and there is no consensus about the best method to measure the health state of an individual. Differentiation of cost sharing based on this dimension can lead to less transparency, especially in the case of differentiating based on indication area.

5.2.3 Feasibility cost sharing differentiated by efficiency

The third dimension on which cost sharing should be differentiated to be only targeted on undesired moral hazard is the efficiency of a medical treatment. The information required is the information required for the differentiation of cost sharing based on the necessity of a medical treatment, supplemented with the cost of a treatment. The feasibility of obtaining the information needed for the QALY's gained per medical treatment and the health state of an individual is discussed in chapter 5.2.2. Regarding the availability of the cost of a treatment,

It has to be decided which costs are taken into account, only the direct costs regarding the medical treatment or also the indirect costs such as productivity costs? Whereas the cost of a medical treatment in general is known, these costs can be supplemented with costs due to complications. The inclusion of indirect costs leads to administrative difficulties, since the indirect costs related to a medical treatment depend on the situation of the individual.

The most well known example of differentiating cost sharing by efficiency is VBID described in chapter 5.1. In addition, it is argued that a VBID, which determines the amount of cost sharing on the value of medical services per indication area, takes into account that the same treatment can be used for different diseases and have different values for those diseases. Nevertheless, this second approach requires more-sophisticated data systems to implement cost sharing based on patients' characteristics and reduces the feasibility (Chernew e.a. 2007).

In short, differentiating cost sharing on efficiency requires the same information as the information needed to differentiate cost sharing on necessity, supplemented by the cost of a treatment. The difficulties to implement cost sharing based on necessity are supplemented by the difficulties to obtain the right cost. It therefore can be questioned if this cost sharing design can be applied in practice. The introduction of a cost sharing design differentiated on all three dimensions requires many adjustments; therefore the feasibility in the short term is indicated to be low.

5.3 Alternatives

Regardless of the low feasibility of the implementation of demand side cost sharing targeted only at undesired moral hazard by differentiating the cost sharing based on income, necessity and efficiency of medical care, it can be questioned to what extent this cost sharing design affects low value medical care consumption. Chapter 4 described different possible explanations of the occurrence of undesired moral hazard. The real explanation for this occurrence is not yet known. The explanation of undesired moral hazard, however, affects the way in which this type of moral hazard best could be reduced. This paragraph describes for each possible explanation the way in which undesired moral hazard best could be reduced.

The first possible explanation given in chapter 4 is the price effect. In this situation, insured consume more medical care and medical care from low value, since they face a reduced price for medical services. This can convince people to consume medical care that they would not have consumed in a situation without health insurance, due to improved

value/price ratio. If undesired moral hazard is only caused by the price effect it makes sense to apply demand side cost sharing which is targeted at undesired moral hazard.

In the second possible explanation, the consumption of low value medical care is caused by information asymmetry between health care provider and patients. This possible explanation indicates that the consumption of low value medical care is not attributable to individuals, but to the health care providers and that it occurs both in a situation with and without health insurance. Nevertheless, one could reason that demand side cost sharing also can reduce a portion of the low value medical care consumption due to information asymmetry. If the cost sharing is differentiated based on accessibility, necessity and efficiency insured are indirect guided to the best medical treatment. Nevertheless, it is suggested that a health care provider has some authority, if he or she argues that another treatment will be better in a certain individual situation, people are likely to follow the prescription of the health care provider. It therefore can be questioned to what extent cost sharing within this possible explanation actual reduces medical care consumption of low value.

In addition, in case of no health insurance, full cost sharing or low differences in cost sharing between different treatments, this indirect guidance to high value medical care does not exists or only to a small extent. An alternative way to reduce low value medical care therefore could be the application of incentives on the supply side. Whereas demand side cost sharing mainly is indicated to reduce medical care seeking, supply side incentives are indicated to affect the health care process. A type of supply side incentive is managed care, examples of managed care are Health Maintenance Organizations (HMO's), in which organizations simultaneously provide medical care and have full financial responsibility, and selective contracting in which health insurance companies limit coverage to medical treatments provided by selected health care providers. Other examples of supply side incentives are the gatekeeping role of a GP, which aims to reduce unnecessary visits to for example hospitals and performance based incentives in which honorarium depends on performance (Schut and Rutten 2009).

In the third situation, low value medical care consumption is caused by a combination of the first and second possible explanation described above. It is therefore indicated that a combination of both demand side cost sharing targeted on undesired moral hazard and supply side incentives is the best way to reduce low value medical care consumption. The extent to which the two instruments should be applied depends on the portion of low value medical care consumption that is caused by the price effect and the portion that is caused by information asymmetry. In addition, as mentioned before, demand side cost sharing is also expected to reduce a part of the low value medical care caused by information asymmetry. The other way around, it can be reasoned that supply side incentives can also reduce a

portion of the low value medical care caused by the price effect, since patients are dependent on the treatments of the health care provider. If a health care provider argues that an (ineffective) treatment is not useful, it can reduces at least a portion of the low value medical care consumption caused by the price effect. Whereas demand side cost sharing provides patients indirect guidance to the 'best' treatment, supply side incentives also can guide patients to this best option.

To summarize, demand side cost sharing is expected to reduce a portion of the low value medical care illustrated in figure 11. It is expected to affect mainly the choice of medical care consumption. Supply side incentives to reduce low value medical care mainly affect the health care process. The extent to which the consumption of low-value medical care is attributable to individuals themselves, demand side cost sharing is expected to be useful to reduce low value medical care consumption. On the other hand, the extent to which the consumption of low-value medical care is attributable to information asymmetry between health care providers and patients, supply side incentives are expected to be useful to reduce this medical care of low value. Nevertheless, demand side cost sharing is expected to be able to reduce also a portion of the low value medical care caused by information asymmetry. The other way around, supply side incentives are expected to reduce a portion of the low value medical care consumption caused by the price effect. Again, the portions are not yet known, the ellipses depicted in figure 11 are conceptual.

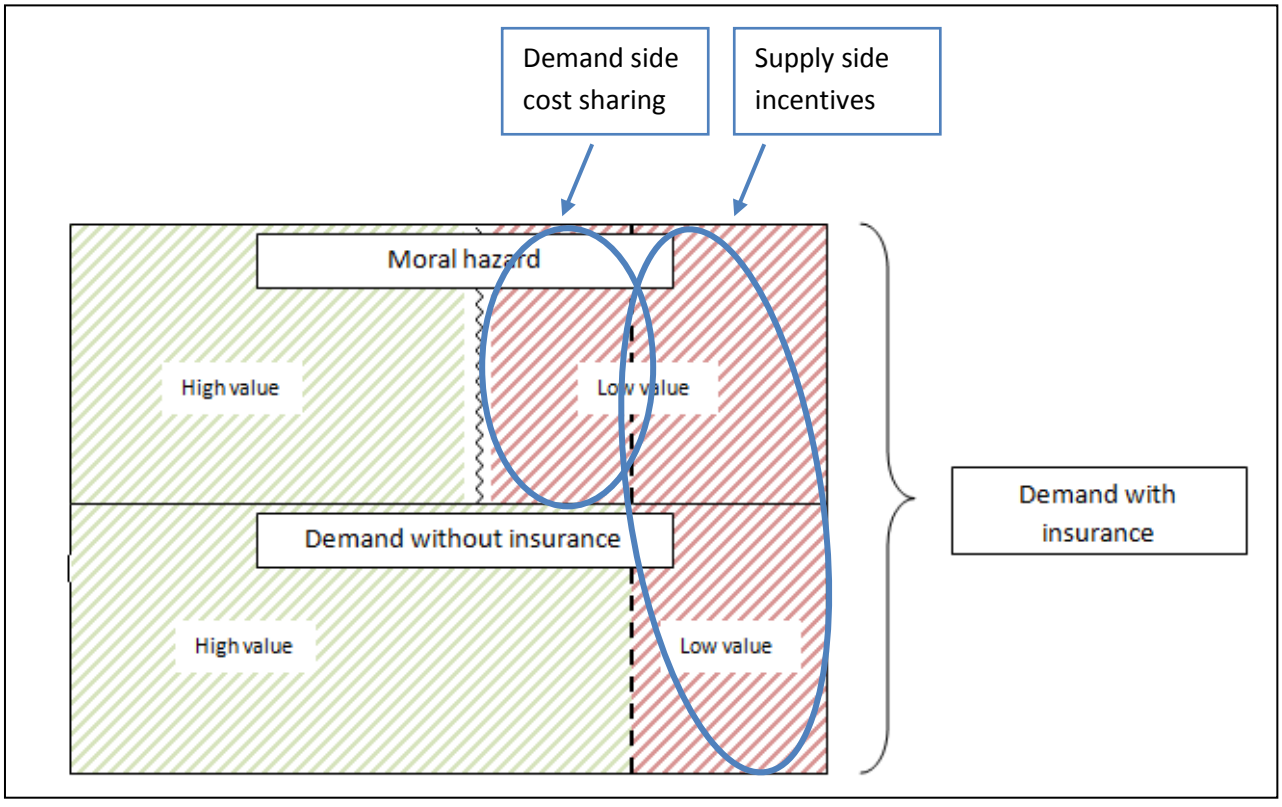

Figure 11: Low value medical care targeted by demand side cost sharing and supply side incentives

5.4 Conclusion

To conclude, this chapter describes a cost sharing design, which is only targeted on undesired moral hazard, and simultaneously let desired moral hazard unaffected or even encourages this type of moral hazard. In chapter 5.1 it is indicated that cost sharing should not be uniform, but should vary depending on the accessibility, necessity and efficiency of medical care services. Cost sharing should successively vary based on income, necessity of a medical care service and the value in terms of effects and cost for specific indication areas (VBID). In addition cost sharing should not count for the most cost-effective treatment of all available treatments for a certain health problem, since people often are not able to determine which treatment is most cost-effective. Full coverage for the most cost-effective treatment solves the problem of insufficient medical knowledge.

However, the information required for such cost sharing design raises questions regarding the feasibility of such cost sharing design. Furthermore, the possible explanation of the occurrence of undesired moral hazard determines the way in which undesired moral hazard best can be reduced. The first possible explanation, the price effect, indicates that it makes sense to apply demand side cost sharing. In the second explanation in which information asymmetry between health care provider and patients causes consumption of low value medical care, both in a situation with and without health insurance, suggests supply side incentives to be useful in the reduction of low value medical care consumption. In the third situation in which the consumption of low value medical care is explained by a combination of the price effect and information asymmetry, a combination of demand side cost sharing and supply side incentives is expected to best reduce low value medical consumption. The extent in which both instruments should be implemented depends on the size of both of these problems, which is not yet known.

6. Cost sharing in the Netherlands

After a cost sharing design targeted on undesired moral hazard, the feasibility of this cost sharing design and the expected effect on the reduction of undesired moral hazard and low value medical care are described in chapter 5, this chapter will take a closer look on the cost sharing design applied in the Netherlands. In chapter 6.1 the cost sharing design used in the Netherlands is described together with the extent to which it corresponds to the cost sharing design as discussed in chapter 5.1. Subsequently, recommendations to improve the cost sharing design in a way that it is only targeted at the undesired moral hazard and low value medical care, and the conclusion of this chapter are discussed respectively in chapter 6.2 and 6.3.

6.1 Description cost sharing design

The Netherlands implemented a mandatory deductible. A deductible requires consumers to pay the first part, a fixed amount per time period, of the consumed medical care themselves before the insurance company proceeds to reimbursement. This fixed amount is defined as the deductible. When the health care expenditures within such time period exceed the deductible or if it is prior very likely that a person will exceed the deductible, there is no longer an incentive to reduce moral hazard. The amount is determined annually by the Dutch Government and is set on 350 euros for the year 2013 (Art. 7 paragraph 1 Zvw; Rijksoverheid 2013). The mandatory deductible does not apply to certain types of medical care; GP visits, obstetric and maternity care, national screening programs, influenza vaccinations and medical care covered by supplementary health insurance (Salland 2013).

In the Netherlands the GP has a gatekeeping role, which can reduce the use of unnecessary expensive medical care and low value medical care, not applying the deductible to GP visits is therefore indicated to be positive. In addition, not applying cost sharing for national screening programs, such as breast cancer screening, can prevent future costs. It could be questioned why there is no incentive to reduce low value medical care that is covered by supplementary health insurance. It is indicated that the most necessary, appropriate and efficient medical care services are covered by the basic health insurance. From this viewpoint it seems especially important to incorporate incentives to reduce undesired moral hazard and low value resulting from supplementary health insurance.

Besides the mandatory deductible, insured have the option to choose a voluntary deductible for which they receive a discount on the premium for the basic insurance in return. The reduction depends on the chosen amount of voluntary deductible. Furthermore, there is compensation for the mandatory deductible for people with high health care costs. In the

Netherlands there is a special organization that determines whether someone is eligible for this compensation. The compensation is a fixed amount (99 euro in 2013), which is not indicated to reduce the consumption of low value medical care since the compensation is not differentiated by the necessity or efficiency of medical care consumption. A second compensation is the so-called health care allowance, which compensates out-of-pocket expenditures related to health care in general, including the insurance premium, and is income-based. In this way the cost sharing design in the Netherlands tries to account for affordability of medical care. However, more and more people need to make payment arrangements with their health insurance company since they cannot pay their out-of-pocket expenditures. Positive are the plans to make the mandatory deductible income-based (Rijksoverheid 2013).

For the consumption of selected medical services, besides the mandatory deductible, there is a mandatory out-of-pocket payment (in 2013 for maternity care, medical devices and transport related to medical care consumption). With consumption of these selected services, patients first need to pay the mandatory out-of-pocket payment and subsequently the mandatory deductible. In the case of maternity care the amount of out-of-pocket expenditures depends on the medical necessity, whereby the out-of-pocket costs are not charged in case of medical necessity. It could be questioned whether the out-of-pocket payment charged for medical devices is desired, since one could reason that some devices e.g. wheelchairs and adjustments in- and around a house, could be desired from societal perspective. These adjustments can lead to more self-reliance, which in turn prevents health care costs of for example home care.

In addition, for all medical services that require a mandatory out-of-pocket payment, a maximum amount of reimbursement is set (after payment of the out-of-pocket costs and deductible(s)), expenditures exceeding this maximized reimbursement are charged to the patient. This affects the affordability of medical care negatively, assuming that also health care providers affect the health care process. Some supplementary insurance schemes reimburse (a part of the) out-of-pocket expenditures for these selected medical services. The amount of out-of-pocket payment is uniform. However low-income patients who need to pay these out-of-pocket expenditures again could use health care allowance. It is remarkable that the lower out-of-pocket costs are charged for short stay (less than six months) in a so-called AWBZ institution (e.g. a nursing home), whereas higher out-of-pocket costs are charged after six months. This is contrary to the recommendation described in chapter 5 to vary cost sharing by necessity. It is suggested that a longer stay is medically more necessary compared to a short stay.

A relatively new instrument for insurance companies to stimulate patients to choose for the most effective health care provider is selective contracting. This mechanism gives

insurance companies the opportunity to ask a lower deductible or even no deductible for consumption of medical care at a selected provider. Health insurance companies, however, do not regularly use this mechanism. Selective contracts with certain health care providers, however, give insurance companies the opportunity to make specific appointments regarding the cost and quality of offered medical care. Currently, no other ways to differentiate cost sharing based on efficiency are observed in the Netherlands.

In sum, the cost sharing design applied in the Netherland tries to account for the affordability of medical care consumption using health care allowance. Differentiated cost sharing based on necessity and efficiency are rarely applied.

6.2 Recommendations for improvement

As concluded in the previous paragraph, there is room for improvement of the cost sharing design applied in the Netherlands regarding the differentiation of cost sharing based on the accessibility, efficiency and necessity of medical care. Recommendations of improvement are discussed below.

It is recommended to implement the plan of an income-based deductible. In addition, the cost sharing design in the Netherlands makes room for the differentiation of cost sharing based on the efficiency of health care providers in terms of selective contracting of health insurance companies with certain health care providers. Aside from little being used, it does not differ cost sharing on the efficiency of a particular treatment. Cost-effectiveness studies assess the efficiency of a certain treatment in terms of cost and value. Cost sharing could differ by the results of these assessments, but as described in chapter 5, the feasibility of such differentiation is indicated to be low. Furthermore the cost sharing design targeted on undesired moral hazard indicates that it can be useful to apply no cost sharing for the most effective treatment within one disease area. This is even suggested to reduce health care cost, since it can prevent high expenditures in the future.

In addition, cost sharing differentiation based on the necessity of medical care is only found for out-of-pocket payments of maternity care. While it is suggested that individuals staying in an AWBZ institution with less medical necessity seem to pay less out-of-pocket for this medical care. This is inconsistent with the indication that cost sharing should be lower for medical care with higher necessity. It is therefore recommended to have a closer look at the possibilities to differentiate cost sharing on the necessity of medical care in the Netherlands. In addition, incentives to reduce medical care consumptions in general are only implemented for those services covered by the basic insurance. It could be questioned why there are no

incentives for the medical services covered by the supplementary insurance, since these medical services are expected to be both less medical necessary and less efficient.
As suggested in chapter five of this study, the portion of low value medical care consumption reduced by applying cost sharing targeted at undesired moral hazard depends on the explanation of the occurrence of undesired moral hazard. It could therefore not be stated that the absence of cost sharing for the medical services covered by supplementary health insurance is by definition incorrect. Nevertheless, if information asymmetry would be an explanation of the occurrence of low value medical care consumption, it could be useful to implement both supply side incentives for the services covered by basic and supplementary health insurance. In the Netherlands it is suggested that the most obvious way to do this is by encouraging health insurance companies to conclude agreements with selective health care providers. First of all, the possibility to use this instrument of selective contracting already exists. Secondly, health insurance companies do have insight in the cost, treatments provided and quality of the health provider.

To summarize, it is recommended to have a closer look at the possibilities to differentiate cost sharing by necessity and efficiency of medical care. In addition, cost sharing is indicated to be especially important for the supplementary health insurance since the medical service covered with this insurance are indicated to be less necessary and efficient. A first step in the reduction of low value medical care by implementing supply side incentives is the increase of selective contracting.

6.3 Conclusion

The cost sharing design applied in the Netherlands tries to account for the affordability of medical care. However, more and more people need to make payment arrangements with their health insurance company. Positive are the plans to make the mandatory deductible income-based. Differentiated cost sharing based on necessity and efficiency are rarely applied and could be improved. A first step could be the introduction of cost sharing for supplementary health insurance by the government, since the medical care services coved by this insurance are expected to be less necessary and less efficient, compared to services covered by basic insurance. Positive is that the deductible does not apply to GP visits, since a GP has a gatekeeping role, which can reduce the use of unnecessary expensive medical care and low value medical care. In addition national screening programs are not subject to cost sharing, which can lead to detection of diseases in an early stage. A first step in the improvement of the cost sharing design applied in the Netherlands could be the increase of provider incentives.

7. Conclusion

The conclusion of this study is structured based on the different sub questions in order to eventually answer the central research question. Four sub questions are defined. The first sub question is as follows; what is the relationship between health insurance and the demand for medical care? The answer to this sub question is divided into a theoretical and empirical part. The most well known theoretical model is Grossman's model of health production. Central in Grossman's model is the assumption that health can be viewed as a durable capital stock, which decreases with age and can be raised by investment. Following Grossman's model, the demand for medical care is derived from the demand for health itself and a person's health state. The investment in health capital is a consideration of the consumer between investment in health capital and investment in other goods. Furthermore the model suggests that individuals pursuit utility maximization. The essence of the Grossman model is that insured can buy more medical care, compared to a situation in which they would have no insurance. This will lead to a new equilibrium that provides the consumer a higher utility, which was not faceable without insurance.

The increase in medical care consumption due to health insurance is confirmed by empirical findings. The most widely accepted study is the RAND-experiment, which is regarded as the basis for the most reliable estimates of price sensitivity of demand for medical services. The RAND-experiment found varying price elasticity for different types of medical care. The effect of cost sharing on the reduction of the consumption of medical care is expected to be somewhat stronger for acute and preventive medical care, compared to chronic care. In addition, cost sharing appeared to have an effect on the number of episodes, whereas cost sharing did not affect the intensity of care within these episodes of illness.

A literature review is performed in order to answer the second sub question, what can be defined as undesired and desired moral hazard. Also, in answering this sub question, a distinction has been made between theoretical and empirical findings that resulted from the literature review. The literature review yielded two major theoretical trends on the desirability of moral hazard. The first one, the conventional theory, considers all moral hazard to be undesired, it assumes that insured value these additional medical care less than its cost. The conventional theory however did not take into account the income transfer caused by health insurance and an individual's ability to pay. The theory of demand introduced by John Nyman argues that some of the moral hazard considered undesired under the conventional theory, must be reclassified as desired moral hazard. The portion desired moral hazard increases with the amount of moral hazard, which in turn increases with the price elasticity of demand for medical care. Also the suggestion that insured value the risk reduction more than they

value the cost of a health insurance premium indicates that people value health insurance more than thought under the conventional theory.

The literature review of empirical findings concerning the desirability of moral hazard has yielded three overarching dimensions, which determine whether moral hazard is desired or undesired. The three overarching dimensions are accessibility, necessity and efficiency. Empirical evidence suggests that with the introduction of cost sharing, aimed to reduce moral hazard, the acceptability and affordability of health care decreased most for the vulnerable groups. Besides the ability to pay, empirical findings indicate that the consumption of necessary, unnecessary, efficient and inefficient medical care reduces with introduction of cost sharing. Desired moral hazard therefore can be defined as: medical care consumption that is efficient in terms of cost and value and medical necessity, which from a societal perspective, should be accessible for everyone. One can speak of undesired moral hazard if it does not meet the definition of desired moral hazard.

An answer to the third sub question, how can cost sharing in theory be targeted on undesired moral hazard (and not on desired moral hazard), is derived from the definitions of desired and undesired moral hazard and the desirability of the consequences found in the empirical findings of sub question two. Cost sharing should focus only on undesired moral hazard, and encourages desired moral hazard. Accordingly, cost sharing should not be uniform, but should vary for medical services depending on the accessibility, necessity and efficiency of that medical care. The introduction of such cost sharing design differentiated on all three dimensions requires many administrative adjustments, which indicates that the feasibility in the short term is low.

Furthermore, the possible explanation of the occurrence of undesired moral hazard determines the way in which undesired moral hazard best can be reduced. The first possible explanation, the price effect, indicates that it makes sense to apply demand side cost sharing targeted on undesired moral hazard. The second explanation in which information asymmetry between health care provider and patients causes consumption of low value medical care, both in a situation with and without health insurance, suggests supply side incentives to be useful in the reduction of low value medical care consumption. In the third situation in which the consumption of low value medical care is explained by a combination of the price effect and information asymmetry, a combination of demand side cost sharing targeted at undesired moral hazard and supply side incentives is expected to best reduce low value medical consumption. The extent in which both instruments should be implemented depends on the size of both of these problems, which is not yet known.

The fourth sub question is: to what extent does cost sharing in the Netherlands take into account the difference between desired and undesired moral hazard. The cost sharing design applied in the Netherlands tries to account for the affordability of medical care.

However, more and more people need to make payment arrangements with their health insurance company. Positive are the plans to make the mandatory deductible income-based. Differentiated cost sharing based on necessity and efficiency is rarely applied. It is therefore recommended to have a closer look at the possibilities to differentiate cost sharing by necessity and efficiency of medical care. In addition, cost sharing is indicated to be especially important for the supplementary health insurance since the medical service covered with this insurance are indicated to be less necessary and efficient. A first step in the improvement of the cost sharing design applied in the Netherlands could be the increase of provider incentives.

The central research question is as follows; what distinguishes desired moral hazard from undesired moral hazard and to what extent is this taken into account in the cost sharing design applied in the Netherlands? The literature review yielded three overarching dimensions, which determine whether moral hazard is desired or undesired: accessibility, necessity and efficiency of medical care. Desired moral hazard therefore can be defined as: medical care consumption that is efficient in terms of cost and value and medical necessity, which from a societal perspective should be accessible for everyone. One can speak of undesired moral hazard if it does not meet the definition of desired moral hazard. Accordingly, cost sharing should vary for medical services depending on the accessibility, necessity and efficiency of that medical care.

The cost sharing design applied in the Netherlands tries to account for the affordability of medical care. However, more and more people need to make payment arrangements with their health insurance company. It is therefore recommended to implement the plans to make the deductible income-based. Differentiated cost sharing based on necessity and efficiency is rarely applied and could be improved. However, it can be questioned if demand side cost sharing is the best way to reduce undesired moral hazard. There are different possible explanations for the occurrence of undesired moral hazard, which determines the way in which undesired moral hazard best can be reduced. Further research into the cause of undesired moral hazard may reveal whether it is more useful to improve demand side cost sharing or to increase provider incentives.

8. Discussion

The literature review on the definition and distinction of undesired and desired moral hazard in order to be able to answer the second sub question yielded two major theoretical trends on the desirability of moral hazard. Pauly (1990), one of the founders of the conventional theory argues that the theory was intended to apply only to 'routine physician's visits, prescriptions and dental care. It can be questioned if this theory would even apply for these kind of medical services. First of all, the description of ''routine physician's visits'' and ''prescriptions'' is vague. The first one could be interpreted as frequent visits to a physician for example for checking your blood pressure. It, however, can be argued that these kinds of visits can be seen as a type of prevention that can save later health care expenditures. Prescriptions could be interpreted in a way of drugs prescriptions or prescriptions of healthy behavior. Nevertheless, also this type of medical care can be desirable. It is therefore indicated that the conventional theory does not hold for any type of medical care at all.

The second, and more convincing, theory regarding the desirability of moral hazard found during the literature review is the theory of demand. Nyman, the founder of this second theory, argues that ambiguity around the desirability of moral hazard due to the payoff mechanism consists. As described in chapter three of this study, reimbursement after medical care is consumed, makes it impossible to determine whether this moral hazard is desired or not. Nyman (2003) and Nyman and Maude-Griffin (2001) describe two hypothetical situations in which they show that a portion of moral hazard is desired. The size of this desired moral hazard, however, is not known yet. A way, in which the desirability of moral hazard can be examined in practice, is by handing people money prior to potential medical care consumption and to look if they really would spend this money on medical care or if they choose to spend the money on something else. In the Netherlands a so-called 'personal budget' is introduced for patients who are expected to need medical care for at least one year. A designated institution determines whether a patient is eligible for such an indication.

Patients who receive this indication get a certain amount of money depending on their health state for which they can choose the medical care they need themselves. This money can only be spent on medical care. The medical expenditures need to be justified by the patient (Rijksoverheid 2013). An idea for a natural experiment on the desirability of moral hazard would be that patients with such indication could choose to spend the money they receive on anything they like. Since, the amount of money these patients receive depends on their expected medical care demand, one could expect that they would spend it on medical care. However, if they choose to spend this additional income on something else than

medical care, one could reason that they value the consumption of this medical care less than its cost and this could therefore be assigned as undesired moral hazard.

The most well known theoretical model regarding the relationship between health insurance and the demand for medical care in general is the Grossman model. When the distinction between desired and undesired moral hazard would be considered from this model, one could reason that people will always pursuit utility maximization. Nevertheless, the marginal utility obtained from an increase in health state will be diminishing. Suggested that the value of medical care consumption is related to the utility and cost of this medical care, the higher someone's health state, the less utility increase will be obtained from extra medical care consumption. This would confirm that cost sharing should depend on the efficiency of medical care in relation to the health state of an individual. This is in line with the differentiation of cost sharing based on necessity described in this study.

Different empirical results regarding the relationship between health insurance and the demand for medical care and the desirability of the consequences of cost sharing are found during the literature review. Methodological problems, which should be taken into account by the selection of empirical findings, are discussed in the method of this study. These potential methodological problems are considered by the selection of the different studies. However none of these studies are definitive. Bias is possible, but argued by Hadley (2003): '' it is very unlikely that all research is potential biased, given that they used varying data and research designs. In addition, it is expected that bias would lead to finding no difference in health between insured and uninsured patients''

Regarding the cost sharing design applied in the Netherlands, cost sharing could be improved regarding the differentiation based on accessibility, efficiency and necessity of medical care. It is most remarkable that for AWBZ indications a lower medical necessity is correlated to lower cost sharing, whereas from the view of the cost sharing design described in this study it should be the other way around. In addition, supplementary health insurance is, besides some insurance schemes that ask for a contribution for certain medical care, in general not subject to cost sharing. In the Netherlands a political procedure determines whether certain medical services will be covered by the basic insurance, which is mandatory for every resident of the Netherlands. The medical services are, inter alia, assessed based on the appropriateness, effectiveness and necessity. Health insurance companies can then decide to cover other services in their supplementary health insurance schemes. Each insurance company decides themselves which services will be covered by the supplementary insurance. It therefore could be reasoned that these medical services are less efficient, necessary and appropriate. So what is the reason that insured that decided to buy supplementary health insurance are by definition not subject to cost sharing?

Examples of medical care services covered by supplementary insurance schemes in 2013 in the Netherlands are sterilization, circumcision and alternative treatments (NPCF 2013). The degree to which and whether medical care is covered depends on the health insurance company and which supplementary insurance scheme is chosen. Nevertheless, to reduce low value medical care, the cost sharing design targeted exclusively on undesired moral hazard indicates that these kinds of medical services should be subject to cost sharing. Furthermore, it is recommended for the Netherlands to apply more selective contracting between health insurance companies and health care providers. These kinds of contracts do not implicitly affect the efficiency of particular treatments, but only the efficiency of health care providers in general. However, health insurance companies in the Netherlands nowadays monitor the quality of health care providers in which they also look at the treatments used for particular diseases. However it may not be the best way to reduce inefficient treatments taking into account different indication areas like recommended by the VBID, it is a good way to start.

Finally, further research into the cause of undesired moral hazard is needed in order to determine whether demand side cost sharing is the best way to reduce undesired moral hazard. The explanation of the existence of undesired moral hazard can offer starting points for insurance companies and the government to determine how the healthcare system can best be improved.

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