

A dissertation on

Economic Problems of Health Insurance – Reforms and Competition

by

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To Sophia and Jonathan

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List of Abbreviations

BMI	Body-Mass-Index
CDHC	Consumer-Directed Health Care
CDHP	Consumer-Directed Health Plan
CHD	Coronary Heart Disease
CMS	Centers for Medicare and Medicaid Services
GAO	Government Accountability Office
GSOEP	German Socio-Economic Panel
HDHP	High Deductible Health Plan
HSA	Health Savings Account
HRA	Health Reimbursement Arrangement
IRS	Internal Revenue Service
MCO	Managed Care Organization
RAND HIE	RAND Health Insurance Experiment
PHI	Private Health Insurance
PPACA	Patient Protection and Affordable Care Act
SGB	Sozialgesetzbuch (Code of Social Law)
SHI	Statutory Health Insurance
SuppHI	Supplemental Health Insurance

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1 General Introduction

Although most modern societies agree that everyone should receive adequate access to medical treatment, health care systems worldwide vary greatly in terms of financing of health care costs, the provision of medical services, and regulatory aspects (Böckmann, 2009; p. 10). Rising costs, economic downturns, and the demographic development have embraced the call for change particularly with regard to financing of health care costs and access to health insurance.

Most health care systems have developed historically, but underwent fundamental changes as a consequence of policy decisions and reforms over the last decades. In Germany, for instance, reforms predominantly aimed at fostering efficiency by means of market-based instruments in a public health care system with a high level of cross subsidization between individuals. In the U.S., a diverging trend can be observed: With the *Patient Protection and Affordable Care Act* of 2010, affordable and universal health insurance coverage has been introduced to a previously predominantly competitive, expensive, and highly fragmented health care system. Even though these two health care systems differ in its origin and alignment, health reforms typically occur in the conflict field of social aspects and economic arguments (i.e. competition).

This thesis aims to draw a comprehensive picture of economic problems of health insurance and, thereby, assesses economic goals and analyzes effects of recent health reforms in the two historically grown very different health insurance systems of Germany and the U.S. More specifically, three research questions will be addressed: First, looking at the demand for supplemental health insurance (SuppHI) in the aftermath of benefit reductions in German Statutory Health Insurance (SHI), it investigates what factors drive the demand for SuppHI and what are possible sources of selection. Furthermore, this thesis offers new insights on what the two health insurance systems

can learn and take over from each other. In this context, it discusses how new trends in health insurance in the U.S. (i.e. Health Savings Accounts (HSAs)) could be implemented in German SHI. The third focus of this thesis is on the mutual interdependence of public and private health insurance markets. Analyzing financial data of private health insurers in the U.S., it looks into the question of how premiums in Private Health Insurance (PHI) are affected by public health insurance programs (i.e. Medicaid).

The following section of this chapter first briefly discusses economic problems of health insurance. Furthermore, it gives an overview on the German and U.S. health care system, identifies potential shortcomings, and summarizes major reform proposals that have been implemented over the last two decades. It therefore helps to understand recent health policy developments in a broad economic context.

1.1 Economic Problems of Health Insurance

When analyzing economic problems of health insurance, it is important to consider that, unlike other markets, the health care market contains some special characteristics: Health care services can be classified as public goods and their consumption can cause external effects. Furthermore, the health care market contains many distortions and lacks essential characteristics of a perfect market (i.e. market transparency, perfect competition, and consumer sovereignty) due to incomplete and asymmetric information (Breyer *et al.*, 2005). Thus, free market forces with regard to a price and quality competition can foster efficiency to a limited extent only in the health care market.

In the context of health insurance, incomplete and asymmetric information exist on both: The individual's inherited risk type at the point of signing an insurance contract and changes of its risk type over time. This lack and/or asymmetry of information can

result in market adjustments or government interventions aiming to redistribute rents or to correct market failures.

In a competitive health insurance market, the insured pays premiums equal to his expected losses in the market equilibrium according to the principle of individual equivalence. However, it is regarded as an unfair financial burden, if higher health care costs are the result of inborn disadvantages or deteriorations of health through no fault of his own. Based on the concept of Harsanyi (1955) and Rawls (1971) that individuals operate from behind a veil of ignorance, a financial redistribution between high risk and low risk types to level out unequal start-off chances would be viewed as fair. Individuals would then have to agree to participate in this arrangement at a point of time when they do not know yet about their actual health state (Breyer *et al.*, 2005).

With regard to the risk of deteriorating health (i.e. a change from a low risk to a high risk type) two market economy solutions to insure this premium risk have been discussed in economics literature: Guaranteed renewable contracts (Pauly *et al.*, 1995) and premium insurance (Cochrane, 1995). In the concept of guaranteed renewable contracts, individuals pay a prepayment to insure the risk of becoming a high risk in exchange for the health insurer's commitment to provide a guaranteed premium. Cochrane's approach to insure premium risk is to offer a separate insurance contract, which pays out an indemnity to individuals in case their health state worsens. A third alternative to insure premium risk relies on governmental intervention in regulating insurance premiums through community rating. This regulatory approach implies pooling contracts and mandatory insurance for individuals in combination with the insurers' obligation to contract. In addition, in order to avoid risk selection, a risk adjustment scheme must be employed to level out differences in the insurers' risk structure if individuals have the freedom to choose a health insurer (Breyer *et al.*, 2005; Kifmann, 2002).

Although interfering with individual preferences and limiting freedom of choice, community rating is a means to ex-ante redistribute premium differences between low risk and high risk types. Furthermore, this type of governmental intervention provokes coverage for high risk types the private market deems uninsurable or for whom private coverage is unaffordable.

Theoretical research has long emphasized the potential importance of asymmetric information, which has been most commonly studied in the context of principal-agent problems (e.g., Jensen and Meckling, 1976). The two concepts of adverse selection and moral hazard are well recognized, as both have their underlying cause in asymmetric information.

Adverse selection describes a situation where an individual's demand for insurance is correlated with the individual's risk type. If the price for insurance is uniform and does not vary according to the risk type, high risks will buy more insurance as the risk type is unobservable and the individual has better information about it. Consequently, expected losses on average will increase and the insurance will raise the premium. Higher prices will cause low risk types to opt out of insurance, which can worsen the adverse selection problem even more and may lead to complete failure of the insurance market. Adverse selection has been discussed repeatedly in the economics literature (Pauly, 1974; Rothschild and Stiglitz, 1976; Wilson, 1977), but depending on the line of coverage and the dataset, evidence of adverse selection has been mixed.

While adverse selection is caused by hidden information, the concept of moral hazard refers to hidden actions. In general, moral hazard occurs if an individual's behavior or motive to prevent or limit a loss is altered due to insurance protection (Shavell, 1979). Two types of moral hazard can be distinguished. One refers to the behavioral change before the event of a loss or also known as ex-ante moral hazard. In this case,

the insured has no incentive to invest into loss prevention, as it only reduces his income but has no direct effect on his utility when the insurance cannot observe his effort. Partial insurance contracts are usually a second best solution for ex-ante moral hazard as they reduce the cost of insurance and set an incentive to invest into effort, thus, directly reducing the loss probability (see Pauly, 1974; Shavell, 1979). In contrast, ex-post moral hazard describes a behavioral change after the event of a loss. In this case, the insured has no incentive to try to reduce the size of the loss as costs are borne by the insurance. Once again, deductible contracts are a second best solution for ex-post moral hazard to set the incentive to minimize costs. Moral hazard has been analyzed in various insurance settings. In the context of health insurance, the RAND Health Insurance Experiment (RAND HIE) is deemed the most influential study of moral hazard. In this experimental study, individuals were randomly assigned to different coverage levels. The study finds evidence that changing from universal coverage to insurance plans with deductibles and/or copayments significantly reduces demand for medical care (Manning *et al.*, 1987). In the French health insurance market, evidence for moral hazard can be found as well; for individuals who experienced an increased deductible the number of general practitioner home visits significantly decreased (Chiappori *et al.*, 1998).

1.2 The German Health Insurance System and Reforms

Germany has a dual health insurance system, with a market-based PHI and a SHI. About 90% of the German population is insured in SHI while the remaining 10% are covered through private health insurers. Whether individuals are privately or statutory insured depends on their income: Individuals with an income above the threshold for compulsory insurance are eligible to opt out of SHI and switch into PHI, where they must undergo a risk assessment and pay risk-based insurance premiums. Benefits in PHI are subject to

bilateral contracts between the insurance company and the insured, and therefore, vary a lot due to the exclusion of pre-existing conditions or benefit eliminations in favor of premium reductions. In contrast, coverage in SHI is almost uniform and offered through highly regulated SHI funds, which are public health insurance entities. Private health insurers in Germany are profit-seeking stock companies or mutual insurance companies in a capital cover system characterized by risk based premiums and individual equivalence. That means insured pay (theoretically) constant premiums including high aging reserves at the beginning of the contract period, which are invested at the equity market and yield interest, hence to suffice increased health expenditures in the future. In context of the approaches described above to cover premium risk, contracts in PHI can be classified as guaranteed renewable contracts with a prepayment (i.e. ageing reserves).

The German SHI shows resemblances with the historical model of social health insurance and follows the regulatory approach of community rating with pooling contracts, mandatory insurance for individuals, and the insurers' obligation to contract. It is based on an unfunded pay-as-you-go system and follows the principle of solidarity, as insured pay contributions according to their economic capacity (i.e. income-related premiums up to the contribution assessment ceiling and which the employer subsidizes by almost 50%) and receive medical services to the extent they need. This financing is characterized by interpersonal and intergenerational reallocation and subsidization, as redistribution is taking place from the healthy to the sick, high incomes to low incomes, younger to older individuals, and unmarried individuals to families as insurance for dependents and spouses without significant income is free of charge (Simon, 2009). However, the dual system of health insurance is criticized to imply a considerable degree of adverse selection against SHI, as risk-related premiums in PHI set the incentive for healthy and high-income individuals to seek coverage in PHI (Greß, 2007). Meanwhile,

insured with more dependents benefit from free coverage for non-working spouses and children in SHI. Several studies analyzed the insurance structure and risk profiles of insured in the public and private health insurance system in Germany. They find evidence that enrollees in PHI are on average healthier, have higher incomes, and have fewer dependents than insured in SHI (see e.g., Kriwy and Mielck, 2006; Mielck and Helmert, 2006; Dräther, 2006).

The German health care system has seen a variety of reforms over the last decades. Until 1992, health reforms can be summed up to the overall strategy of cost containment, which predominantly aimed at keeping contribution rates stable. Foremost, with the introduction of the *Health Care Structure Reform Act* of 1993 ("*Gesundheitsstrukturgesetz*") market-based management instruments have spread into many areas of the health care sector. It initiated far-reaching structural reforms, e.g. it opened SHI funds to all insured independent of their profession and place of residence and gave the insured freedom of choice of a SHI fund while sickness funds remain subject to the obligation to contract. Starting in 1994, a risk-structure compensation scheme has been introduced to eliminate competitive disadvantages of health insurance funds that had an unfavorable risk structure.

The two subsequent health reforms of 2003 and 2007 focused in particular at designing a sustainable financing and fostering competition, meanwhile, keeping cost increases moderate. Expanding competitive patterns in the health care market aim to greater efficiency, ensure a high quality of care, and grant individuals' decision-making power.

The introduction of the *Health Care Modernization Act* of 2003 ("*GKV-Modernisierungsgesetz*") modernized the supply structures of the German health care system, while the transformation of individual co-payments and benefit exclusions (e.g.

for non-prescription drugs, vision aids, and dentures services) reduced spending and/or increased cost sharing.

The *SHI Competition Re-enforcement Act of 2007* (“*GKV-Wettbewerbsstärkungsgesetz*”) primarily pursued the goal to strengthen competition in SHI. For this purpose, a health fund and uniform contribution rates were introduced to SHI in 2009. Furthermore, SHI funds are allowed to differ in optional benefits and offer a broader variety of tariffs with the introduction of Flexible Health Plans (“*Wahltarife*”). Simultaneously, the existing risk structure compensation scheme has been extended by the compensation of morbidity characteristics, thereby reducing incentives for risk selection.

While the latter reform points predominantly intensified competition between SHI funds, new regulations affecting PHI have been introduced in order to stimulate competition between SHI and PHI. Since 2009, private health insurers are obliged to offer a basic tariff with equivalent scope of benefits of SHI, while premiums may not be calculated equivalent to risk. Furthermore, the portability of aging reserves (in the amount of the basic tariff) when exchanging the private insurer is intended to foster competition among private health insurers. However, it must be noted that recent health reforms have only induced an assimilation of the two systems, but the dichotomy between SHI and PHI with its different financing, access, and supply of medical services remain a major challenge in the German health care system.

1.3 The U.S. Health Insurance System and Reforms

The U.S. health care system is characterized by its fragmentation and many included stakeholders. Various market components are competitive and there is a belief among parts of the society that the protection against health risks is left to the individual’s deci-

sion and not duty of the government. Health insurance is provided by several different private and public entities. Most individuals are privately insured through their employer, while individuals who do not have access to employer-sponsored health insurance can obtain private coverage individually through direct purchase (DeNavas-Walt *et al.*, 2011; Kaiser, 2014). Public programs insure health risks of the elderly through the social insurance program Medicare while the needy can receive care through the means-tested program Medicaid. Publicly provided universal coverage has not been available until 2014, leaving almost 46 million U.S. citizens uninsured (DeNavas-Walt *et al.*, 2011).

Many companies offer health insurance to their employees as a voluntary benefit. In absence of collective labor agreements, employees could not claim it. Due to rising health insurance costs, especially small employers (3-199 employees) reduced offering health coverage in recent years (Kaiser, 2014). Employer-sponsored health insurance has been criticized to be inefficient because of its fiscal promotion (Feldstein, 1973; Pauly and Goodman, 1995). Opponents argue that it leads to distortions in the demand for health insurance and the financing of medical services. At the same time, it is considered unfair regarding accessibility, because it is only available for individuals who worked for employers that arrange such coverage. The strong dependence of health insurance coverage and employment lead to another weakness: workers and their families lost their health insurance coverage when they changed or lost their jobs. The *Health Insurance Portability and Accountability Act* of 1996 eliminated at least the latter issue through the portability of health insurance coverage and further obliged health insurance companies to cover pre-existing conditions.

Contract design in PHI has greatly changed in recent decades. Fee-for-service used to be the most widespread compensation scheme, where services are unbundled and paid for separately, thus, lacking the incentive to minimize costs. Spurred by the

enactment of the *Health Maintenance Organization Act* of 1973, managed care arrangements have become the most common coverage option in PHI throughout the 1980s. Managed care is an approach to delivering and financing health care through one entity that is aimed at both improving the quality of care and saving costs. However, managed care has experienced an erosion of trust (much discussed as managed care backlash) in the later part of the 1990s. It was criticized for limiting consumer choice and not achieving its overall goal of controlling medical costs.

Passed by the *Medicare Prescription Drug, Improvement, and Modernization Act* in 2004, consumer-directed health care (CDHC) received a boost due to new regulations and constitutes a new trend in PHI. It allows members to use a tax-exempt HSAs, Health Reimbursement Arrangement (HRAs), or similar medical payment products to pay routine health care expenses directly, while a High-Deductible Health Plan (HDHP) protects them from catastrophic medical expenses. Supporters particularly emphasize the potential of HSAs to induce an economical consumption of medical care and thus, reduce overall health care costs. Customers choose consciously adequate medical treatment and also influence physicians to provide health care in a more efficient way. CDHPs are seen by proponents as a way to make health care more affordable and expand access to health insurance in the U.S. (see e.g., Bunce, 2001; Schwartz, 2001). Critics fear that HSAs will induce selection effects such that primarily healthy individuals with a high income will select CDHC (see e.g., Remler and Glied, 2005; Hoffman and Tolbert, 2006). Despite these concerns, HSAs are fostered by the individual insurance mandate from the latest reform and thus, are expected to further increase demand for CDHC.

Although the U.S. looks back on a long history of health reforms, structural changes have rarely been accomplished. Foremost, the *Patient Protection and Affordable Care Act* of 2010 can be regarded as a landmark reform. It provides a comprehensive

system of mandated health insurance. U.S. citizens and legal residents are now required to have qualifying health coverage; otherwise, they have to pay a penalty tax. The same regulation affects employers with 50 or more full-time employees, as they are now required to offer health insurance to their workforce. In order to expand access to health insurance, state-based American Health Benefit Exchanges are created through which individuals can purchase coverage, with premium and cost-sharing credits available to individuals/families with income between 133-400% of the federal poverty level. Furthermore, separate Exchanges through which small businesses can purchase coverage are created (Department of Health & Human Services, 2015). Finally, extending the Medicaid program by raising access to individuals with income up to 133% of the federal poverty level can be seen as the core measure to cope with the high number of uninsured.

1.4 Overview

Looking back on recent health reforms in the U.S. and Germany two divergent trends can be observed: Over the last two decades, German SHI primarily experienced benefit cuts and had to implement economic incentives and market-based instruments to a solidary-based social security model in order to overall contain costs. At the same time, recent health reforms in the U.S. have shown that a solely market-based health insurance system is hardly consistent with modern society's ideas on fairness and distributive justice. Furthermore, the exclusion of large parts of the population from seeking health insurance as a result of high premiums is not only associated with high costs and negative effects (even for those holding insurance coverage), but overall seen as highly inefficient.

In the subsequent chapters of this thesis, individual aspects of recent health reforms both in Germany and in the U.S. will be discussed and/or empirically analyzed.

Chapter 2 addresses the effects of the *Health Care Modernization Act* of 2004 in the context of SuppHI in Germany. Benefit cuts for dental care and higher co-payments increased the demand to complement or substitute existing health insurance options. The chapter empirically assesses the selection effects and determinants of the demand for SuppHI that covers hospital and dental benefits. Using data from the German Socio-Economic Panel (GSOEP), the study does not only consider the individuals' risk attitude, their demand for medical services, and insurance purchases in other lines of insurance besides rich demographic and socioeconomic information. Furthermore, it uses doctor-diagnosed illnesses to assess the individual's health status, and thus, does not have to rely on self-reported health-status measures as usually used in previous studies.

Chapter 3 discusses suitable ways to implement HSAs in German SHI following the legislation of the *SHI Competition Re-enforcement Act* of 2007, which provided German SHI funds with the possibility to offer Flexible Health Plans (§ 53 Social Security Code V). The chapter explains the design of HSAs from a technical and economical point of view, and reviews experiences from the U.S. and other countries. Furthermore, it examines a detailed approach to implement HSAs to SHI that is consistent with the existent health insurance system while it places a special focus on implementation details.

Chapter 4 analyzes the interdependence of the PHI market and the public Medicaid program in the U.S. As the extension of the Medicaid program is viewed as one of the core measures of the *Patient Protection and Affordable Care Act* of 2010, it will affect Medicaid itself and also have a far-reaching impact on the financing of health care costs in the U.S. overall. The chapter evaluates how the price for health insurance cov-

erage in the PHI market relates to the design and extent of government provided health insurance and thus, addresses cost shifting issues related to uncompensated care. To this end, by looking at firm level data from the National Association of Insurance Commissioners (NAIC), the analysis assesses how coverage in public state health programs relates to premiums in comprehensive business of private health insurers. Unlike previous studies, it takes the different institutional setups and the insurers' participation into account as the federal-state Medicaid program significantly differs from state to state. Furthermore, important state demographics as well as features of the health care market are controlled for.

This thesis ends with a general summary of the results and concluding remarks in Chapter 5.

2 Supplemental Health Insurance in Germany – Improving Quality of Care and Closing Coverage Gaps¹

2.1 Introduction

There is a common trend in countries with public health care systems to incrementally reduce benefits as a consequence of high and steadily rising health care costs. The decision to complement public coverage is left to the individuals, depending on their financial ability, their preferences, and farsightedness with respect to future health risks. Supplemental health insurance (SuppHI) contracts are highly relevant in regulated health care systems with standardized statutory coverage and restricted choice of health-care providers and services as in Germany, France, Belgium, the Netherlands or the U.S. (e.g., McCall *et al.*, 1986; Saliba and Ventelou, 2007; Van de Ven and Schut, 2008; Schokkaert *et al.*, 2010; Simon, 2013).

In Germany, 17.55 million policies of supplemental coverage were in place in 2012 among the 69.71 million individuals insured under public coverage. Premiums written accounted for 19.73% of the overall private market for health and long-term care insurance (Association of German Private Healthcare Insurers, 2012). Given the significance of SuppHI, this paper analyzes the main determinants of demand and investigates whether the market suffers from adverse selection using data from German Socio-Economic Panel (GSOEP).

The market for SuppHI has been in the focus of previous work, particularly with respect to potential adverse selection issues. Marquis and Phelps (1987) investigate the potential impact of adverse selection issues on the demand for SuppHI in the RAND HIE. The authors find that health characteristics are an important driver for whether individ-

¹ This paper is a single authored manuscript by the candidate and yet unpublished. The author wants to thank several persons for their insightful comments during academic seminars: members of the Faculty of Business, Economics, and Social Sciences - particularly the colleagues from the Institute of Health Care & Public Management - at the University of Hohenheim and at the Institute of Risk Management and Insurance of LMU Munich.

uals choose SuppHI from a hypothetical and retrospective point of view. Woolfe and Goddeeris (1991), Browne and Doeringhaus (1994) and Ettner (1997) find mild evidence for adverse selection in Medicare SuppHI (Medigap) while Dardanoni and Li Donni (2012) find evidence of adverse and advantageous selection. Fang *et al.* (2008) find that seniors with Medigap coverage have significantly lower health expenditures. When they control for health condition, they do, however, find evidence of adverse selection. As Medigap insurance purchasers are per definition older than 65 years, the discussed findings may be specific to the age group. Several studies investigate the demand for SuppHI with a focus on different age groups (see Cohen and Siegelman, 2010). Schokkaert *et al.* (2010) also find weak evidence for adverse selection in the Belgian market for SuppHI, while Saliba and Ventelou (2007) find no evidence that health risk considerations affect the decision to purchase SuppHI in France.

With regard to the German market for SuppHI, Christoph (2003) finds evidence that the demand for SuppHI increases with the individuals' self-assessed health. However, he does not distinguish between different lines of coverage. Vargas and Elhewaihi (2008) analyze German SuppHI in the context of moral hazard and identify a positive correlation between the likelihood of holding SuppHI and the number of doctor visits. Yet, reverse causality may be suspected. Kapfer (2008) investigates supplemental hospital benefits using the GSOEP data for 2002 and 2004. She finds evidence for risk selection in the SuppHI market. Schmitz (2011) analyzes GSOEP data from 2002 and finds evidence for advantageous selection, indicating that healthy individuals are more likely to buy supplemental hospital insurance due to higher risk aversion. In contrast to these studies, we divide our dataset into two age groups, consisting of individuals of age 65 and younger and individuals above 65 as we suspect different effects for the age groups. Different preferences among these age groups may offer one possible explanation for the mixed findings with respect to adverse selection in previous studies.

Adverse selection has been discussed repeatedly in the economics literature (e.g., Pauly, 1974; Rothschild and Stiglitz, 1976; Wilson, 1977). A widespread approach to test for adverse selection is to examine the correlation between the chosen insurance contract and the occurrence or severity of losses (Abbring *et al.*, 2003). However, from an empirical point of view, it is difficult to disentangle adverse selection (higher risks chose more generous coverage) from moral hazard (more extensive coverage may increase health expenditures), as the causality relationship between cost and coverage can be reverse (e.g., Chiappori and Salanié, 2000; Gardiol *et al.*, 2011). Finkelstein and McGarry (2006) note that adverse selection effects can be overshadowed by individual preferences such as wealth, risk attitude, and insurance preferences and, therefore, suggest that adverse selection may be much more widespread than empirical studies have been able to prove. Not surprisingly, evidence of adverse selection has been mixed depending on the line of coverage and the dataset.

When investigating health insurance specifically, many studies overcome the problem of unobserved preferences and moral hazard by simultaneously estimating the demand and the utilization of health services (e.g., Holly *et al.*, 1998; Vera-Hernández, 1999; Schellhorn, 2001; Nuscheler and Knaus, 2002; Werblow and Felder, 2003; Schokkaert *et al.*, 2010). Other studies use the individuals' self-assessed health status to test for adverse selection (e.g., Browne, 1992; Christoph, 2003). Having access to a very rich dataset, we are able to circumvent the above-mentioned problem of disentangling adverse selection and moral hazard. Besides the earlier available demographic and socio-economic information, since 2009, GSOEP includes data on chronic diseases diagnosed by a doctor. Linking the 2009 diagnosis with the 2008 insurance and socio-economic information, we do not have to deal with potential measurement errors, usually intrinsic to self-reported health variables. In addition, we are able to control for a variety of fac-

tors that are suspected to impact insurance demand and possibly overshadow adverse selection effects such as risk attitude, income, and insurance affinity.

To preview our main findings, we find evidence for adverse selection for individuals aged 65 and younger: less healthy individuals are more likely to buy hospital SuppHI. For seniors, we see the reverse effect; namely, that healthier individuals are more likely to hold hospital SuppHI. We attribute this to a decline in private information on health status over one's lifetime as argued by Peter *et al.* (2014). We focus on two lines of SuppHI: hospital and dental coverage. As premiums differ substantially between the two lines and individuals may have different motives when seeking supplemental dental or hospital coverage. We find that insurance affinity, measured by the switching behavior in SHI and the demand for life insurance, positively affects the demand of SuppHI. Finally, income positively affects the demand for both types of SuppHI.

The remainder of this paper is structured as follows. In the Section 2.2 we give a short overview of the institutional background and the role of SuppHI in Germany. Section 2.3 presents the hypotheses. A description of the data and methodology follows in Section 2.4. We then present and discuss the results from our empirical analysis (Section 2.5) and validate the robustness of our results in Section 2.6. The final section concludes the paper (Section 2.7).

2.2 Institutional Background and Supplemental Health Insurance in Germany

In Germany, nearly 90% of the population is insured under the public SHI with a highly uniform and regulated coverage. Non-profit sickness funds provide coverage and enrollees can freely choose their health insurance provider. Premiums are basically uniform for all sickness funds and are not risk-based but income-related with average contribution rates of about 14% on gross income for 2008. Only about 10% of the German popu-

lation is insured under PHI as individuals only become eligible for private insurance, if their income is above a threshold or they are self-employed. These individuals have the choice to opt out of SHI and obtain private coverage or remain under SHI. Coverage in PHI is less strictly regulated and subject to individual underwriting, and therefore, it is especially attractive to healthy and high-income individuals.

Over the last two decades, several cost-containment policies restricting coverage in SHI have resulted in increased out-of-pocket expenses (i.e., the 2004 health care reform has significantly cut benefits for dental care and increased co-payments for prescribed drugs). This contributed to the rise in demand for SuppHI. The Association of German Private Healthcare Insurers (2010) reported 20.98 million SuppHI policies in 2008. 73.36% were bought by insured under SHI. This equals a proportion of 21.92% of insured under SHI holding additional private health insurance coverage.

In Germany, SuppHI contracts are sold by the private insurance industry. There are four major types: hospital benefits, dental benefits, prescription drugs and adjuvants, and health insurance when travelling abroad. Supplemental hospital benefits cover semi-private or private rooms instead of a public ward and treatments by more senior physicians (i.e. the chief physician). It mostly aims at improving the quality of care during hospitalization. Dental coverage predominantly closes the coverage gap of SHI benefits and further includes higher quality services like better fillings etc. Therefore, it can be regarded as a hybrid between quality aspects and reducing out-of-pocket expenses. Prescription and adjuvant plans main purpose is to reduce out-of-pocket expenses, whereas SuppHI when travelling abroad covers costs of treatments and return transport from overseas (outside the European Union).

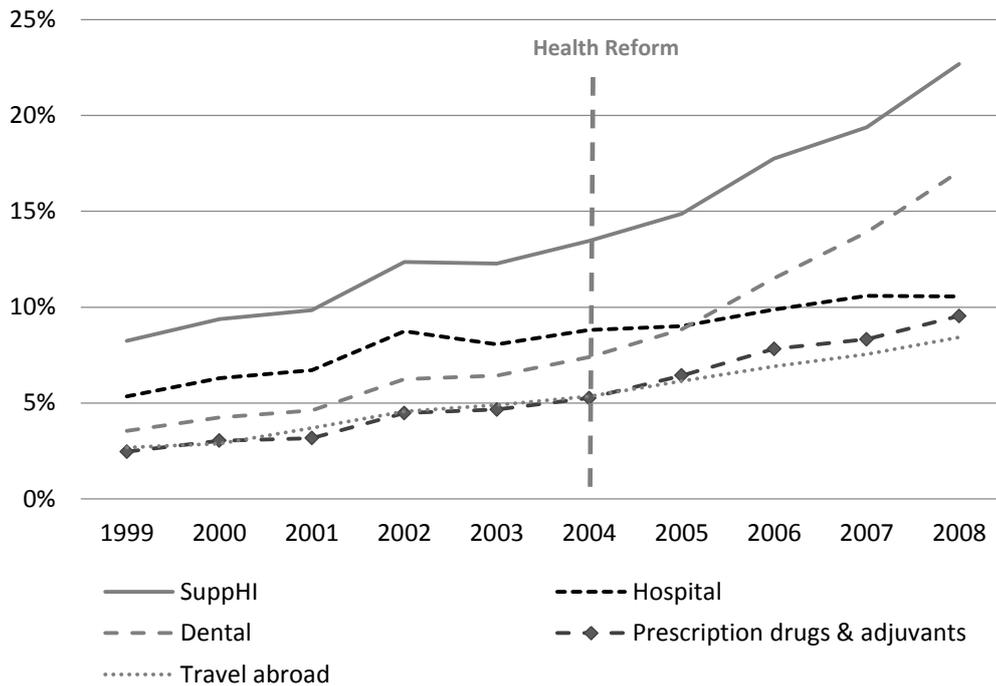
We focus on supplemental hospital and supplemental dental insurance for the following reasons: First, these types of SuppHI constitute the two lines of business with the highest demand in the German market. Second, motives for the purchase of SuppHI

may differ. Supplemental hospital insurance mainly focuses on quality aspects. It enhances the publicly provided insurance as it covers semi-private or private rooms, and treatments by more senior physicians. Supplemental dental coverage focuses in particular on protecting against a financial risk, which arises from coverage gaps in SHI benefits, but also includes higher quality services like better fillings. Therefore, it can be regarded as a hybrid between quality aspects and reducing out-of-pocket expenses. Part of our contribution is to compare a quality- and a financially oriented line of SuppHI and discuss similarities and differences in one paper.

SuppHI contracts are underwritten on an individual basis and are guaranteed renewable (see Pauly *et al.*, 1995). Individual underwriting is most rigorous for hospital benefits using the same standards as private comprehensive health plans. Premiums in the market are therefore risk-based and insurance companies can deny applicants based on pre-existing health conditions. Dental SuppHI also utilize risk-based underwriting, but in less detail.

Based on data from the GSOEP, Figure 2.1 illustrates the demand for SuppHI of insured under SHI in percent overall and by line of business between 1999 and 2008. In 1999, only 8.24% of individuals insured under SHI had SuppHI, whereas by 2008 about 22.68% held additional health insurance coverage. SuppHI for hospital benefits rose rather constantly over time as measured by the portion of publicly insured. The demand for the other three lines of business rose substantially. This is especially the case for supplemental dental insurance after the health reform of 2004, which increased by 231% between 2004 and 2008 (from 7.39% to 17.07%).

Figure 2.1: Share of SHI Enrollees with SuppHI, 1999–2008



Notes: The percentage of SuppHI is not the sum of the percentages in the different lines of business because individuals can hold multiple supplemental health benefits under SuppHI insurance.
Source: SOEP v25.

2.3 Hypotheses

In this section, we first briefly outline the theoretical foundation for our hypotheses before we state our detailed hypotheses. Based on the existing literature, this section also provides a discussion of the control variables.

Adverse Selection

Adverse selection is one of the most commonly discussed insurance market imperfections and may lead an inefficient market outcome, as low-risk policyholders may be rationed (Rothschild and Stiglitz, 1976). We restrict our analysis of adverse selection to hospital SuppHI, as there are no indicators of dental health in the GSOEP data. Adverse selection models à la Rothschild and Stiglitz (1976) suggest that individuals with poorer

health are more interested in purchasing supplemental hospital benefits as well as renewing their existing plans as they are more likely to consume medical services. At the same time, insurance companies underwrite risks individually trying to overcome potential issues of adverse selection.

An individual's health state can impact the demand for SuppHI in two ways according to the theory of adverse selection: Individuals with chronic diseases may be expected to more likely initiate getting coverage and also to renew their policies (Cohen and Siegelman, 2010) which are guaranteed renewable in Germany. Our dataset allows us conclusions about the aggregate effect. However, the data set does not provide detailed information to disentangle these two sources of adverse selection.

Several arguments can be considered, which potentially explain the mixed evidence on the existence of adverse selection in SuppHI. One reason is varying underwriting standards and contract characteristics in different countries, which naturally influence the existence and magnitude of potential adverse selection issues. Another argument are measurement errors: Self-reported health state as utilized by Kapfer (2008) is often critiqued for including several biases. Individuals vary in their perception or may have different reference points when they are asked to judge their health. Following Bolhaar *et al.* (2012), we use an indicator variable to estimate the individual's health state using the doctor diagnosed sicknesses: asthma, cancer, coronary heart disease (CHD), dementia, depression, diabetes, high blood pressure, and migraines (see Schokkaert *et al.*, 2010). We supposedly have relatively comparable information on individuals' risk type as German private insurers gain from medical underwriting with respect to sickness information and previous hospital stays. A simple t-test shows that the likelihood of hospital stays and number of hospital nights are statistically significantly greater at the 1% level for individuals with one of the above-mentioned sicknesses. This implies that individuals with one or more of these diagnoses can be expected to cause higher

expected hospital costs. At the same time, we do not expect a significant moral hazard problem with respect to hospital SuppHI as these diseases are usually diagnosed by primary care doctors. Furthermore, the reliability of our health variable compared to self-reported measures is unlikely affected by e.g. socio-economic status as all observed individuals are insured under German SHI.²

In our analysis, we test whether the observed health state in 2009 measured by doctor-diagnosed illnesses has an impact on holding SuppHI in 2008. Given the chronic nature of most of the diseases included in our sample, it is likely that a significant number of the individuals identified as chronically ill in 2009 were already sick in 2008. The sick variable is also likely to capture individuals with private information on their future health state, i.e. that they may come down with one of these illnesses in the following year.

Using medical service utilization may also be delicate to bias due to moral hazard. Accordingly, we do not construct a bivariate model in order to test for adverse selection using individuals' number of hospital stays, days hospitalized, and doctor visits but we utilize our constructed indicator variable. This circumvents the problem of having to disentangle adverse selection effects from (ex-post) moral hazard, see e.g. Dardanoni and Li Donni (2012). Kapfer (2008) uses a bivariate adverse selection model and does not find evidence for adverse selection in the German market for SuppHI. Furthermore, Cohen (2005) argues that differing findings of the cost-coverage relationship among different subgroups in the sample rather imply hidden information than hidden action. This supports our adverse selection hypothesis as we find different results regarding adverse selection based on age group.

² Crossley and Kennedy (2002) find that the reliability of self-assessed health status is strongly related to other observable variables such as age, income, and occupation.

Furthermore, adverse selection effects may be overshadowed by individual preferences implying advantageous selection (see Finkelstein and McGarry, 2006). We are able to control for a range of individual preferences which have been suspected to potentially cause advantageous selection such as risk attitude, individual's financial situation, and the propensity to purchase insurance (Cohen and Siegelman, 2010).

We add to the arguments the hypothesis that adverse selection only exist for younger individuals. Peter *et al.* (2014) argue that private information on the health state resolves as most illnesses materialize over time, i.e. towards retirement age and older. Fang *et al.* (2008) even find evidence that retired individuals in the U.S. with SuppHI (Medigap) have significantly lower health expenditures than individuals without SuppHI. Accordingly, we separately investigate retired and non-retired individuals. Summing up, we propose the adverse selection hypothesis as follows:

Hypothesis 1: *Supplemental hospital insurance suffers from adverse selection for individuals younger 65 years.*

Affinity to Insurance

Several studies show that some individuals have a higher propensity to insure than others after controlling for demographic and socio-economic factors (e.g., Pourat *et al.*, 2000; Saliba and Ventelou, 2007; Schokkaert *et al.*, 2010). We use the person's observed effective demand for life insurance and whether an individual has switched her SHI in the previous year to create dichotomous variables we subsume under the heading insurance affinity. Both measures indicate whether an individual has acquainted herself with the concept of insurance and will therefore be considered to have an insurance affinity. The variable Change of SHI Provider indicates whether an individual has switched to another SHI fund in the previous period. Changing the SHI fund involves

decisions concerning insurance, financial, and quality aspects and therefore implies that the insured consciously made a decision for a specific sickness fund. Previous studies using GSOEP data (e.g., Christoph, 2003; Kapfer, 2008) find a positive impact of whether an individual has switched her sickness fund in the last year on the likelihood of holding supplemental health insurance. Yet, holding life insurance has not been included in their analyses, which we add to our analysis.

In this context, we further include the individuals' self-assessed risk attitude to disentangle insurance affinity from varying risk attitudes among individuals. Theoretically, it is assumed that the individual's demand for insurance increases with the degree of risk aversion. Hence, a more risk averse individual is more likely to purchase insurance and spend more on insurance (Dionne and Eeckhoudt, 1985; Briys and Schlesinger, 1990). In order to control for changes in the individual's risk attitude resulting of a change in wealth, we control for the interaction of risk attitude and adjusted household income in our regressions. Thus, we propose the insurance affinity hypothesis as follows:

Hypothesis 2: *Insurance affinity increases the demand for supplemental hospital and dental benefits.*

Income

Several studies have investigated the impact of income on the demand for SuppHI in different countries. Garfinkel *et al.* (1987) investigate the demand for SuppHI under Medigap in the U.S. They find that higher income individuals are more likely to have insurance coverage. Borrell *et al.* (2001) investigate the demand for SuppHI in Spain which offers a higher quality of care (reduced waiting times and elective surgeries). They find that higher social class is an indicator. The study of Schokkaert *et al.* (2010) on Belgian supplemental hospital insurance indicates a strong impact of individuals' socio-

economic background. Saliba and Ventelou (2007) also find a strong and significant effect of income on the decision to purchase SuppHI in France. Vargas and Elhewaihi (2008) investigate GSOEP data and find that higher income is positively correlated with holding SuppHI in Germany. Their cross-sectional probit model, however, indicates that income is only significant on the 10% level. Furthermore, they do not account for different types of SuppHI, which vary from health insurance for travel, which costs a couple of Euros per year to hospital SuppHI which can amount to € 50-70 per month. Accordingly, motives for seeking different kinds of coverage can be suspected to vary widely. In our analysis, we use the logarithmic adjusted household income definition from the GSOEP dataset. We later test the robustness of results by using per capita income.

Our study provides insights from the demand for SuppHI for lines that are more quality oriented as well as aiming at closing coverage gaps in the same country. This is particularly interesting as we assume that income should have a differing impact on these lines. We hypothesize that income generally has a positive impact on the demand for SuppHI, as sufficient funds must be available in order to afford SuppHI. At the same time, a higher income also enables the individual to cover possible out-of-pocket expenses more easily from the ongoing financial situation. Accordingly, we hypothesize that the income effect should be lower for dental SuppHI than for hospital SuppHI as the first one is more affordable and mostly aims at closing coverage gaps.

Although, dental procedure expenses can easily reach high levels, dental SuppHI covers the gap in SHI benefits for reasonable insurance premiums affordable to the majority of the German population. In contrast, supplemental hospital insurance mostly aims at improving the quality of hospital services offered to the individual. As the latter coverage is the significantly more expensive, we believe that income is even more important in this line of insurance. The following hypothesis summarizes the discussion:

Hypothesis 3: *Higher income increases the demand for SuppHI. We see a stronger impact of income for hospital insurance than for dental coverage.*

In addition to our three main hypotheses, we also control for several characteristics which have been repeatedly discussed in the literature. The likelihood of demand for SuppHI relates to several demographic factors such as gender (Schokkaert *et al.*, 2010), age (Browne and Doeringhaus, 1994), household size (Ettner, 1997), education (Dardanoni and Li Donni, 2012), occupational status and regional differences (Saliba and Ventolou, 2007). In addition, we include data on the type of SHI (Kapfer, 2008) and control for the individual's physical constitution using the body-mass-index (BMI) (Schokkaert *et al.*, 2010). Furthermore, our dataset includes information on self-reported risk attitude, which we also incorporate in our model. We use this variable in our analysis instead of proxy variables for risk attitude such as smoking, as Dohmen *et al.* (2011) prove the validity of the self-reported measure. This variable is of particular relevance to the study of adverse selection as individual preferences can overshadow adverse selection effects as discussed by Finkelstein and McGarry (2006). Oftentimes, researchers do not have information on risk attitude available, particularly if they use data from an insurance company such as Browne (1992).

2.4 Data and Methodology

In our analysis, we use GSOEP data, which is a representative, longitudinal panel survey of private households in Germany containing around 12,000 households with approximately 21,000 individuals. The survey has been conducted on a yearly basis since 1984. Besides demographic and socio-economic variables, the dataset includes various health

indicators, data on life satisfaction, and information on health insurance (Wagner *et al.*, 2007).

Individuals insured under German SHI are asked whether they have additional private health insurance and which benefits are covered i.e. hospital, dental and/or other additional coverage. This constitutes our two binary coded dependent variables, indicating whether an individual holds hospital or dental SuppHI or not.

For our analysis, we use the 2008 wave of the GSOEP. It contains the most recent available data on SuppHI, which we can merge with information on doctor-diagnosed sicknesses in the following year. The complete sample covers 19,664 observations. We drop individuals who report to either be civil servants and self-employed as these individuals mostly insure themselves under private health insurance. Furthermore, we clean the data of individuals who unofficially work within the family as their health insurance status is unclear. In addition, we drop additional 1,486 individuals who report not to be insured under SHI. We lose another 1,437 individuals when we merge the 2009 sickness data into the 2008 dataset. As a last step, we clean the data of missing values for the controls. We then divide the dataset into two subsets: A first dataset only including individuals of age 65 and younger (9,804 observations) and a second dataset with individuals older than 65 (3,030 observations). We do this for the following two reasons: As explained above, we hypothesize that private information on health state diminishes with age. In addition, we measure insurance affinity with a variable whether an individual holds life insurance. As there are rigid age limits imposed in the German market for life insurance excluding the majority of seniors from initiating or continuing coverage, we suspect that holding life insurance will not be a powerful predictor for insurance affinity for seniors.

The exogenous regressors contain a set of control variables as gender, age, income, occupational status and group, education, household size, and state of residence.

Insurance status differs with regard to whether the insured is a compulsory or a voluntarily member, family insured (i.e. non-working spouse or child) or other member (i.e. unemployed or retiree) of the SHI. We also control for whether an individual has switched her SHI fund in the previous period, which indicates the individual's willingness to design their health insurance.

In 2009, questions on chronic diseases diagnosed by a doctor were included in GSOEP for the first time. Therefore, we merge the 2009 sickness data into our 2008 dataset. Because of the chronic nature of these diseases, it is straightforward to assume that almost all individuals who reported one of the diseases in 2009 have already been at least partially affected in the previous wave, and therefore had information that would influence their demand for SuppHI.

We create a sickness indicator variable, which equals one if an individual has one or more of the following diseases: asthma, cancer, CHD, diabetes, hypertension, migraines, dementia, and depressions. Table 2.1 displays the mean of the several chronic conditions in our sample. Overall, 32.47% of the individuals (non-retirees) in our sample are sick according to our indicator variable.

Previous studies on the demand for SuppHI and adverse selection in health insurance had to rely on self-reported health state measures or on data from the SF-12 questionnaire, which generates a quality of life measures including questions on physical and emotional well-being, energy and fatigue and is frequently used in studies including health state. Following a similar approach of Schokkaert *et al.* (2010) for Belgian data, we use the GSOEP data including actual sickness indicators. Using these indicators, we are able to find evidence for adverse selection.

Table 2.1: Summary Statistics of Chronic Diseases in 2009

Variable	Individuals Age ≤ 65 (N=9,804)		Individuals Age > 65 (N=3,030)	
	Mean	Std. Dev.	Mean	Std. Dev.
Diabetes	0.0424	(0.2016)	0.1894	(0.3919)
Asthma	0.0473	(0.2123)	0.0587	(0.2352)
CHD	0.0417	(0.2000)	0.2627	(0.4402)
Cancer	0.0248	(0.1555)	0.0884	(0.2840)
Migraines	0.0576	(0.2331)	0.0320	(0.1761)
Hypertension	0.1752	(0.3802)	0.4719	(0.4993)
Dementia	0.0004	(0.0202)	0.0099	(0.0990)
Depression	0.0534	(0.2249)	0.0376	(0.1903)
<i>Sick in 2009</i>	0.3247	(0.4683)	0.6868	(0.4639)

Notes: Sick in 2009 is not the sum of the means of the different chronic diseases as individuals could be affected by more than one disease. Table 2.1 is based on GSOEP data from 2009. The percentages above are very similar to the stated percentages concerning the sickness structure of the Belgian population in Schokkaert *et al.* (2010).

The descriptive statistics of our sample, which consists of 9,804 observations, shows that 925 individuals (10.56%) held supplemental hospital insurance in 2008 (Table 2.2). Despite the fact of individual underwriting and the insurers' possibility to deny coverage due to pre-existing conditions, 307 of the individuals with hospital SuppHI are defined sick according to our indicator variable.

Table 2.2: Sick in 2009 and Supplemental Hospital Contracts, 2008

	Hospital SuppHI	No Hospital SuppHI	Total
Sick in 2009	307	2,876	3,183
Not Sick in 2009	618	6,003	6,621
Total	925	8,879	9,804

In addition to demographic, socio-economic variables (i.e. education, occupational status, and logarithmic adjusted household income), and data on health insurance status (i.e. compulsory, voluntarily, family or other insured), we consider individual factors, assessing i.e. the individuals' health and insurance affinity, as exogenous regressors in our model as explained in the previous section. To estimate the demand decision for supplemental hospital and dental coverage, we fit two independent probit equations for the dichotomous event of purchasing versus not purchasing supplemental hospital and dental coverage with respect to socio-demographic, economic, and individual factors, assessing i.e. their health and risk type, insurance affinity, and health. A general formulation of this model is:

$$P(\text{Hospital SuppHI}) = \alpha + \beta \cdot X_{ij} + \varepsilon_{ij} \quad \text{with } i=1, \dots, N \text{ and } j=1, \dots, M \quad (1)$$

$$P(\text{Dental SuppHI}) = \alpha + \beta \cdot X_{ij} + \varepsilon_{ij} \quad \text{with } i=1, \dots, N \text{ and } j=1, \dots, M \quad (2)$$

where N = sample size and M = # of variables.

Furthermore, we also run the Cohen-Siegelman test for adverse selection where we regress the existence of coverage on risk type including all relevant controls. Accordingly, we have the following equation:

$$P(\text{Sick2009}) = \theta + \vartheta \cdot \text{HospSuppHI} + \mu \cdot Y_{ij} + \gamma_{ij} \quad \text{with } i=1, \dots, N \text{ and } j=1, \dots, M \quad (3)$$

where N = sample size and M = # of variables.

Table 2.3 illustrates the summary statistics for all variables included in the two samples by age.

Table 2.3: Summary Statistics of Variables in the two Samples, 2008

Variables	Individuals Age ≤ 65		Individuals Age > 65	
	Mean	Std. Dev.	Mean	Std. Dev.
<i>Dependent variables</i>				
Hospital benefits	0.0943	(0.2923)	0.0967	(0.2956)
Dental benefits	0.1491	(0.3562)	0.0802	(0.2716)
<i>Variables of interest</i>				
Household income (log)	7.8438	(0.5484)	7.5400	(0.4906)
Sick in 2009	0.3247	(0.4683)	0.6868	(0.4639)
Life insurance	0.6106	(0.4876)	0.2215	(0.4153)
Change of SHI provider	0.0648	(0.2461)	0.0155	(0.1236)
<i>Control Variables</i>				
Male	0.4505	(0.4976)	0.4462	(0.4972)
Age	42.5363	(12.8756)	73.3112	(6.0025)
Age: younger than 25	0.1269	(0.3329)		
Age: 26-35	0.1780	(0.3825)		
Age: 36-45	0.2568	(0.4369)		
Age: 46-55	0.2500	(0.4330)		
Age: 56-65	0.1883	(0.3910)		
Age: 66-75			0.6894	(0.4628)
Age: 76-85			0.2686	(0.4433)
Age: Older than 85			0.0419	(0.2004)
BMI	25.8924	(4.7671)	27.1819	(4.1567)
Household size	2.8577	(1.2599)	1.8007	(0.6150)
Monthly net income	2934.84	(1662.06)	2137.95	(1265.10)
Risk attitude	4.5172	(2.2425)	3.8010	(2.3156)
Hospital stay in t-1	0.0937	(0.2915)	0.1825	(0.3863)
Self-ass. health: Very good	0.0968	(0.2957)	0.0168	(0.1287)
Self-ass. health: Good	0.4460	(0.4971)	0.2149	(0.4108)
Self-ass. health: Fair	0.3118	(0.4633)	0.4581	(0.4983)
Self-ass. health: Poor	0.1453	(0.3525)	0.3102	(0.4627)
Low level of school	0.3896	(0.4877)	0.7363	(0.4407)
Medium level of school	0.3740	(0.4839)	0.1515	(0.3586)
High level of school	0.2363	(0.4249)	0.1122	(0.3157)
Blue collar worker	0.2502	(0.4332)	0.0129	(0.1127)
White collar worker	0.4309	(0.4952)	0.0112	(0.1054)
Trainee	0.0860	(0.2804)	0.0003	(0.0182)
Unemployed	0.0793	(0.2701)	0.0013	(0.0363)
Retired	0.0725	(0.2594)	0.9601	(0.1958)
No job	0.0811	(0.2730)	0.0142	(0.1183)
SHI mandatory member	0.6340	(0.4817)	0.2139	(0.4101)
SHI voluntary member	0.0926	(0.2899)	0.0343	(0.1821)
SHI family member	0.1613	(0.3678)	0.0360	(0.1863)
SHI other member	0.1121	(0.3155)	0.7158	(0.4511)
Observations	9,804		3,030	

2.5 Results and Discussion

Table 2.4 shows the marginal effects and significance levels of the exogenous regressors on the demand for hospital and dental SuppHI for the full model (Model II and Model IV) for all individuals below the age of 65. In order to assess the robustness and to better identify the impact of the main drivers on the demand for SuppHI, we further estimate a reduced model (Model I and Model III) where we only include the variables gender, age, household income (log), and the individual's health status approximated by the indicator variable Sick in 2009. We are able to investigate our adverse selection hypothesis only for hospital benefits, because the GSOEP does not include any information on dental health. We test the hypothesis in two ways: we first follow Schockaert *et al.* (2010) and include the health indicator into the demand equation (Table 2.4). In a second step, we run the Cohen-Siegelman test for adverse selection where we regress coverage on the health indicator (Table 2.5).

In the reduced Model I for individuals aged 65 and younger, we find that the sickness indicator is statistically significant at the 5% level supporting the adverse selection hypothesis. The likelihood of SuppHI is higher for those who have a chronic illness. In the full model, the indicator Sick in 2009 is significant at the 10% level. We find only small deviations from the full model in terms of marginal effects for the sickness indicator in the hospital model. Having at least one of the above listed diseases, the likelihood for holding hospital SuppHI increases by 1.45% (vs. 1.18% in the full model) which indicates the existence of adverse selection for individuals age 65 and younger. The differences are not as high as in order to assume a severe robustness issue. As mentioned above, previous studies have examined the GSOEP dataset have come to the conclusion that there is no adverse selection in the demand for supplemental hospital insurance (see Kapfer, 2008).

Table 2.4: Probit Regressions on Hospital and Dental SuppHI for Individuals Age ≤ 65, 2008

	Pr(Hospital SuppHI)						Pr(Dental SuppHI)					
	Model I		Model II		Model III		Model III		Model IV		Model IV	
Variables of Interest												
Household income (log)	0.0738	***	(0.0054)	0.0634	***	(0.0118)	0.0772	***	(0.0070)	0.0696	***	(0.0154)
Sick in 2009	0.0145	**	(0.0064)	0.0118	*	(0.0061)	0.0139	*	(0.0081)	0.0107		(0.0078)
Life insurance				0.0316	***	(0.0056)				0.0632	***	(0.0072)
Change of SHI provider				0.0278	**	(0.0122)				0.0605	***	(0.0163)
Control Variables												
Male	-0.0093	*	(0.0055)	-0.0080		(0.0058)	-0.0262	***	(0.0071)	-0.0258	***	(0.0076)
Age: younger than 26	-0.0428	***	(0.0070)	-0.0396	***	(0.0088)	-0.0717	***	(0.0096)	-0.0535	***	(0.0130)
Age: 26-35	0.0195	**	(0.0089)	0.0018		(0.0080)	0.0285	***	(0.0115)	0.0054		(0.0107)
Age: 46-55	-0.0091		(0.0072)	-0.0131	*	(0.0068)	-0.0008	***	(0.0098)	-0.0110		(0.0094)
Age: 56-65	0.0043		(0.0084)	-0.0002		(0.0092)	0.0135	***	(0.0111)	0.0032		(0.0121)
BMI	-0.0020	***	(0.0006)	-0.0012	*	(0.0006)	-0.0008	***	(0.0008)	0.0002		(0.0008)
Household size				-0.0180	***	(0.0027)				-0.0324	***	(0.0037)
Risk attitude				-0.0048		(0.0177)				-0.0025		(0.0227)
Risk attitude*income				0.0006		(0.0022)				0.0005		(0.0029)
Hospital stay in t-1				0.0042		(0.0094)						
Low level of school				-0.0218	***	(0.0065)				-0.0346	***	(0.0084)
High level of school				0.0270	***	(0.0076)				0.0092		(0.0092)
Blue collar worker				-0.0097		(0.0072)				-0.0211	**	(0.0091)
Trainee				0.0141		(0.0162)				-0.0107		(0.0184)
Unemployed				-0.0076		(0.0138)				-0.0402	***	(0.0151)
Retired				-0.0028		(0.0140)				-0.0076		(0.0176)
No job				0.0100		(0.0125)				-0.0172		(0.0144)
SHI voluntary member				0.0104		(0.0090)				-0.0030		(0.0114)
SHI family member				-0.0114		(0.0089)				-0.0294	***	(0.0115)
SHI other member				-0.0085		(0.0116)				-0.0171		(0.0148)
Log Likelihood	-2,851.86		-2,758.02		-3,969.12		-3,814.03					

Notes: Standard deviations reported in parentheses. ***, **, * significance at the 1%, 5% and 10% levels. Reference groups: Age: 36-45, Medium level of school, White-collar worker, SHI compulsory member.

In contrast to previous studies, we split the data into two subgroups: Individuals of age 65 and younger and individuals older than 65. In addition, we use actual sickness data to estimate the individuals' health state³ while previous studies relied on previous hospital stays and self-reported health to estimate an individual's health state. We include hospital stays in the previous period in Model II and find no statistically significant impact. Model XI (Table A 1 in the Appendix) shows that using self-rated health state, as usually done in previous studies, shows no significant impact. Accordingly, this finding suggests that we have access to more detailed health-related data compared to existing previous studies.

Table 2.5 shows the coefficient estimates for the Cohen-Siegelman test for adverse selection. We find that having hospital SuppHI increase the likelihood of suffering from one of the above defined chronic conditions. This finding is significant on the 5% level and in line with our adverse selection hypothesis.

³ Actual sickness has been included in the GSOEP in 2009 for the first time. Data on self-reported health and medical service intensity have been available before.

Table 2.5: Cohen-Siegelman Test for Adverse Selection for Individuals Age ≤ 65, 2008

	Pr(Sick in 2009)	
<i>Variables of Interest</i>		
Hospital SuppHI	0.0989 **	(0.0481)
<i>Control Variables</i>		
Life insurance	0.0471	(0.0308)
Change of SHI provider	-0.0810	(0.0589)
Household income (log)	-0.1369 **	(0.0581)
Male	-0.1296 ***	(0.0312)
Age: younger than 25	-0.3878 ***	(0.0691)
Age: 26-35	-0.3172 ***	(0.0462)
Age: 46-55	0.3139 ***	(0.0387)
Age 56-65	0.4885 ***	(0.0474)
BMI	0.0495 ***	(0.0031)
Household size	-0.0342 **	(0.0144)
Risk attitude	0.0265	(0.0831)
Risk attitude *income	-0.0053	(0.0106)
Hospital stay in t-1	0.4033 ***	(0.0468)
Low level of school	0.0350	(0.0352)
High level of school	0.0502	(0.0391)
Blue collar worker	-0.1135 ***	(0.0395)
Trainee	-0.0367	(0.0793)
Unemployed	-0.0514	(0.0648)
Retired	0.2183 ***	(0.0695)
No job	-0.2463 ***	(0.0634)
SHI voluntary member	0.0756	(0.0505)
SHI family member	0.2404 ***	(0.0497)
SHI other member	0.0657	(0.0573)
Observations	9,804	
Log Likelihood	-5465.7915	

Notes: Standard deviations reported in parentheses. ***, **, * significance at the 1%, 5% and 10% levels. Reference groups: Age: 36-45, Medium level of school, White-collar worker, SHI compulsory member.

We subsequently investigate our insurance affinity hypothesis. Holding life insurance is highly significant in both lines of SuppHI and has a positive impact, implying that holding life insurance increases the demand for hospital and dental SuppHI, respectively. The marginal effect for hospital insurance is 3.16% and 6.32% for dental insurance, which is twice as large for dental SuppHI compared to hospital SuppHI. Our insurance affinity factor measures whether or not an individual has life insurance, which is a purely financial policy. It seems straightforward that it has higher explanatory power for dental SuppHI as this policy closes financial coverage gaps compared to the more quality oriented hospital SuppHI.

The insurance affinity hypothesis is further supported by the fact that having changed their SHI provider in the last period increases the likelihood of having both types of SuppHI. Individuals who change their sickness fund can be expected to have spent some effort in designing their health insurance according to their needs, which suggests that they have carefully exploited options to add on to the public coverage.

With respect to our income hypothesis, logarithmic household income has a positive and significant impact on the likelihood of holding hospital SuppHI as shown e.g. by Schokkaert *et al.* (2010) and Kapfer (2008). The marginal effect for a one unit increase of the logarithmic household income increases the likelihood of having hospital SuppHI by 7.38% in the reduced model and 6.34% in the full model. An increase from the median income of €3,000 to the 75% percentile (€3,850) increases the likelihood of having hospital SuppHI by 1.84% (Model I) or 1.58% (Model II) respectively.

Model III and IV illustrate how logarithmic household income affects the demand for dental SuppHI for individuals below 66. Marginal effects are equal to 7.72% and 6.96% in the full and the reduced model, respectively. We do not, however, find support for our hypothesis that income is a more important driver for quality oriented

hospital insurance compared to dental coverage that aims at closing out of pocket expenses in our dataset of individuals below 66.

With respect to the control variables, we see no statistically significant impact of gender for hospital benefits in the full model. In Model I, the likelihood of holding hospital SuppHI for men is slightly less and significant on the 10% level. This is comparable to Schokkaert *et al.* (2010) who also do not find a statistically significant impact of gender in their full model. With respect to dental benefits, there is a consistent statistical significance on the 1% level in both models that men are less likely to hold dental SuppHI. We find that younger individuals are statistically significant less likely to hold hospital and dental SuppHI which supports the findings of Kapfer (2008). The self-stated risk attitude is neither for hospital nor for dental SuppHI statistically significant.

A higher education level increases the likelihood of holding both types of SuppHI as shown by Ettner (1997)⁴ while the household size decreases the likelihood which is different to the Belgian study of Schokkaert *et al.* (2010). The BMI is statistically significant on the 10% level for hospital benefits; a higher BMI decreases the likelihood of holding SuppHI. All other control variables are not statistically significant for hospital benefits. For dental SuppHI, we see that the demand depends more on socio-economic factors such as occupational status and not primarily on income. We find that unemployed individuals and blue-collar workers are significantly less likely to hold dental SuppHI. In addition, family members, who do not have to pay any premiums in the SHI system, are less likely to have dental SuppHI.

⁴ These findings are in line with previous studies (see e.g., Berghman and Meerbergen, 2005; Kapfer, 2008; Vargas and Elhewaihi, 2008; Schokkaert *et al.*, 2010).

Table 2.6 displays the marginal effects for the demand for hospital SuppHI for individuals over 65 years of age. As before, we fit Model V with a reduced set of exogenous regressors and Model VI including all variables. We do not, however, estimate the demand for dental SuppHI for individuals over 65 years as dentures are by far the most common way of medical prosthesis.

Opposing the results for individuals younger than 66, the sickness indicator has a negative sign for seniors implying that sicker individuals are less likely to hold SuppHI. It is significant on the 10% level in Model V and on the 5% level in the full model (Model VI). We attribute this change of sign to the hypothesis that private information diminishes over the course of a lifetime. For seniors, it can be suspected that most potential conditions have already materialized and therefore, the individual underwriting of the insurers will pick them up. Accordingly, we do not find evidence of adverse selection for seniors. We rather confirm Kapfer's (2008) hypothesis of risk selection by the insurers. This finding is also confirmed by the Cohen-Siegelman test where the coefficient for holding hospital SuppHI is negative and significant on the 5% level (Table 2.7).

Among seniors, holding life insurance and the change of the SHI provider have less explanatory power to predict the demand for hospital SuppHI. The first result can be explained by the fact that the life insurance products in Germany are not offered to individuals exceeding certain age thresholds. The summary statistics show that individuals older than 65 are three times less likely to change their SHI provider. Table 2.6 still shows strong support for our income hypothesis. In addition, the likelihood of holding SuppHI decreases with household size as well as low level of schooling for individuals above 66 years of age.

Table 2.6: Probit Regressions on Hospital SuppHI for Individuals Age > 65, 2008

	Pr(Hospital SuppHI)					
	Model V			Model VI		
Variables of Interest						
Household income (log)	0.1166	***	(0.0102)	0.1079	***	(0.0164)
Sick2009	-0.0170	*	(0.0102)	-0.0179	**	(0.0090)
Life insurance				0.0211	*	(0.0108)
Change of sickness fund				-0.0224		(0.0262)
Control Variables						
Male	-0.0249	***	(0.0090)	-0.0233	***	(0.0082)
Age: 76-85	0.0011		(0.0105)	-0.0039	**	(0.0089)
Age: Older than 85	0.0361		(0.0276)	0.0219	*	(0.0223)
BMI	-0.0030	***	(0.0012)	-0.0007		(0.0010)
Household size				-0.0494	***	(0.0089)
Risk attitude				0.01309		(0.0238)
Risk attitude*income				-0.0010		(0.0031)
Hospital stay in t-1				0.01986	*	(0.0117)
Low level of school				-0.0791	***	(0.0154)
High level of school				0.0080		(0.0130)
Blue collar worker				0.1554		(0.1278)
Retired				0.03217	*	(0.0165)
No job				0.10207		(0.1103)
SHI voluntary member				0.01921		(0.0228)
SHI family member				-0.01771		(0.0169)
SHI other member				0.00242		(0.0099)
Observations	3,030			3,030		
Log Likelihood	-751.98			-747.67		

Notes: Standard deviations reported in parentheses. ***, **, * significance at the 1%, 5% and 10% levels. Reference groups: Age: 66-75, Medium level of school, White collar worker, SHI compulsory member. Occupational categories of trainee and unemployed dropped.

Table 2.7: Cohen-Siegelman Test for Adverse Selection for Individuals Age > 65, 2008

	Pr(Sick2009)	
Variable of Interest		
Hospital SuppHI	-0.2195 **	(0.0899)
Control Variables		
Life insurance	0.0613	(0.0618)
Change of SHI provider	-0.1293	(0.2003)
Household income (log)	0.0199	(0.1034)
Male	-0.0128	(0.0525)
Age: 76-85	0.4205 ***	(0.0591)
Age: Older than 85	0.2092 *	(0.1232)
BMI	0.0551 ***	(0.0065)
Household size	-0.0377	(0.0496)
Risk attitude	-0.0499	(0.1605)
Risk attitude *income	0.0055	(0.0212)
Hospital stay in t-1	0.2690 ***	(0.0669)
Low level of school	-0.0466	(0.0727)
High level of school	-0.0452	(0.0982)
Blue collar worker	-0.2836	(0.3085)
Unemployed	-1.4183 *	(0.8315)
Retired	-0.0395	(0.2325)
No job	-0.5150	(0.3179)
SHI voluntary member	0.4021 ***	(0.1539)
SHI family member	0.0837	(0.1505)
SHI other member	0.1132 *	0.0607)
Observations	3,030	
Log Likelihood	-1766.1100	

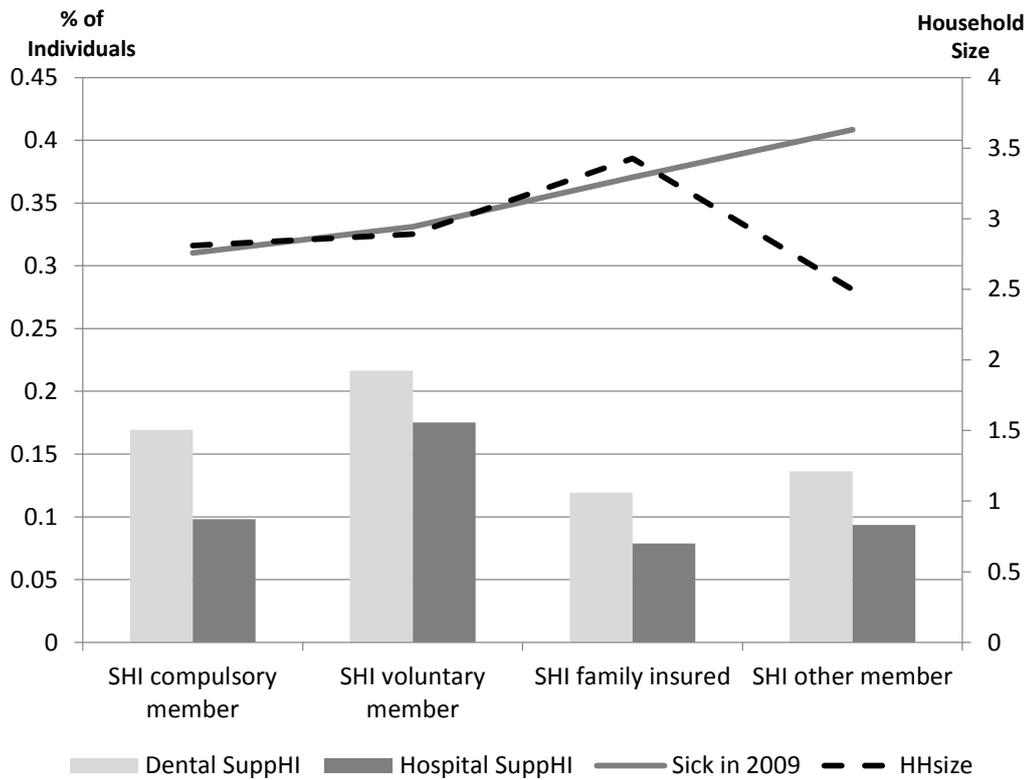
Notes: Standard deviations reported in parentheses. ***, **, * significance at the 1%, 5% and 10% levels. Reference groups: Age: 66-75, Medium level of school, White collar worker, SHI compulsory member. Occupational categories of trainee and unemployed dropped.

2.6 Robustness of the Results

We run our regressions on different data subsets in order to assess the robustness of our results. In the first subsample, we only include individuals who are mandatory, premium paying members in SHI. The full dataset also includes voluntary members of SHI who could theoretically opt out of SHI and seek private coverage. As the German private health insurance industry does risk-based underwriting, those who remain voluntarily in SHI are assumed to be higher risk types on average in their income class. Privately insured have to pay premiums for each family member under an individual health insurance plan while SHI members can insure spouses and children free of charge, if their dependents do not have any earnings, which are subject to social security contributions. Staying in SHI as a voluntary member is supposedly attractive to large households due to the possibility of insuring non-contributory family members in SHI.

A comparison of means in the subgroup of voluntary insured and other types of insurance status in SHI shows that the differences of the means is not significant, neither with regard to family size nor to the prevalence of chronic illnesses. Figure 2.2 underlines these findings and indicates no evidence for selection issues, as the household size (black dotted line, right axis) does not significantly differ between compulsory insured and voluntary members of SHI (columns, left axis). Nor do we find a significant increase of chronic diseases (*Sick in 2009*) (grey line, left axis) among compulsory insured SHI. Furthermore, the figure illustrates that voluntary members in SHI more often hold supplemental hospital and dental benefits on average compared to other types of insurance status in SHI.

Figure 2.2: Share of Enrollees in SuppHI, Household Size, and Chronic Diseases by Insurance Status, 2008



Source: SOEP v25.

In order to check whether a potential sample selection issue problem may skew the results, we created a subsample with only premium-paying, mandatory members. Table 2.8 shows the regressions for hospital (Model VII) and dental SuppHI (Model VIII), respectively. In this subset, we dropped the controls for type of employment as the sample is much more homogenous in this sense. In terms of our adverse selection hypothesis, we still find that the sickness indicator is significant on the 10% level for hospital insurance, but not significant for dental insurance. The marginal effect of the sickness indicator for hospital SuppHI is equal to 1.52%, which is relatively similar to the effect from the full dataset (1.18%).

Holding life insurance is significant on the 1% level for hospital and dental insurance, the marginal effects equal 3.27% and 7.18%, respectively. This compares to 3.16% and 6.32%, respectively, in the full dataset. Thus, differences are minimal. The

impact of a change of the SHI provider in the previous period remains positive and significant compared to the full model for hospital and dental benefits. The marginal effect hardly differs in size in both lines of insurance, which equals 4.07% and 8.07%, respectively, compared to 2.78% and 6.05% in the full model. We suggest that changing the SHI provider has a greater impact on the demand for hospital and dental Sup-pHI for compulsory insured individuals as a change of the SHI provider must be initiated by the compulsory insured and not by any family members, which are under the same coverage. Thus, the fact that a compulsory insured changes the SHI provider probably implies that she has actively sought information about the health insurance status. In comparison, a family member may simply change the SHI provider as the associated compulsory insured has.

Table 2.8: Probit Regressions on Hospital and Dental SuppHI - Compulsory Insured

	Pr(Hospital SuppHI)			Pr(Dental SuppHI)		
	Model VII			Model VIII		
Variables of Interest						
Household income (log)	0.0765	***	(0.0170)	0.0924	***	(0.0222)
Sick in 2009	0.0152	*	(0.0080)	0.0143		(0.0105)
Life insurance	0.0327	***	(0.0071)	0.0718	***	(0.0094)
Change of SHI provider	0.0407	**	(0.0160)	0.0807	***	(0.0213)
Control Variables						
Male	-0.0150	**	(0.0071)	-0.0401	***	(0.0095)
Age: younger than 26	-0.0269	**	(0.0110)	-0.0574	***	(0.0150)
Age: 26-35	0.0088		(0.0100)	0.0084		(0.0134)
Age: 46-55	-0.0127		(0.0086)	-0.0066		(0.0121)
Age: 56-65	-0.0120		(0.0108)	-0.0066		(0.0153)
BMI	-0.0009		(0.0008)	0.0001		(0.0010)
Household size	-0.0207	***	(0.0035)	-0.0345	***	(0.0048)
Risk attitude	0.0047		(0.0258)	0.0176		(0.0335)
Risk attitude*income	-0.0005		(0.0032)	-0.0021		(0.0042)
Hospital stay in t-1	-0.0034		(0.0117)			
Low level of school	-0.0203	**	(0.0082)	-0.0334	**	(0.0111)
High level of school	0.0340	***	(0.0099)	0.0396	**	(0.0127)
Observations	6,216			6,216		
Log Likelihood	-1,788.66			-669.60		

Notes: Standard deviations reported in parentheses. ***, **, * significance at the 1%, 5% and 10% levels. Reference groups: Age: 36-45, Medium level of school.

In a second robustness check, we account for the individual's changing family structure by introducing the adjusted household income per family member in the full sample. Table 2.9 displays that the impact of per capita income is still significant on the 1% level for hospital and dental SuppHI. Household size is not significant anymore for hospital benefits and significant on the 10% level for dental SuppHI. This allows the conclusion that part of the household size impact is now included in the per capita income variable. All other estimates have the same significance levels and roughly the same size marginal effects.

Table 2.9: Probit Regressions on Hospital and Dental SuppHI - Per Capita Income

	Pr(Hospital SuppHI)			Pr(Dental SuppHI)		
	Model IX			Model X		
Variables of Interest						
Per capita income (log)	0.0594	***	(0.0112)	0.0606	***	(0.0147)
Sick in 2009	0.0114	*	(0.0061)	0.0104		(0.0078)
Life insurance	0.0326	***	(0.0055)	0.0646	***	(0.0072)
Change of SHI provider	0.0286	**	(0.0123)	0.0615	***	(0.0163)
Control Variables						
Male	-0.0088		(0.0059)	-0.0269	***	(0.0076)
Age: younger than 26	-0.0395	***	(0.0088)	-0.0535	***	(0.0130)
Age: 26-35	0.0025		(0.0080)	0.0061		(0.0108)
Age: 46-55	-0.0127	*	(0.0069)	-0.0102		(0.0094)
Age: 56-65	0.0006		(0.0092)	0.0048		(0.0122)
BMI	-0.0011	*	(0.0006)	0.0003		(0.0008)
Household size	0.0035		(0.0042)	-0.0096	*	(0.0056)
Risk attitude	-0.0172		(0.0158)	-0.0215		(0.0204)
Risk attitude*income	0.0021		(0.0020)	0.0029		(0.0026)
Hospital stay in t-1	0.0052		(0.0095)			
Low level of school	-0.0217	***	(0.0065)	-0.0345	***	(0.0084)
High level of school	0.0259	***	(0.0076)	0.0084		(0.0092)
Blue collar worker	-0.0090		(0.0072)	-0.0208	**	(0.0092)
Trainee	0.0138		(0.0162)	-0.0114		(0.0184)
Unemployed	-0.0070		(0.0139)	-0.0402	***	(0.0151)
Retired	-0.0025		(0.0141)	-0.0075		(0.0176)
No job	0.0105		(0.0126)	-0.0167		(0.0145)
SHI voluntary member	0.0100		(0.0090)	-0.0034		(0.0114)
SHI family member	-0.0110		(0.0089)	-0.0292	**	(0.0115)
SHI other member	-0.0088		(0.0115)	-0.0177		(0.0147)
Observations	9,804			9,804		
Log Likelihood	-2,758.47			-3,815.84		

Notes: Standard deviations reported in parentheses. ***, **, * significance at the 1%, 5% and 10% levels. Reference groups: Age: 36-45, Medium level of school, White-collar worker, SHI compulsory member.

2.7 Conclusion

In this paper, we determine factors that drive the demand for different kinds of SuppHI using a very rich dataset. We find that insurance affinity and income have a strong positive effect on the demand for SuppHI. Unlike previous studies using GSOEP data (e.g., Kapfer, 2008; Schmitz, 2011), we find evidence for adverse selection in SuppHI in Germany, when including data on the actual health state of individuals and diseases diagnosed by a doctor rather than self-reported health state or doctor visits. This is, however, only valid for individuals age 65 and younger. On the contrary, we find support for the risk selection hypothesis of Kapfer (2008) for individuals aged 66 and older. These findings are line with the assumptions of Peter *et al.* (2014) that private information diminishes over time when more and more diseases become apparent. When comparing the results for hospital and dental benefits, we find largely the same effects. However, we find that the socio-economic status apart from income such as occupational status and type of SHI benefits have a significant impact for the demand for dental benefits while the demand for hospital coverage primarily depends on income, insurance affinity, household size, and health state.

The strong dependence of SuppHI demand on income may raise equity or fairness issues concerning access to health insurance and medical care, especially when public benefits are further reduced. Up to now, SuppHI in Germany rather complements and enhances SHI coverage in terms of improved quality, as in the case of supplemental hospital benefits. Supplemental dental insurance does indeed substitute SHI benefits, which were cut over time. Our findings imply that comprehensive dental benefits are more often covered for higher income individuals.

Given the recent development in the German health insurance system, we believe that there is a great potential for market growth in SuppHI. In addition, the ac-

quired knowledge on the demand for different types of supplemental coverages provides valuable insights how to design a reformed health care system that partially relies on SuppHI and that aims at ensuring that everyone receives appropriate care. The obtained results can be of importance for other countries than Germany. We observe that many countries with publicly provided coverage or social health insurance tend to cut benefits and incentivize the use of private supplemental coverage.

3 Using Experiences from the U.S. to Implement Health Savings Accounts in German Statutory Health Insurance⁵

3.1 Introduction

The German health-care system has to cope with several challenges that can be observed worldwide. Rising health-care costs, a high utilization of health services due to moral hazard, and the consequences of demographic change put pressure on the financing of health expenditures in Germany.⁶ Various cost-containment policies implemented over the last decades, i.e., spending caps for sectors or individual providers, reference prices for pharmaceuticals, reducing the number of hospital beds and restricting the amount of high-cost medical equipment, as well as introducing or increasing co-payments for certain services, were designed to achieve stable premium rates in German SHI. However, premiums have increased substantially over recent years and there is still a significant solvency problem for SHI. Especially the strong dependence of SHI revenues on the development of wages as well as the increasing effect of health insurance premiums on incidental wage costs and the associated negative incentives on the labor market are widely criticized. Thus, financing of health expenditures has been discussed within health sector reform debates over the last decade and was the focus of recent reforms.

Besides cost issues, the current discussion on rationing in health care – expressed for example by a priority treatment list – supports the argument that there is a

⁵ This paper is joint work with Petra Steinorth from St. John's University New York. The candidate's individual contribution focused mainly on the writing and the literature research. The article is printed with kind permission of Schmollers Jahrbuch. It has been originally published as Lange, R. and Steinorth, P. (2012). *Using Experiences from the U.S. to Implement Health Savings Accounts in German Statutory Health Insurance*. Doi: 10.3790/schm.132.1.27. Therefore, the authors thank the two unknown referees for their helpful comments.

⁶ Germany spent 10.4% of its GDP on health in 2007, more than the OECD average of 8.9%, and Germany's spending on health per person was 20% higher than the OECD average (see OECD, 2009, p 163). Doctors' consultations per capita counted 7.5 annually compared with the 6.8 OECD average (see OECD, 2009; p 91).

need for extended individual responsibility in health care. By increasing individual responsibility, there is the potential to disburden the shared risk pool in SHI and to return to the original intention of SHI, which is financial protection against cost-intensive health risk.

Although some of the above-described issues are inherent to the German system, most industrialized countries face similar challenges. Accordingly, there have been intensive discussions and reforms of health-care financing worldwide. One major change in financing health-care expenditures was the introduction of Medical Savings Accounts (MSAs) in Singapore three decades ago. Since then, MSAs have been adopted in several countries as China, South Africa, Hong Kong, USA or their implementation is discussed within health sector reform debates i.e. Canada and UK.⁷ These approaches do not only differ in their characteristics but are usually referred to as MSAs if outside the U.S. and as Health Savings Accounts (HSAs) if the current approach in the U.S. health care market is discussed.

MSAs are single or family savings accounts from which medical expenses are paid and to which contributions are made by individuals or employers (usually tax-exempt), or by the government. MSAs are accompanied by a High-Deductible Health Plan (HDHP), which covers catastrophic medical expenses after the deductible has been reached. The goal is to enhance cost-awareness and individual responsibility due to increased out-of-pocket payments. By this, moral hazard will be controlled, inducing a reduced demand for medical care and the overall medical costs will decrease (see e.g. Arrow (1963) and Shavell (1979) on moral hazard).

However, the objectives for implementing MSAs vary and depend on the specific structure of the pre-existing health care system. One major aim is to enlist health-care consumers in controlling costs, but also to stimulate savings for expected high

⁷ Hanvoravongchai (2002), Shrott (2002), and Schreyögg (2003) give a good overview on the introduction of MSAs in several countries and early experience.

costs of medical care in the future in order to reduce the intergenerational burden of the financing systems. Furthermore, MSAs pose an opportunity to mobilize additional funds for health-care systems (Hanvoravongchai, 2002).

The aim of our paper is first to analyze the potential of HSAs to improve the current situation in SHI and then to design an approach to implement HSAs in the current SHI without requiring substantial changes to the system. The introduction of so-called Flexible Health Plans (*“Wahltarife”*) according to § 53 para. 1 Social Security Code V in 2007 allows insurers in SHI to offer a greater variety of health plans. Accordingly, only the latest health-care reform enabled SHI funds to offer more than one health plan and thus provides the opportunity to implement HSAs. The focus is on adaptability of SHI for two reasons: On the one hand, the possibility to offer products differing from universal health coverage for insurers in the SHI market provides an excellent opportunity to introduce HSAs. On the other hand, the authors strongly believe that HSAs can lead to significant cost improvements in SHI. The introduction of significant out-of-pocket payments will induce the insured to consume medical care in a more conscious way and thereby reduce costs. In addition, HSAs potentially increase consumers' responsibility in SHI and the competition between SHI and private insurance.

The remainder of the paper is structured as follows: We describe HSAs in the U.S., placing a special focus on implementation details and experiences in the U.S. and other countries so far (Section 3.2). In Section 3.3, we first briefly emphasize the suitability of HSAs for the German system (Section 3.3.1) and discuss earlier concepts of introducing HSAs to SHI (Section 3.3.2). Based on those results, we develop an approach in Section 3.3.3 to introducing HSAs to SHI that is consistent with the existent system. We refer on the increased flexibility of offering contracts following the introduction of Flexible Health Plans. We also discuss the detailed design, tax subsidies,

coverage for families and portability of HSAs. The chapter ends with a summary of the results and a short outlook in the conclusion (Section 3.4).

3.2 Health Savings Accounts in the U.S.

3.2.1 *Design of Health Savings Accounts*

In the U.S., most individuals receive employer-sponsored health care coverage. Employers seek coverage for their employees from commercial or non-profit insurers or self-insure their employees. Public programs only insure health risks of the elderly (Medicare) and the needy (Medicaid), but universal coverage has not been available so far, leaving almost 46 million U.S. citizens uninsured. Recent health care reforms try to cope with the latter issue predominantly by extending the Medicaid program; however the costs and acceptance of this reform are still unpredictable.

HSAs are mostly common for individuals without public coverage, as mandated Medicare plans or the Medicare Part C Advantage plans for those who contract out from Medicare usually do not qualify for establishing and contributing to an HSA. However, withdrawals for qualified expenses from an existing HSA are still possible under Medicare. We do neglect Medicaid in the following discussion, as Medicaid requires individuals to be below certain income and asset thresholds in order to qualify. Accordingly, significant savings in an HSA would prevent eligibility. The following discussion mostly refers to non-public health insurance contracts, as HSAs are most common there.

In the U.S., MSAs in combination with HDHPs were first authorized by the Health Insurance Portability and Accountability Act of 1996. They were first implemented in a demonstration project for the self-employed and workers in small businesses on a voluntary, employer sponsored basis, and managed by insurance compa-

nies.⁸ Passed by the Medicare Prescription Drug, Improvement, and Modernization Act in 2004, various restrictions were lifted and MSAs, renamed HSAs, were made available to the private individual insurance market.

Insured people are induced to make significant tax-free deposits to their HSA. To be eligible to open an HSA, it is mandatory to be covered by an HDHP. Figure 3.1 displays the current rules for minimum deductibles and maximum out-of-pocket payments. Above the maximum out-of-pocket threshold insurers refund all medical expenses. Tax-exempt contributions are allowed up to the limits shown in Figure 3.1 and can be arranged until enrolling in Medicare⁹ at the age of 65. In addition, contributions can only be made with an existing HDHP, while withdrawals for qualified medical expenses (defined by the IRS) are possible at any time even after terminating an HDHP.¹⁰ Withdrawals used for consumption purposes other than qualified medical expenses are also possible; however, the insured have to pay their regular income taxes and an additional surcharge of 10% on such expenses. In cases when there are no funds left in the HSA, further medical expenses have to be covered by after-tax income (Internal Revenue Service (IRS), 2009). The tax relief of HSAs also includes earned interest on the balance. The balance is interest-bearing and can be invested in the capital market either following a pre-specified investment plan or individually. This provides an incentive for financing future health expenditures (Fronstin, 2008). In the case of death, the accumulated funds will be transferred into the spouse's HSA and treated under the same conditions. The inheritance of an HSA by a beneficiary other than the spouse

⁸ Since 2007 MSAs are also available in Medicare as a type of Medicare Advantage plan, but only pay to covered Part A and B services. Medicare Part D is excluded. A set amount of money is contributed annually to the MSA from Medicare, whereas enrollees cannot deposit their own money into the account. Due to small market share and few experience, we focus in our paper on non-Medicare MSAs. (See Centers for Medicare and Medicaid Services, 2010).

⁹ Medicare is a statutory health insurance program for elderly and disabled persons.

¹⁰ Apart from premiums for health insurance.

leads to the termination of the HSA and the fair market value of the HSA becomes taxable to the heir (IRS, 2009).

Figure 3.1 gives an overview of the design of HSAs and HSA eligible HDHPs.

Figure 3.1: Design of HSAs and HSA-eligible HDHPs according to IRS Guidelines in 2010

		Individual coverage	Family coverage
HDHP	min. deductible	\$1,200	\$2,400
	max. out-of-pocket expenses	\$5,950	\$11,900
HSA	max. contributions	\$3,050	\$6,150
	max. withdrawals <ul style="list-style-type: none"> • for qualified medical expenses • for non-qualified medical expenses 	<p>up to balance in HSA</p> <p>up to balance in HSA incl. income tax and penalty tax of 10%</p>	<p>up to balance in HSA</p> <p>up to balance in HSA incl. income tax and penalty tax of 10%</p>

The combination of an HSA with an HDHP creates different incentives. Introducing high deductibles leads to a reduction of insurance premiums in two ways. On the one hand, the premiums are lower as coverage is limited. However, the insurance premiums are also reduced due to lower administrative costs and a more cost-conscious consumption of medical care by the insured. Yet, the insured face a higher financial risk since there is less risk-sharing in the case of a high deductible. HSAs provide a buffer for this financial risk as the tax-exempt balance will be used to cover the deductible, in particular after a sufficient period of time in which reserves could be built up. On the other hand, HSAs are assumed to be a powerful instrument for reducing increasing health-care costs due to moral hazard. In addition, relatively low premi-

ums for an HDHP might help to increase the overall insurance coverage in the U.S., tackling one of the major issues in the U.S. health-care system (Bunce, 2001).

The individual insurance mandate from the *Patient Protection and Affordable Care Act* (PPACA) that will be in place starting 2014 has a great potential to further increase the demand for HSAs. One major critique of the PPACA is that the individual mandate is enforced by financial penalties for most individuals without health insurance. Those who will not be affected by the increased income threshold to qualify for Medicaid can contract low-cost HDHPs and start saving within an HSA which is assumed to be more affordable than traditional insurance coverage.

3.2.2 Experiences from the U.S.

A steady growth of HDHPs combined with HSAs has been observed in the U.S. market since the introduction of HSAs in 2004. The number of people with HDHPs rose from 438,000 U.S. citizens in 2004 to 11.4 million citizens in 2011. Accordingly, the current market share is about 4.3% in the private health insurance market (Yoo, 2005; AHIP, 2011). Supporters of Consumer-directed Health Plans (CDHPs)¹¹ particularly emphasize the potential of HSAs to induce an economical consumption of medical care. Customers choose consciously adequate medical treatment and also influence physicians to provide health care in a more efficient way. Critics fear that HSAs will induce selection effects such that primarily healthy individuals with a high income will select CDHPs (McNeill, 2004; Buntin *et al.*, 2006; Cannon, 2006; Dixon *et al.*, 2008; Greene *et al.*, 2008).

The first surveys of the Government Accountability Office (GAO) based on tax data seem to confirm selection (see GAO, 2006; GAO, 2008). Previous work also pro-

¹¹ Consumer-directed Health Plan (CDHP) is the generic term for a HDHP including some savings option like a HSAs or MSAs.

vides evidence that high-income individuals are more likely to choose an HAS (e.g., Lo Sasso *et al.*, 2004; Parente *et al.*, 2004a; Parente *et al.*; 2004b; Tollen *et al.*, 2004; Swartz, 2004; Remler and Glied, 2005; Greene *et al.*, 2006; Hoffman and Tolbert, 2006).

Tollen *et al.* (2004) point out the problem of risk segmentation arising from employers offering high-deductible or CDHP options alongside more traditional insurance options. They show that employees switching coverage from traditional health plans to health plans featuring some HSA characteristics consume significantly less medical care and thus tend to be healthier than employees who stay in traditional insurance. McNeill (2004) also finds that the healthy, especially young, men are those who will benefit most from CDHPs. However, there is also evidence that adverse selection might not be such an issue, as older and chronically ill individuals will also enroll in HSAs due to the reduced premiums, fixed upper limits and tax favors (see Keeler *et al.*, 1996; Parente *et al.*, 2004a). The ambiguity of the results so far can be partly attributed to the fact that there is only a small amount of data on HSAs, since they were only introduced in 2004.

Although HSAs are intended to attract uninsured individuals by reduced premiums and tax favors evidence does not seem to support the hypothesis so far. This is because primarily low-income individuals and families have no health insurance and thus most of them do not face high enough marginal tax rates to benefit from the tax deductibility of HSAs. In 2007, about 50% of the uninsured had a gross yearly income of \$30,000 or less and half of them did not pay taxes at all (Remler and Glied, 2005). Low-income individuals are also more likely to have difficulties paying the high deductible (Hoffman and Tolbert, 2006).

Remler and Glied (2006) argue that HSAs significantly increase cost-sharing and, thus, must reduce moral hazard issues.¹² As mentioned before, high deductibles also have the power to reduce administrative costs as the insured are fully responsible for all their medical expenses up to the deductible. Accordingly, there will be no administrative expenditures until the deductible is reached (Bond, 1999).

Different surveys have tried to estimate the influence of CDHPs on the overall medical costs; however, they reach divergent conclusions. Keeler *et al.* (1996) forecast a change in health costs of +1% to -13% while Nichols *et al.* (1996) estimate a reduction of 4% to 15% (depending on different assumptions).¹³ This surprisingly small potential of CDHPs to reduce costs is – among other reasons – due to the fact that some cost-sharing elements have already been implemented in traditional health insurance as a consequence of the results of the RAND HIE, which was an experimental study from 1974-1982 testing how individuals react to financial incentives like co-insurance elements in health plans. In addition, the type of insured people in health plans with regard to their spending profile matters. As about 10% of U.S. citizens cause nearly 57% of all medical costs, those individuals are not very likely to enroll in a CDHP and hence the potential of CDHPs to decrease the overall costs is rather limited (Remler and Glied, 2006).

Despite those issues mentioned before, the significant demand for HSAs in the U.S. implies that they must have certain beneficial qualities at least for a part of the population. After a short overview on further international experience and a description of the particularities of the German health-insurance system we will discuss why some of the above-mentioned shortcomings of HSAs as seen in the U.S. will not be a major issue when transferring HSAs to German SHI.

¹² Using a theoretical approach, Steinorth (2011) shows that moral hazard will only be decreased under certain conditions.

¹³ See Keeler *et al.*, 1996, p 1669; Nichols *et al.*, 1996, p 7 f. Both use Medical Savings Accounts (MSAs), the predecessors of HSAs, in their analysis.

3.2.3 *Experiences from Other Countries*

In Singapore and China, MSAs are an inherent part to finance health expenditures.¹⁴ However, Singapore's and China's success of keeping health costs low, which is mostly attributed to the introduction of MSAs, must be carefully considered. In the case of Singapore, this success is traced back to its social and demographic peculiarities, a stringent government, as well as the opacity and different standards of measuring data, i.e. health expenditures (Barr, 2001). Also in China, the observed drop in health-care spending is not solely attributable to MSAs, as the government simultaneously imposed fixed remuneration rates to providers and limits on the use of expensive diagnostic procedures and pharmaceuticals (Shrott, 2002).

Whereas Singapore's MSA system is universal, compulsory, and managed by the government, MSAs have been provided by private and public insurers in a number of countries to partially finance health expenditures, i.e. USA and South Africa (Hanvoravongchai, 2002; Shrott, 2002; Schreyögg, 2003). Even though implemented in several countries over the world, empirical evidence on the efficiency of HSAs and MSAs in countries other than the U.S. is relatively scarce.

In our paper, we concentrate on Health Savings Accounts (HSAs) from the U.S. for several reasons: First of all, HSAs in the U.S. are easily integrated in the pre-existing system and second, they constitute a voluntary and not compulsory health plan option. Furthermore, the political environment in the U.S. and Germany are largely comparable. As the process of reforming the health-care systems in both countries has been a long-lasting challenge, we argue that a solution requiring the least changes to the current system is most likely to be adapted.

¹⁴ Since 1984, MSAs (Medisave) are obligatory for all Singaporeans and used to finance their immediate medical care expenses. China initiated a pilot study in 1994 of implementing MSAs in two cities, expanded the program in 1996 to over 50 cities, and scheduled to include all urban areas by 1999 (see Hanvoravongchai, 2002; p 24 f).

3.3 Implementing Health Savings Accounts in German Statutory Health Insurance

3.3.1 *The German Health Insurance System and Health Savings Accounts*

Particularities of the German Health Insurance System

In contrast to the U.S., the problem of not being able to attract formerly uninsured individuals does not play a role in Germany as health insurance is mandatory for everyone in the dual system of SHI and PHI. Thus, the number of uninsured people is very low.

The fact that people with earnings above the threshold for compulsory insurance can opt out of SHI and switch to PHI distorts the fundamental principle of solidarity within SHI. Therefore, the duality of the health insurance system and the possibility for certain groups of people to leave SHI is criticized. In particular, young, healthy and single individuals have an incentive to switch to PHI due to comparably low risk-related premiums, which erodes the income redistribution within SHI.¹⁵ It seems plausible that risk segmentation will not occur to the same level as in the U.S. when introducing HSAs to SHI, since this phenomenon is already inherent to the German health insurance system. In contrast, implementing HSAs in SHI might even prevent eligible young, healthy and high-income individuals from opting out of SHI. In these cases, HSAs are a means to reduce premiums in SHI and increase individual preferences concerning treatment decisions. HSAs may then even contribute to increasing competition between SHI and PHI such that the current selection issue may decline, as explained later.

Further distortions between SHI and PHI can be attributed to the compensation of providers and the reimbursement of medical care. Considerable differences

¹⁵ Kriwy and Mielck (2006) investigate the effect of health and health behavior on the choice of insurance (SHI or PHI). They find that healthier people are more likely to be insured under PHI than under SHI in Germany (the “selection hypothesis”).

between SHI and PHI in terms of remuneration¹⁶ lead to biased incentives for physicians to treat privately insured individuals preferentially (e.g., shorter waiting times, extensive and more cost-intensive treatments). HSAs could overcome these issues, as statutory insured individuals with HSAs pay care providers directly up to the deductible. In addition, introducing HSAs to SHI allows SHI funds to differentiate themselves from competitors, as currently, benefits within SHI hardly vary between the different funds, since the list of medical services covered is determined by law and ensures primary health care.

The described shortcomings of the German health insurance system have been in the focus of several health sector reform debates and recent reforms. Initial point of these debates were proposals for introducing a flat rate insurance versus a citizens' health insurance, which intended to broaden the financing basis and reduce inherent distortions between SHI and PHI (citizens' health insurance) or increase competition between the two systems while maintaining PHI (flat rate insurance). As our approach of implementing HSAs is very flexible, it is also compatible with both reform proposals.

Out of Pocket Payments and Cost Savings Potential in SHI

So far, cost sharing and out of pocket payments under SHI are not very common and capped by law.¹⁷ Accordingly, cost sharing is not pronounced under German SHI and greater cost savings due to reduced moral hazard can be expected compared to the U.S. Overall, it can be expected that the introduction of HSAs to German SHI will lead to inherent improvements in German SHI.

¹⁶ Walendzik *et al.* (2009) find that, for privately insured patients, payment for the same service on average exceeds payment for SHI patients by a factor of 2.28.

¹⁷ Co-payments are limited to €10 per quarter for outpatient services, €10 per quarter for dentist visits and per hospital day up to a limit of 28 days.

Felder and Werblow (2006) are the first to investigate the impact of an increased cost sharing in SHI and examine how higher deductibles in Flexible Health Plans influence the overall health-care costs. They estimate that a €300 deductible on top of standard copayments induces significant cost reductions. They disentangle the cost savings from selection and behavior changes and show that at minimum 28% of all cost savings are due to changes in health-care consumption by the insured. These results correspond with the RAND HIE, which also showed a significant impact on the health-care consumption induced by the level of health-insurance coverage. Accordingly, these facts indicate that there is a considerable potential for cost saving in German SHI by further introducing cost sharing and increasing out-of-pocket payments. As our approach claims for a higher deductible than the €300 from the Felder and Werblow (2006), we expect further costs savings and a greater impact on utilization as the RAND HIE shows.

One important critique of Flexible Health Plans so far is the relative low catch-up¹⁸ among insured, which may also be due to disadvantageous taxation when choosing a Flexible Health Plan. The rapid growth of tax-incentivized private retirement products shows that tax incentives are likely to have a substantial impact on demand. In addition, the market response to HSAs in the U.S. has been much higher than the catch-up of Flexible Health Plans in Germany, which is probably due to tax incentives. Therefore, we expect a much greater market response to HSAs compared to other Flexible Health Plans before. Health insurance funds have been reluctant to aggressively market Flexible Health Plans so far as those have to pay off for themselves. Designing a product that can attract a significant market share would also increase the inter-

¹⁸ In 2010 only 395.538 individuals in SHI chose a (deductible) Flexible Health Plan which equals about 0.6% of insured (German Ministry of Health, 2011).

est of health insurance funds to engage in that market as they mostly compete in terms of market share.

3.3.2 Previous Proposals for Implementing Health Savings Accounts in German Statutory Health Insurance

The Concept of HSAs in Statutory Health Insurance following Schreyögg

Different proposals and approaches for implementing HSAs in Germany have been discussed over the last few years. Schreyögg (2003) proposes to introduce income-dependent deductibles to SHI.¹⁹ In addition, mandatory HSAs are installed and the insured have to make a fixed and tax-free monthly contribution from their gross income. The annual contributions equal the maximum yearly deductible.²⁰ Medical care is financed either via reimbursements to the insured or according to the principle of benefits in kind depending on the price elasticity of a treatment. All price-elastic treatments are paid directly by the insured up to the deductible. Price-elastic treatments above the deductible and non-price-elastic treatments are reimbursed directly to the supplier following the principle of benefits in kind.

However, the proposal of Schreyögg (2003) does not consider the increasing competition between SHI and PHI in Germany as our proposal does. By making an HDHP mandatory, the competitive advantage of private insurance will increase due to the fact that private health insurers are much less regulated in regard to the contracts they offer. Thus, income-dependent deductibles can induce the insured above the income threshold to switch to PHI.

¹⁹ Deductibles will be either €600 or €1200 depending on whether the insured individual meets a certain income threshold. Low-income individuals as well as chronic patients and children are exempt from deductibles.

²⁰ Accordingly, contributions will either be €50 or €100 depending on whether an individual is below or above the income threshold.

HSAs as a Third Column to Finance Health-care Expenses following Spreemann

Spreemann (2003) describes a model for the German health-insurance system that could be conceivable as a third column to cover health expenses besides the SHI and PHI. Individuals use so-called “Personal Health Accounts” (PHAs) to pay for health expenses. Having a PHA releases them from compulsory insurance under SHI. The core of the model consists of two components: a tax-favored savings account and a catastrophic insurance covering extremely high medical expenses. Funds in the account accumulate through regular minimum fees (10% of the gross wage), which are shared equally by employers and holders of PHAs until a target balance is met. Once the target balance is reached no further contributions are necessary due to the fixed interest rate of funds. If the capital in the PHA falls below the target balance as a consequence of increased use of medical services, contributions to the PHA become necessary again. Regularly, funds in the PHA are used to cover all medical expenses. However, extremely high medical costs in the price-inelastic area, which financially overburden the PHA, are covered by complementary catastrophic insurance. Premiums for this catastrophic insurance have to be paid monthly as a lump sum. Tax exemption of contributions and interest subsidize PHAs. Once having opted out of the existing health-insurance system and having established a PHA, the possibility of returning to other insurance options is very limited as holders of PHAs avoid interpersonal and intergenerational subsidization in SHI (Spreemann, 2003).

Subsequently, the introduction of PHA to the German health insurance system could cause adverse selection. On the one hand, particularly “(...) young and health-conscious people who are ready to take over responsibility, who think and act economically, and want to be independent (...)” will prefer PHAs to traditional health insurance (Spreemann, 2003). On the other hand, PHAs constitute a form of self-

insurance discriminating low-income and chronically ill individuals. Thus, they are hardly in line with the principle of redistribution in the German health insurance system.

Mandatory HSAs in Statutory Health Insurance following Neubauer

The third concept follows Neubauer (2006), proposing savings accounts for all people insured under SHI. In combination with a low deductible, contributions to the savings account should be voluntary at the beginning. Similar to the concept of HSAs in the U.S., funds from the savings account cover medical expenses up to the deductible. The aim is to implement a partial capital covered system for the insured in the SHI in the medium term that might absorb demographic risk in the pay-as-you-go financed SHI system in the long run. A reduction of costs induced by insurance and by lower administrative costs is one advantage of implementing savings accounts in the SHI (Neubauer, 2006). Implementing savings accounts for medical expenses further offers the opportunity to build up ageing reserves on an individual level within the collectively financed SHI. Furthermore, building up capital reserves on an individual basis (in a savings account) can alleviate switching between SHI and PHI when the PHA can be used to compensate for missing ageing reserves under SHI. This may induce competition between the two systems. Therefore, moving back from PHI into SHI may also be possible by rolling over ageing reserves into the savings account. One of Neubauer's major concerns is the possibility of risk selection, when particularly young individuals with a high income, who primarily subsidize sick and poor individuals insured in SHI, reduce their premiums due to the deductible and decrease solidarity within the statutory system. This might be intensified by the peculiarity of the German health-insurance sys-

tem as premiums in the SHI are income-related and not determined by risk (Neubauer, 2006).²¹

The concept of implementing HSAs in German SHI in combination with Flexible Health Plans, as presented in this paper,²² requires the smallest intervention in the existing German health-insurance system compared with the previously discussed models. At the same time, it aims to provide the same benefits as the other approaches. In contrast to Neubauer (2006), neither establishing an HSA is mandatory for the insured, nor are there fixed contributions to the HSA as in Schreyögg's and Spreemann's models. Subsequently, consumers are more conscious and independent in choosing adequate health-insurance coverage in the authors' view, which may result in increased competition between the two German health-insurance systems.

3.3.3 Implementing Health Savings Accounts in German Statutory Health Insurance

Health Savings Accounts following Flexible Health Plans

Flexible Health Plans provide the legal foundation for easily implementing HSAs in combination with deductible health plans in SHI. Deductible health plans are usually an instrument of PHI, but since 2007 SHI funds are allowed to offer deductibles within optional Flexible Health Plans. The aim of these Flexible Health Plans is to increase the insured individual's freedom of choice within the SHI, sustain transparency, and encourage competition between the different SHI funds as well as between SHI and PHI (Schulze-Ehring and Weber, 2007).

²¹ Schulze-Ehring and Weber (2007) analyze critically the differences in premiums of deductible health plans in SHI and PHI.

²² Schreyögg (2003) and Pütz (2004) discuss the implementation of savings accounts on the basis of Flexible Health Plans.

As premiums for German SHI are income-dependent, deductible health plans under SHI include a bonus payment fixed within income classes and disbursed to the insured as she bears medical expenses (at least partially) that are usually covered by SHI. The statutory period of commitment in the health plan is three years.

The advantage of implementing HSAs on the basis of Flexible Health Plans under SHI is that no annihilation or extensive alteration of the existing German health-insurance system is necessary. HSAs can be one option within Flexible Health Plans. HSAs can, thus, be easily introduced within the legal and institutional framework. SHI will benefit from the previously mentioned positive effects of HDHPs, e.g., a reduction in premiums due to a reduction in moral hazard, a decrease in overall medical expenses and thus a reduction in the intergenerational reallocation of funds within SHI (Scheyögg, 2003). Combining HDHPs with HSAs offers further advantages: first, HSAs absorb the financial risk inherent to deductibles, thus making even high deductibles affordable for low-income individuals. Secondly, in comparison with pure deductibles, they reduce the incentive to delay necessary care due to the savings in the HAS (Pütz, 2004). Furthermore, offering HSAs in combination with deductibles in SHI has the potential to increase the acceptance of Flexible Health Plans in Germany, if insured people are allowed to finance those tax-exempt in an HSA. Introducing new health-insurance options under SHI can increase the attractiveness of the different funds and raise their position in competing for the insured.

Figure 3.2: Traditional SHI and HSAs

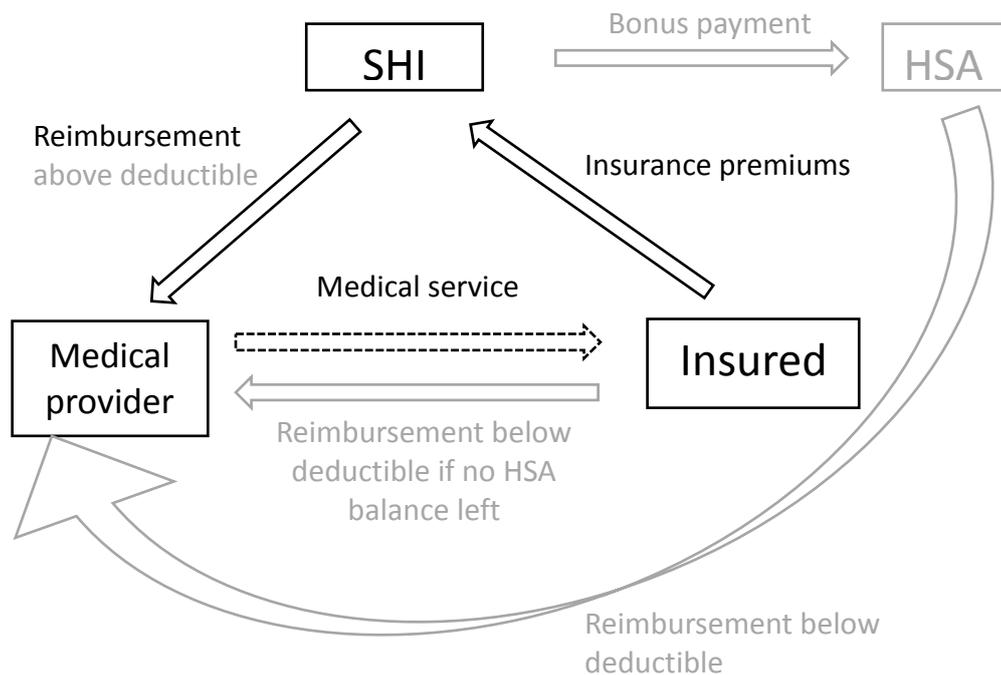


Figure 3.2 displays how HSAs fit into the traditional SHI system. Without HSAs, relations are marked in black while grey arrows display a Flexible Health Plan with HSAs. In the traditional approach, the insured pay their fixed insurance premium to their SHI fund, which reimburses medical providers for medical services delivered to the insured. Service flows are marked by dotted arrows while continuous arrows display cash flows. Adding HSAs to the system implies that the SHI fund only reimburses the provider above the deductible while the insured are responsible for reimbursement below the deductible. If the balance in their HSA suffices, they can pay the providers from their HSAs, otherwise they have to use other personal funds.

Deductibles

When implementing HSAs in the German market it has to be ensured that the HDHP and contributions to an HSA are in an economical relation. Felder and Werblow (2006) show that even a small deductible has a substantial impact on health-care consump-

tion. Furthermore, a recent study on optional deductibles within Flexible Health Plans in SHI concluded that participants of optional deductibles have a lower health care costs (284€) than the reference group (Hemken *et al.*, 2011). As the RAND HIE shows that higher out-of-pocket expenses increase the induced behavioral change compared to full insurance, we propose a sufficiently great deductible in order to induce substantial behavioral changes of insured people as well as of suppliers (Newhouse *et al.*, 1993). Among the available Flexible Health Plans in the German market, deductibles are sometimes so low that they will be exceeded after a few visits to a physician or one stay in a hospital. Yet, there is no explicit regulation concerning the maximum deductible that can be offered in Germany. However, the law forbids SHI funds from disbursing a bonus payment of more than 20% of yearly premiums or €600 (Ulrich *et al.*, 2008). This implicitly determines the maximum deductible (see § 53 subs. 8 Social Security Code V). The existing deductible health plans in SHI are solely dependent on income, which will somehow adjust the deductible to the bonus payment and guarantee to some extent that insured individuals are likely to finance the deductible (Pütz, 2003). However, this approach has led to some cases where deductibles are very low (around €100) and significant changes in health-care consumption cannot be expected. Introducing HSAs will provide individuals with an incentive to save for future health-care costs and might, thus, allow higher deductibles. Accordingly, the minimum deductible should not fall below €1,000, as in the U.S. and Switzerland (IRS, 2009; Werblow, 2002),²³ while cost sharing above this deductible can also be implemented.²⁴ In order to implement substantial deductibles, a change in law is required. Also, the max-

²³ Felder and Werblow (2002) show a decrease in medical consumption of about two-thirds when increasing deductibles to 1,200 and 1,500 sFr.

²⁴ However, German law limits maximum out-of-pocket payments for individuals insured in SHI to 2% of gross income. As individuals are fully subject to social insurance contributions if their annual gross income exceeds €9,600, the maximum possible deductible in their case would only be €192. Under this law, a social graduation of deductibles would automatically be implemented.

imum for bonus payments must be increased to be able to offer behavior-changing deductibles.

Health Savings Accounts and the Reimbursement of Medical Expenses in German SHI

Combining HSAs and deductible health plans is supposed to stimulate individuals to use medical care more consciously (Buntin *et al.*, 2006; Dixon *et al.*, 2008). In order to achieve changes in the insured's behavior through a deductible, it is necessary for patients to be sufficiently informed about the costs and benefits of different treatments. This requires medical costs to be billed directly to the patient and then to be reimbursed by the insurer. This is contradictory to the principle of benefit in kind inherent to German SHI, as patients can use medical services without being directly charged by the provider, as demonstrated in figure 3.2. Remuneration is exclusively conducted between the SHI funds and the providers, leaving the insured without any information about the costs of treatment.

Concerning the present deductible plans, SHI funds use accounting models that counterbalance the costs of all used services up to the deductible and the bonus payment, which the insured receive dependent on their income. Due to the difficulty of breaking down the cost of every treatment, SHI funds use lump sums for pricing dental and out-patient treatment (with prescriptions). Subsequently, these lump sums do not reflect the actual consumption of resources and thus fail to establish complete transparency of costs. Hence, an exact allocation of costs is inevitable to induce changes in behavior through deductibles.

In order to avoid biased incentives and to guarantee straightforward and fast compensation, implementing HSAs within Flexible Health Plans is only reasonable

when the insured choose reimbursement of medical expenses.²⁵ We are aware of the fact that reimbursement of medical expenses causes higher administrative costs. As argued in the U.S., deductible health plans reduce administrative costs since the insured are solely responsible for medical costs below the deductible (Bond, 1999). Any expenses below the deductible do not have to be administered by the SHI fund and do not cause any costs. The skewness of distribution of medical expenses supports the significance of the latter argument, as for instance in the U.S. five percent of the population accounted for almost half of the medical expenses (49%) in 2004 (Stanton and Rutherford, 2006). Health expenditure profiles in German SHI also show that insured in the age of 20 to 40 consume medical care for around €1,000 per year (Niehaus and Finkenstaedt, 2009). Because of the extreme skewness of medical expenses, as for many age groups, average medical spending is in the range of the deductible and due to the induced reduced utilization, we estimate that a substantial portion of individuals do not file any claims with their SHI funds in an average year. This should compensate for higher costs caused by reimbursement of medical expenses above the deductible. Thus, the implementation of HSAs in combination with deductibles in the German health-insurance market should be combined with reimbursement of medical costs rather than benefits in kind in order to have a substantial effect on the reduction of administration costs below the deductible and create the right incentives for utilization.

Deposits to and Withdrawals from Health Savings Accounts

Due to the particularities of German SHI, we suggest that contributions to HSAs are only possible from obtained bonus payments in Flexible Health Plans. This will auto-

²⁵ Already, now, it is possible to choose reimbursement of medical costs rather than benefits in kind. However, this option has to be explicitly chosen by the insured and is not yet very common.

matically lead to a situation with yearly contributions to an HSA going below the yearly deductible, which guarantees that HSAs will not be used as tax shelters. However, after some time this so-called donut hole can easily be covered by the accrued balance of the HSA.

The actual savings²⁶ will be on a voluntary basis as the introduction of Flexible Health Plans aimed to increase consumers' choices. Mandatory savings do not comply with those aims (Pütz, 2004). The incentives for savings are provided by tax favors. As the balance of an HSA can only be used for medical expenses this narrows consumers' choice of how to spend the money compared with deductible health plans without HSAs. This will again be compensated for by the tax incentives. To earmark the balance of an HSA for medical costs also seems reasonable as out-of-pocket payments have increased in SHI over the last few years.

The balance of an HSA will be invested in the capital markets, e.g., by a cooperation partner of the SHI fund. According to government-funded pension schemes, financial institutions require certification to offer HSAs. We are aware of the fact that cooperation between German SHI funds and private institutions must be strictly regulated. Yet, the German private pensions (so-called "Riester") contracts provide a good example of a successful collaboration between financial institutions and the public sector. Furthermore, experiences from U.S. show that such cooperation works in the field of HSAs. Accordingly, we propose that the HSAs should be handled by private financial institutions. This also includes a check that their customers are allowed to receive tax subsidies only in cases where the insured have an HDHP. It is crucial that the insured are constantly enabled to obtain information on their balance and withdrawals at all times. In addition, the insured will receive compulsory information on their balance once a year.

²⁶ Accumulation of bonus payments.

On the one hand, withdrawals will be possible to finance the deductible. On the other hand, financing health care that is not covered under SHI will be possible from an HSA, i.e. on the secondary health market. This includes treatments that are completely excluded from SHI coverage and also upgrading treatments, e.g. patented drugs or laser tonsillectomies. In the case of higher-value services, only the gap between the costs the SHI usually reimburses for such a treatment and the actual price has to be paid from the HSA, the remainder will be covered by SHI. This will lead to greater freedom of treatment choice for individuals insured under SHI and will potentially decrease implicit rationing in SHI.

Tax Favors for Health Savings Accounts

In the following section we discuss how the above-described concept of HSAs can be implemented in German taxation. Under the German tax system, health-insurance premiums were partly tax-exempt up to a threshold until October 2010.²⁷ Starting in October 2010 all health-insurance premiums are tax-exempt up to the level of medical care that is provided by SHI. Accordingly, part of the insurance premiums for PHI is not tax-exempt, if a higher level of care is provided than in SHI. However, if people insured under SHI receive bonus payments for reducing their coverage, they have to pay taxes on these payments. This will create incentives to choose an HDHP with an HSA where contributions are tax-exempt rather than having an HDHP without an HSA. Arguments for the tax exemption in HSAs can easily be found as the deposited money will be used to cover medical expenses.

At present, enrolling into a Flexible Health Plan under German SHI leads to a lower tax exemption as the bonus payment is taxed. On the aggregate level, enrolling

²⁷ In 2009, this threshold was €2,400, which also includes premiums for long-term care insurance, unemployment insurance, personal liability insurance and accident insurance.

into a Flexible Health Plan thus implies higher tax revenues. As mentioned before, we propose to use these higher tax revenues to be reinvested and to create tax incentives to contribute to an HSA. If the insured can carry forward the full tax exemption under full coverage to a HDHP with a HSA, there will be no extra cost occurring in order to create incentives to switch to a tax exempt HSA. This rather remedies the tax disadvantages from choosing a Flexible Health Plan than creating further public costs.

The balance of HSAs will – as described before – be invested in the capital markets. To obtain a certain security level a minimum amount of interest will be guaranteed, as is usual in German life insurance. The earned interest will also be tax-exempt, which will further increase the demand for HSAs compared with standard deductible contracts. As capital gains are also tax-exempt until a certain threshold in general, not taxing the earnings on HSAs can intensify anti-selection as only individuals with capital earnings above this threshold will benefit.²⁸

To reduce the remaining selection issues and to increase the demand for HSAs for lower-income individuals as well, we suggest that individuals can either choose tax-exempt contributions to their HSAs or receive a fixed tax subsidy on their HSA balance (Neubauer, 2006). Such a choice has been very successfully implemented in German “Riester” contracts where individuals can also choose to receive either tax exemption or a fixed subsidy. This will guarantee that all individuals – regardless of income – can benefit from the tax favors in HSAs and will reduce selection issues. Introducing a tax subsidy for low income risk would of course impose additional costs for the tax payers. However, Corneo *et al.* (2007) show that an increase of the tax subsidies does not significantly increase the number of low-income individuals as well as their savings ratio in case of the Riester retirement plans. Accordingly, expected costs of introducing a subsidy for low-income individuals are not expected to be excessive.

²⁸ See Table B 1 in Appendix B.

To increase flexibility for HSA holders and, thus, to make HSAs more appealing, we allow withdrawals for purposes other than medical expenses, as in the U.S. model. This is particularly important in situations of financial need, e.g. due to the loss of a job. However, tax subsidies have to be paid back or the current balance will be subject to income tax when not used for medical costs, depending on the tax favor chosen before. Otherwise, individuals could abuse HSAs for general savings rather than saving for medical expenditures. In the U.S., consumption withdrawals from HSAs are also subject to a penalty tax, if the balance is used for non-medical consumption.²⁹ Therefore, we propose that individuals have to pay for increased administrative costs if they decide to withdraw money for non-medical consumption. However, these additional fees will be redeemed when individuals have reached a certain age as in the U.S.

Health Savings Accounts for Families

As mentioned before, we strongly support the thesis that families that only have a conjoint health insurance plan must have a higher minimum deductible in their HDHP. Otherwise, families are more likely to reach the minimum deductible and, thus, HSAs will become less attractive to them. Accordingly, the treatment of all the family members who are subsumed under one insurance contract will account for the joint deductible. However, we suggest that treatments for minors will be excluded from that in order to secure that children will receive sufficient medical treatment in all cases. This is also consistent with German regulation so far as there are no out-of-pocket payments for underage persons (§ 28 para. 4 Social Security Code V). However, if one or both parents do have an HSA they will also be eligible to use their balance for the medical treatment of their children, which might not be covered by SHI.

²⁹ However, this penalty tax will be redeemed when individuals are older than 65 and are under Medicare.

In the case of a conjoint health-insurance contract for married couples, the spouses can decide to open a conjoint HSA as well. The HDHP will then have a minimum deductible that will equal double the minimum deductible for a single person, comparable with the U.S. As non-working married individuals without their own income are co-insured under their spouse's SHI for free, the insurance premium will be equal to the premium of a single person. However, families with an HSA must receive higher bonus payments due to higher deductibles in order to compensate for that. If both spouses have their own insurance contract, both spouses must have the opportunity to open single HSAs. In order to avoid financial discrimination against working couples, both spouses should have the opportunity to finance their spouse's medical expenditures from their HSA.

Portability of Health Savings Accounts in the Case of Death, Divorce, Change of Health Plan, Switching within Statutory Health Insurance or Switching to Private Health Insurance

To enhance the market for HSAs the accrued balance must be inheritable. A spouse or life partner will be able to decide whether to continue the existing HSA, to transfer the balance of their dead spouse's or partner's HSA to their own HSA if they have one or simply to bequeath the balance of an HSA. If the funds of an HSA are not continued as or transferred to an HSA, the tax favors must be paid back and the balance will be taxed. In the case of a divorce, the balance of an HSA has to be divided between the two ex-spouses according to the divorce settlement. Ex-spouses can decide whether they want to either continue single HSAs or use the money for other consumption purposes. In the latter case they have to pay back the received tax favors and pay the additional administrative fee when younger than 65.

However, the balance of an HSA will still be available even after quitting an HDHP and returning to other insurance plans regardless of whether the new plan is under SHI or PHI. The balance can still be used to pay for medical treatments that are not included in the new health plan and for out-of-pocket expenses.

3.4 Conclusion

HSAs have been successfully introduced in several countries and have been accepted by insurers as well as by insured people to the same degree. Our paper investigates whether the introduction of tax-favored HSAs to German SHI is possible and desirable. We developed an approach that is compatible with the existing SHI system in Germany, building on the newly defined Flexible Health Plans. Contrasting previous proposals to implement HSAs in German SHI our approach requires the smallest changes to the existing system and allows the greatest freedom to customers when arranging their health insurance. Therefore, we analyze the particularities of German SHI as well as financial and fiscal aspects.

By implementing HSAs as proposed here, the insured consume health care in a more conscious way. On the one hand, the insured receive more information on the actual treatment costs. On the other hand, the high deductible reduces moral hazard. Altogether, there will be a more price-elastic demand for medical care as long as the insured have not reached the deductible, which is likely to lead to an overall cost reduction. The greater financial risk that is imposed on the insured due to the HDHP will be reduced by the accrued balance in an HSA. Accordingly, HSAs increase incentives at least partially to self-insure. This will lead to a greater private responsibility for health care and more consumer-directed health care.

The increased co-determination of the insured and possible cost reductions have the potential to enhance competition between SHI and PHI. The combination of an HSA with an HDHP will be particularly interesting to individuals who are planning to leave SHI due to the lower prices and greater freedom of choice in PHI. Accordingly, the focus of our paper is on how HSAs can be implemented in SHI. However, to ensure competitive fairness, tax favors for HSAs when combined with an HDHP must also be available under PHI. Proposing how CDHPs can be arranged for PHI is a promising scope for further investigations into how HSAs fit into the German health-insurance system.

4 Medicaid Managed Care and the Market for Private Health Insurance³⁰

4.1 Introduction

Ongoing concerns about the increasing number of uninsured and increasing spending on health care services have prompted a variety of public policy responses in the U.S. Typically, the government's role in insurance markets is that of a regulator and monitor of insurer performance. In some cases, however, the government is involved as a safety net to promote indemnification of (1) individuals (or companies) facing risks the private market deems uninsurable, (2) those who may be unable to secure coverage in the standard way, and (3) those for whom private insurance coverage is not affordable. The most recent health reform in the U.S. suggests an increasing role of the federal government in providing insurance coverage is therefore likely to affect the health care and health insurance market.³¹

Government involvement in the provision of health care significantly affects many market participants. Direct effects of an expansion of health insurance became evident after the introduction of Medicare, which constituted the largest change in health insurance coverage in the U.S. as, for example, hospital spending increased disproportionately after the introduction of that new insurance system for the elderly (Finkelstein, 2007). In addition to these direct effects, governmental health insurance activities and the respective implementation may also indirectly affect existing private

³⁰ This paper is joint work with Patricia Born from Florida State University and Jörg Schiller from the University of Hohenheim. The candidate's contribution mainly focused on the structure of the paper, the literature research, and the writing. The paper was presented to several international audiences (e.g., ARIA Annual Meeting 2013) and submitted to *Health Economics, Policy and Law* for publication.

³¹ Medicaid expansions and the formation of state-based health insurance exchanges are the key provisions of the federal Patient Protection and Affordable Care Act (PPACA) and are designed with the intention to extend health insurance coverage to the uninsured. A summary of the major provisions of PPACA can be found on the U.S. Department of Health and Human Services website at www.hhs.gov/healthcare/facts/timeline/timeline-text.html.

health insurance markets if compensation of health care providers varies for different consumer groups. In 2013, the cost of “uncompensated care” provided to uninsured individuals in the U.S. was estimated at \$84.9 billion. According to Coughlin *et al.* (2014), government sources provided \$53.3 billion in payments to providers to help offset these costs. However, \$10.5 billion was provided by office-based physicians as charity care, and about \$21.1 billion were mainly financed by private insurance in the form of higher payments which yield to premium increases. Although the extent is controversial (Stoll, 2005; Dobson *et al.*, 2006; Hadley *et al.*, 2008), these numbers suggest that cost-shifting activities of health care providers might significantly affect premiums of privately insured enrollees. As provider compensation from public programs, like Medicaid or Medicare, is in general substantially lower than that from privately insured, these programs may lead to higher premiums in the private market. Given the identified cost-shifting activities on the provider level, a comprehensive picture about the impact on private health insurance premiums is still missing.

Private health insurance in the U.S. has experienced turbulent times over the last few decades - the rise of and backlash against managed care, the erosion in employer-sponsored coverage, and enrollment losses - altogether leading to double-digit premium increases. The profitability downturn has induced two major effects: extensive consolidations in the health insurance industry and private health insurers’ altered interest in public-sector lines of business (Robinson, 2006). Medicaid is the public health insurance program for eligible low-income individuals and families in the U.S. It is jointly funded by the federal and state governments but administered by the states only. Medicaid programs, therefore, vary significantly across states with regard to eligibility, services covered, and the degree to which private health insurance can participate through Medicaid managed care.

In this paper, we evaluate how premiums in the U.S. private health insurance market relate to the design and extent of government provided health insurance. In particular, by looking at insurer level data for the U.S. market from 2001 to 2009, we consider how the Medicaid program is related to premiums for private health insurance coverage in the comprehensive business line. As private insurers can take an active role in Medicaid for some states, we distinguish between states that allow insurers to enroll Medicaid beneficiaries in commercial managed care organizations (MCOs) and states that solely operate Medicaid through their state's Medicaid agency in a state-run environment. We find that a greater Medicaid population and higher utilization of Medicaid MCOs increases premiums in private health insurance if states open Medicaid to commercial insurers but private insurers do not participate in the Medicaid business. Private insurers that operate in a state-run Medicaid environment and those who participate in Medicaid are less affected by the extent of the public program in terms of premium increases.

The paper proceeds as follows. In the next section, we provide some institutional background on Medicaid managed care. In Section 4.3, we give a review on the literature and develop our predictions. In Section 4.4, we describe the data and methodology for our analysis. Our results are presented and discussed in Section 4.5. A final section concludes.

4.2 Medicaid Managed Care

Medicaid plays an integral role in financing health care services in the U.S., accounting for 15 percent of total national health expenditures in 2011 (CMS, 2013). According to the Centers for Medicare and Medicaid Services (CMS, 2011), the federal-state Medicaid program provides health insurance coverage and long-term care assistance to

about 57 million low-income individuals, elderly, and persons with disabilities. States establish and administer their own Medicaid programs within broad federal guidelines, but financing is shared by states and the federal government (Gruber, 2003). Each state determines how the program is organized and administered, decides what medical benefits are covered, and establishes specific eligibility rules which must also meet mandatory minimum federal requirements (Smith *et al.*, 2008; Bitler and Zavodny, 2014).

Throughout the 1990s, as many states pursued waivers to undertake eligibility expansion and to restructure their Medicaid financing and delivery systems, several state Medicaid programs converted their compensation schemes from a traditional fee-for-service model into a variety of managed care arrangements (Holahan *et al.*, 1995; Hurley and Draper, 2002). The most commonly used type of Medicaid managed care arrangements are comprehensive risk-based plans where state Medicaid agencies contract with MCOs paying them a fixed per member per month payment (capitation) to provide all or a defined set of Medicaid-covered services.³² Prepaid arrangements offer states predictable cost increases, control of program costs, and provide them with an opportunity to shift administrative efforts and expenses to private plans. In return, states would accept restricted networks and different forms of care management for guaranteed access for Medicaid beneficiaries (NAIC, 1996; Herring and Adams, 2011; Hurley and Draper, 2002). However, findings are mixed as to whether moving Medicaid recipients to managed care plans reduces Medicaid expenditures and increases program efficiency (Duggan, 2004; Duggan and Hayford, 2013; Herring and Adams, 2011). Furthermore, this remuneration scheme puts networks of providers and

³² Other types of Medicaid managed care arrangements are primary care case management (PCCM) programs and limited-benefit plans, i.e., prepaid inpatient health plans (PIHPs) or prepaid ambulatory health plans (PAHPs).

private insurers at financial risk and holds them accountable for the quality of care they provide to Medicaid enrollees.

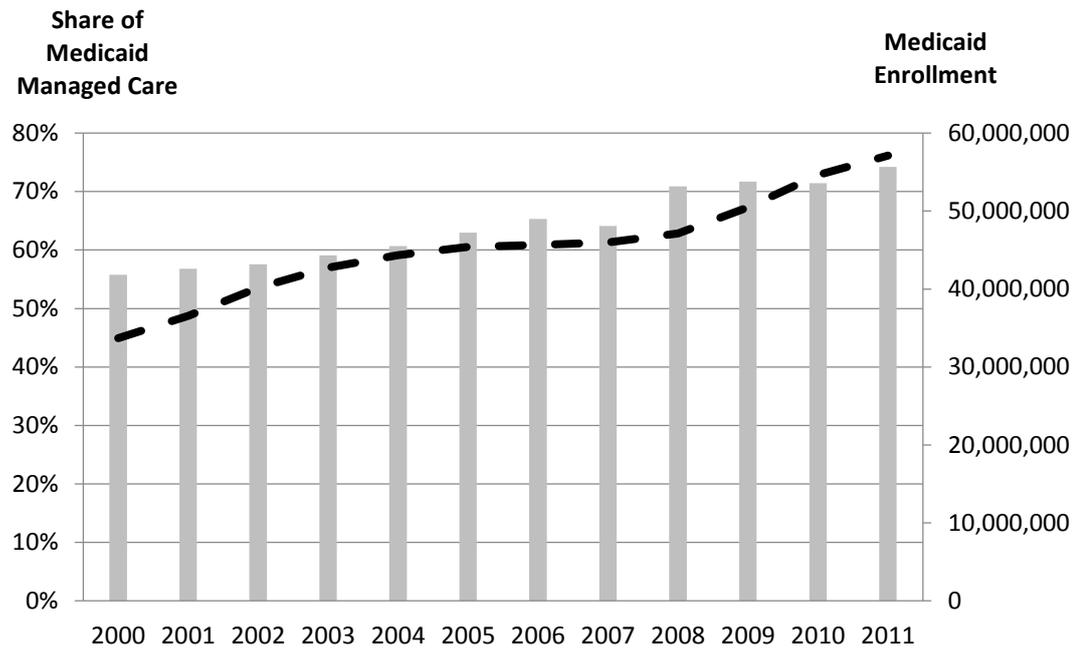
The degree to which Medicaid has transitioned into a managed care-based program was initially been promoted by the growth of managed care in private health insurance and commercial plans' willingness to integrate Medicaid into their business portfolio. Private insurers entered the Medicaid market predominantly to grow membership for market positioning purposes and to gain increased negotiating leverage with network providers (Hurley and Draper, 2002). However, distinctive features of Medicaid managed care, i.e. intermittent eligibility among beneficiaries or the expansion of existing networks to incorporate traditional Medicaid providers to respond to state agency and consumer preferences (Hurley and McCue, 2000), did not increase commercial plans' negotiating leverage, but rather increased administrative costs and affected insurer profitability (Hurley and Somers, 2003). As a result, predominantly private insurers' participation in Medicaid managed care flattened after its peak in 1998. This trend was emphasized by regulations that emanated from the Balanced Budget Act (BBA) of 1997 which gave state Medicaid programs new authority to mandate managed care enrollment without a waiver. Furthermore, it eliminated Medicaid's longstanding "75/25" rule, which required 25 percent of a Medicaid plan's enrollment to be commercially insured. This change paved the way for the emergence of Medicaid-dominated and Medicaid-only managed care plans.³³ Consequently, enrollment in Medicaid-only MCOs has climbed steadily after the issue of BBA in 2002 from 43 percent to 58 percent in 2011 (CMS, 2011). Since 2006, the share of Medicaid beneficiaries enrolled in Medicaid-only MCOs has exceeded Medicaid enrollment in commercial plans. A similar trend can be observed with respect to the number of commer-

³³ Many of these MCOs are owned by safety-net hospitals while others are run by multi-state, publicly traded corporations that have chosen to specialize in the Medicaid market.

cial MCOs, which has decreased from 202 private plans in 2007 to 157 in 2011. In contrast, the number of Medicaid-only MCOs increased in the same period from 143 to 175 (CMS, 2011; Kaiser Commission on Medicaid and the Uninsured, 2010).

Figure 4.1 illustrates the share of Medicaid managed care (columns, left axis) and the overall Medicaid enrollment (dotted line, right axis) from 2000 to 2011. Medicaid enrollment has substantially increased over time. Managed care has become Medicaid's dominant delivery system, covering 74 percent of all Medicaid enrollees, and serving over 42 million beneficiaries in 2011. The notable growth between 2000 and 2002 reflects, on the one hand, state coverage expansions that occurred in the late 1990s. On the other hand, it is also related to the economic slowdown, as more people experienced job losses and income declines and became eligible for Medicaid (Holahan and Ghosh, 2005). A comparable trend can be seen after 2008, where the largest net increase in enrollment (of almost 4 million) reflects major expansions of Medicaid managed care in several states and the aftermath of the financial crisis. Between 2007 and 2008, the percentage of Medicaid beneficiaries in managed care rose from 64 percent to 71 percent. The managed care penetration rate varies significantly from state to state where highly urbanized states tend to have a higher percentage of beneficiaries enrolled in comprehensive risk-based plans (CMS, 2011; Kaiser Commission on Medicaid and the Uninsured, 2010).

Figure 4.1: Share of Medicaid Managed Care and Overall Medicaid Enrollment, 2000-2011



Source: CMS Medicaid Managed Care Enrollment Report, 2011.

4.3 Literature Review and Predictions

Over the last decade, premiums in private health insurance have been growing at a much higher rate than earnings and overall inflation. Average premiums in employer-sponsored health insurance have increased 69 percent since 2004 and have more than doubled since 2002 (Kaiser, 2014). Technological progress is widely considered to be responsible for driving up premiums (Newhouse, 1992; Cutler, 1995; Chernew *et al.*, 1998), but there are other factors that influence premiums.

Changing market conditions in private health insurance induced changes in the provision, utilization, and financing of health care which also further attribute to premium increases. The widespread implementation of managed care in the 1990s was followed by the control of medical utilization, tighter provider networks, and cost-saving measures (Mayes and Hurley, 2006; Rice, 1999). Implemented in an attempt of

private plans to maintain profitability, these restrictions became increasingly unpopular, and a managed care backlash ensued. Managed care reforms alleviated these restrictions but also ended the era of low premium increases in private health insurance (Frakt, 2011).

Additional drivers of increasing premiums relate to the market structure and market concentration in private health insurance as well as health insurance reforms. Robinson (2004) analyzes the state-level market structure of commercial insurance carriers in 2000-2003. He finds that local health insurance markets in the U.S. are highly concentrated and typically dominated by only three insurance carriers. Between 2000 and 2003, health plans were able to raise prices consistently above the rate of growth in costs, with premium yields 1.5 to 2.0 percentage points above cost trends. Dafny *et al.* (2012) report similar results when estimating the impact of changes in local market concentration on premium growth over the period 1998-2006. They find that local markets are very concentrated and that consolidation during the observation period raised premiums by around 7 percent. Cogan *et al.* (2010) analyze the effect of Massachusetts' health reform on employer-sponsored insurance premiums. They find that between 2004 and 2008 premiums in single coverage, employer-sponsored insurance increased by about 6 percent due to the health reform.

Consolidation, premium growth, and the economic downturn did not only affect the private health insurance market but also swamped public programs, in particular the Medicaid program, because enrollment and spending increased. As a response, states made policy changes that affected benefits and provider reimbursement rates, and in the end they controlled the rate of Medicaid spending growth (Holahan and Ghosh, 2005).

Existing literature primarily focuses on evaluating the size and operation of the Medicaid program, i.e. access to care, cost of care and health outcomes within the Medicaid program.³⁴ However, reforms and changes to public programs have affected private health insurance in various ways and reveal a mutual relationship of the private health insurance market with the Medicaid program. Expansions in eligibility which were intended to cover the uninsured had the effect of prompting individuals already enrolled in private insurance to switch into Medicaid. This effect, referred to as “crowding out”, has been recognized and measured in a variety of settings (e.g., Cutler and Gruber, 1996; Blumberg *et al.*, 2000; Shore-Sheppard, 2000; Shore-Sheppard *et al.*, 2000; Lo Sasso and Buchmueller, 2004; Ham and Shore-Sheppard, 2005; Gruber and Kosali, 2008; Shore-Sheppard, 2008).

The interdependence of the public and private health insurance market further becomes obvious in terms of the reimbursement of providers. While insurers have to negotiate payments on an individual basis, public programs determine payment rates for providers. Hadley and Holahan (2003) analyze comparable populations of Medicaid and privately insured and identify lower provider payment rates in Medicaid as the underlying cause of lower health care costs. Furthermore, data collected by the American Hospital Association (AHA) displays huge variation in the payment-to-cost ratio in the hospital market depending on the type of insurance coverage, indicating a cost shift from privately to publicly insured and the uninsured. Dobson *et al.* (2006) define a cost shift as “the allocation of unpaid costs of care delivered to one patient population through above-cost payments collected from other patient populations”. In the period between 1992 and 2012 the payment-to-cost ratio for private payers ranged between

³⁴ Buchmueller *et al.* (2015) provide an overview on the Medicaid program and its impact on a broad range of outcomes.

1.15 and 1.48.³⁵ For Medicare (Medicaid) the range was between .89 and 1.04 (.86 and .96) (AHA, 2014) indicating that with regard to remuneration, Medicare is slightly more generous than Medicaid. Zuckerman *et al.* (2009) show that, as a consequence of spending caps imposed by the states, Medicaid reimbursement levels fell in inflation-adjusted terms between 2003 and 2008. In 2008, Medicaid reimbursement levels were only 72 percent of those in Medicare.

While the crowding out phenomenon and cost shifts towards private health insurance are well recognized, little research has considered how the design and extent of Medicaid affects the performance of the private insurance market. This might be traced back to the fact that crowding out is relatively small when compared to its overall positive effect i.e., the reduction of uninsured. Changes in eligibility have not been so great as to spark fears that the private market would suffer any significant loss in enrollees. However, public health programs, like Medicaid or Medicare, may significantly affect private health insurance markets on other dimensions, such as availability of services and the cost of coverage.

In our study, we focus on premiums in comprehensive medical insurance in the private health insurance market and analyze how these are affected by the Medicaid program. We propose our first prediction as follows:

Prediction 1: *Premiums in comprehensive medical insurance market increase with the size of the state's Medicaid population.*

³⁵ A payment-to-cost ratio of 1.15 indicates that for every dollar of cost, hospitals received \$1.15 from private payers.

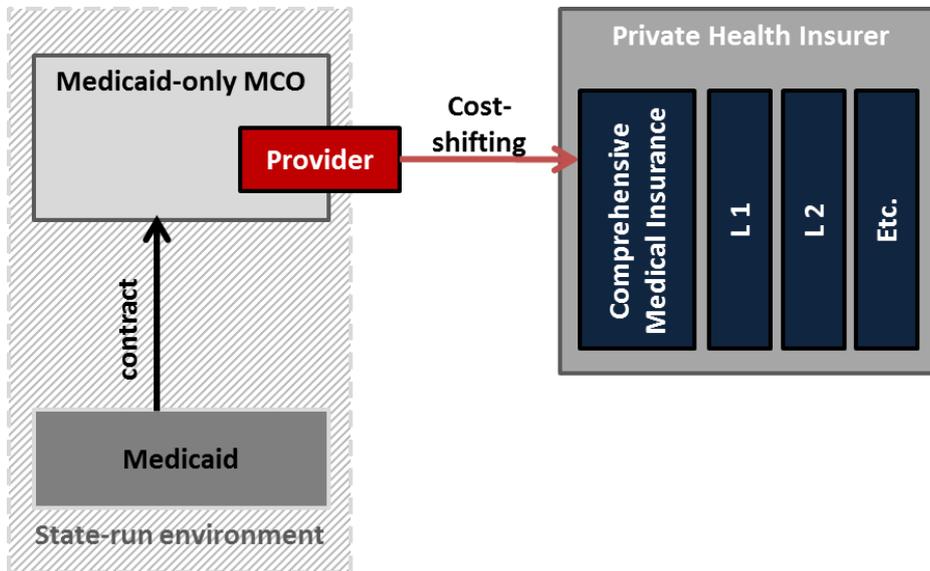
In the empirical analysis, we account for the extent of the Medicaid program by using the percentage of Medicaid enrollees in a given state for a given year. To control for cross-state variation with regard to the extent of the Medicaid program, we include the Medicaid costs per beneficiary in our regression. As states have considerable leeway to set reimbursement levels to health care providers and to set eligibility rules, there are large differences across states in per-capita Medicaid expenditures. Expenditures per Medicaid beneficiary in fiscal year 2007 were \$8450 in New York and \$3168 in California, compared with an overall average of \$5163 (Gilmer and Kronick, 2011). Determinants of this great variation in Medicaid spending include differences in prices and amounts of services used as well as the underlying characteristics of populations, such as the percentages elderly and disabled (e.g., Fisher *et al.*, 2003; Holahan, 2007). In principal, we expect higher Medicaid costs per beneficiary to induce higher premiums in private health insurance due to the lack of adequate provider reimbursement rates and as a result of policy changes made by the states to control the rate of spending growth.

An interesting feature of the Medicaid program is that it differs significantly from state to state. When analyzing its influence on the private health insurance market in the U.S., it is important to take into account how Medicaid is organized in a state and to what extent private insurers participate in the program. Three relationships are possible:

- (1) *A state-run Medicaid program:* State Medicaid agencies directly pay health care providers or contract with non-commercial Medicaid-only MCOs. The private insurer does not participate, nor do any other private insurers participate in Medicaid.

Figure 4.2 displays a state-run Medicaid environment in which the state Medicaid agency contracts with a Medicaid-only MCO.

Figure 4.2: State-run Medicaid Environment

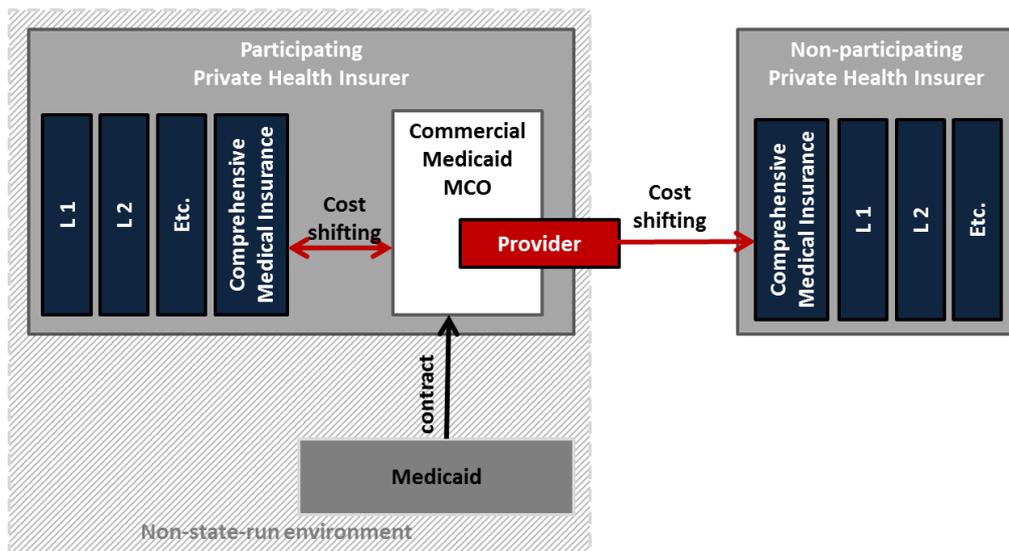


States make use of Medicaid-only managed care arrangements and existing provider networks to control costs. McCue (2012) analyzes the financial performance of health plans in Medicaid managed care and finds that Medicaid-only MCOs incur a lower medical loss ratio and higher administrative cost ratio than commercial plans due to more cost-effective care. A state-run system might further be more cost-effective in a sense that providers and private insurance companies have fewer opportunities to engage in cost shifting towards the Medicaid program. However, cost shifts might arise from providers towards privately insured as a result of low and fully capitated Medicaid provider reimbursements. Thus, we expect Medicaid costs per beneficiary to be lower in Medicaid systems that are operated by the state. In contrast, premiums in private health insurance are higher in state-run systems and increase with the size of the Medicaid program and proportion of Medicaid managed care as a result of providers' cost-shifting activities.

- (2) A non-state-run Medicaid environment with the participation of the private insurer: The private insurer operates in a state with a non-state-run Medicaid program. In this case, state Medicaid agencies contract with commercial Medicaid MCOs, and the private insurer participates in the program (i.e., covers Medicaid enrollees on a risk basis).
- (3) A non-state-run Medicaid environment without the participation of the private insurer: The private insurer operates in a state with a non-state-run Medicaid program, but does not participate.

Figure 4.3 displays a non-state-run Medicaid system. Private insurers that participate in the public program then operate Medicaid besides comprehensive medical insurance and other lines of business. However, there are still private health insurers in the market that do not participate in Medicaid.

Figure 4.3: Non-state-run Medicaid Environment



Long and Yemane (2005) analyze factors that explain commercial plans' decisions to stay in or exit from Medicaid managed care. They find that higher capitation rates and higher growth rates in capitation rates are associated with a lower probability that commercial plans exit. Furthermore, private health insurers that have invested in Medicaid managed care and cover a larger share of the market are more likely to stay. Holahan and Suzuki (2003) surveyed Medicaid managed care payment methods in 2001 and find considerable variation across states. The authors attribute the level of payment rates and the degree to which states adjust for risk to be crucial for commercial plans' willingness to serve the Medicaid clientele. Our research takes the participation in Medicaid as a given, but we recognize the selection that occurs when private insurers have different incentives and strategies that drive the decision to participate.

In a non-state-run environment, cost shifts can possibly lead into various directions. Private health insurers that do not participate in Medicaid could experience cost shifts from providers that serve the Medicaid population. Provider-induced cost shifts might also affect participating health insurers, but these insurers have the potential to alleviate additional costs within their Medicaid business. Hence, we expect that insurers are directly affected by their participation in the Medicaid program. Participating insurers are likely to be less prone to Medicaid related premium increases, as they can internalize cost shifts through their commercial Medicaid MCOs. We expect that the extent to which insurers are affected and cost-shifting results, increases as the population enrolled in the program increases. We therefore evaluate the following prediction:

Prediction 2: *Premiums in comprehensive medical insurance business increase if a greater share of the state's Medicaid population is enrolled in Medicaid managed care.*

In the analysis, we further include state demographic factors (e.g., per capita income, the percentage of uninsured and individuals over 65 years) and variables that account for differences in the states' health care markets. Higher income levels and wages influence cost and payment levels in the health care market. Thus, a higher per capita income is typically related to higher health care costs and insurance premiums. The same impact can be expected from a higher portion of individuals over 65 years, as they are more likely to cause higher health care utilization and higher costs. Despite state and government funded health insurance programs to cover this population (e.g., Medicaid and Medicare), providers might offset prices through cost shifts towards private health insurance due to lower provider payment rates in public programs. Thus, we expect premiums in private health insurance will increase with the number of individuals over 65 years. The same effect should appear in the matter of uncompensated care of the uninsured. Over the last decade, there has been an upward trend in the emergency utilization rate of the uninsured. Qin and Liu (2013) calculate that uncompensated hospital emergency utilization increased from 30.2 percent to 43.8 percent between 2000 and 2007. In 2013, the cost for uncompensated care provided to uninsured individuals was \$84.9 billion (Coughlin *et al.*, 2014). A large portion of this amount was paid by the federal government through a variety of programs (including Medicaid and Medicare), states, and the private sector. Stoll (2005) estimates the impact of uncompensated care funded through cost shifts to amount an extra \$922 for family health insurance and \$341 for individual insurance, on average. Hadley *et al.* (2008) estimate this impact to be smaller, as they include further government sources and the assumption that some providers absorb the cost of uncompensated care in the form of lower profits. Thus, we expect premiums in private health insurance will increase with the state's share of uninsured.

It is useful to control for characteristics of the states' health care markets with respect to the provision and costs of care as they vary significantly across states and influence the health care market itself as well as premiums in private health insurance. The consolidation of the hospital sector has permitted hospital systems to raise the rates charged to insurers and thus led to higher prices (Bates and Santerre, 2008; Cuelar and Gertler, 2003; Robinson, 2004). In our analysis, we account for the number of hospitals (per thousand state inhabitants) and expect that a higher concentrated hospital market increases premiums in private health insurance. We expect the same impact for the state average physician salary per year.

As noted above, the level of market concentration in private health insurance influences premium growth (Dafny *et al.*, 2012). We measure the competitiveness of private insurers' comprehensive business on the state-level using the Herfindahl-Hirschman Index (HHI) and expect higher premiums to be accompanied by higher values of HHI.

Over the last decade, the erosion in employment-based coverage, enrollment losses, and the profitability downturn in the managed care industry have altered private insurers' interest in public-sector lines of business (e.g., Medicaid and Medicare). In principle, diversification across different products and markets has been private health insurers' core strategy to remain profitable (Robinson, 2006). In our analysis, we include the numbers of lines and states in which the insurer operates to account for the degree of diversification, but its impact on premiums is twofold. Diversification can be a means to spread risk and offset losses but this potential relies on each line's (or state's) profitability and whether economies of scope apply (i.e., using existing provider networks).

Another main determinant of an insurer's profitability is market share. A higher market share is associated with more efficient methods of operation (economies of scale) that could be captured in claims processing and negotiating provider networks through greater market power (Austin and Hungerford, 2009). We therefore expect that a higher market share in comprehensive business is associated with lower premiums.

Finally, in order to control for the health plan's financial performance we include a measure of the insurer's potential to bear risk, i.e. its financial capacity. The insurer's financial capacity is represented by its premium volume divided by total surplus and thus proxies the amount of risk it can underwrite based on its financial condition.

4.4 Data and Methodology

The data for our analysis was obtained from the National Association of Insurance Commissioners' (NAIC) Health Insurers Annual Statutory Data. We include data for all insurers that reported financial information to the NAIC from the years 2001-2009. We limit our observation period to 2009, as with the passage of the PPACA in 2010 a broad range of provisions (e.g. expansion of Medicaid, creation of an insurance exchange) will come into place, affecting both, the Medicaid program and private health insurance in subsequent years. The NAIC data set contains detailed information, by state and by line of business, on premiums earned, administrative expenses, surpluses, and enrollees. State level market concentration measures were calculated from this data³⁶ and all monetary values have been adjusted for inflation (\$2009). The analysis includes data from 30 states of which 15 states have a state-run Medicaid system and 15 states

³⁶ We do not include self-insured employers or health business reported by life insurers.

admit commercial private health insurers to the provision of Medicaid services (non-state-run).³⁷ For the insurer-level analysis, we include multi-state operating companies that write premiums in comprehensive medical business and truncate the sample at the 99 percent quantile. Further, we only consider health insurance companies that have total premiums earned of at least \$5,000 and covered at least 1,000 enrollees per year.

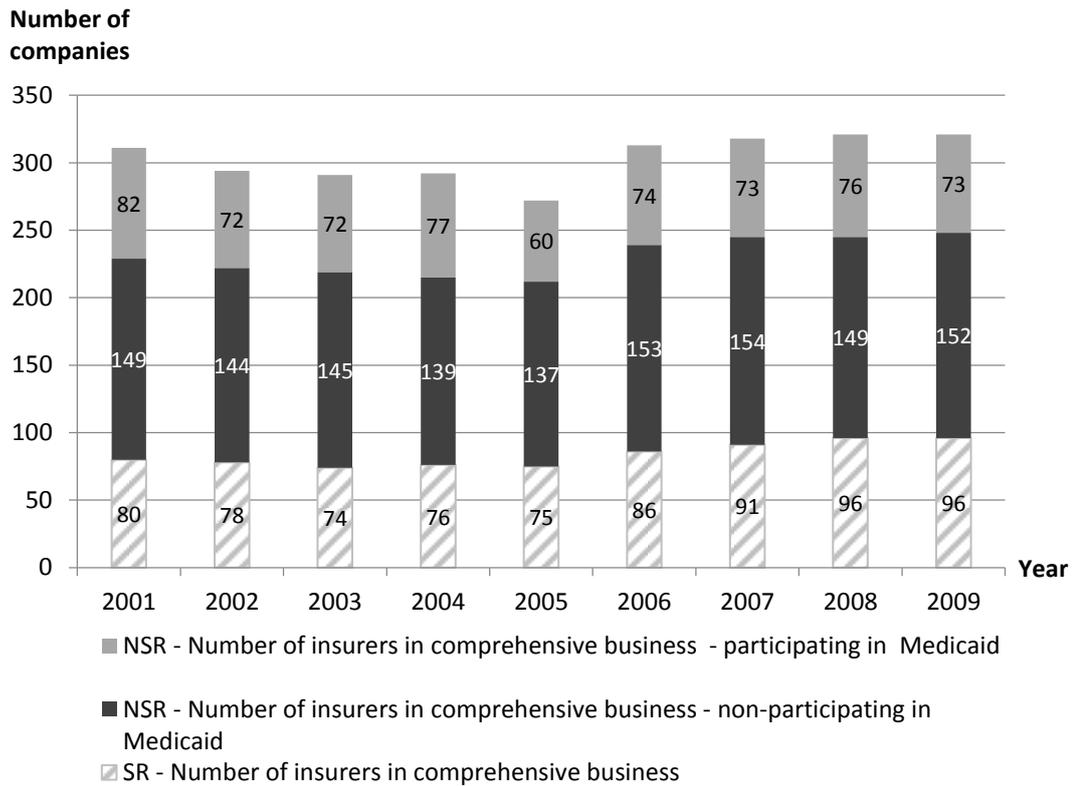
Overall, in the period of 2001-2009 we have a total of 2,733 observations.³⁸ We divide the dataset into three different subsamples: The first subset includes observations for all insurers in states where Medicaid is solely operated by the states' Medicaid agencies in absence of any commercial health insurer participation (n=752). The remaining 1,981 observations represent private insurers in a competitive non-state-run Medicaid environment.³⁹ About 33 percent of these health insurers participate in Medicaid managed care (NSR-PAR) and constitute our second subsample with 659 observations. The third subsample contains 1,322 observations of companies that have no premium income in Medicaid and thus do not participate (NSR-NPAR). Figure 4.4 gives an overview of the number of health insurers in comprehensive medical insurance considering the states' Medicaid environment and the insurers' participation in Medicaid.

³⁷ We exclude 20 states from our analysis because either (1) insurers in the state did not provide a financial report to the NAIC for some years in our sample, or (2) the state switched between a state-run Medicaid program and Medicaid managed care program which involved commercial health insurers (non-state-run). A detailed overview on states that have been dropped from the sample can be found in Appendix D.

³⁸ Sample statistics for the overall sample are provided in Appendix A.

³⁹ The classification of state-run and non-state-run is based on data from the NAIC and reconciled with Medicaid Statistical Information System (MSIS) data obtained from CMS. A state has a non-state-run Medicaid system in case a company reports positive premiums earned in Medicaid (according to NAIC data) and Medicaid enrollees in commercial HMOs were reported to CMS in that state.

Figure 4.4: Number of Comprehensive Medical Insurers, 2001-2009



We combine insurer-level data with several state demographics that were obtained from U.S. Census, i.e. state average income per capita, the percentage of the population over 65 years, and data on health insurance coverage status, i.e. states' Medicaid enrollment and the percent of the population that is uninsured. State-level calculations of Medicaid costs per beneficiary and the proportion of Medicaid beneficiaries covered in Medicaid managed care organizations are derived from data from the Medicaid Statistical Information System (MSIS) provided by the CMS. As we further want to control for a state's medical provider infrastructure, we include data on the number of hospitals per thousand inhabitants, obtained from the American Hospital Association Annual Survey of Hospitals, and the state average annual physician salary from the Bureau of Labor Statistics, Occupational Employment Statistics Survey. Table 4.1 provides an overview and a description of the variables used in the analysis.

Table 4.1: Variable Definitions

Variable	Definition
<i>Dependent Variable</i>	
Premiums in Comprehensive Business	Premiums earned per member for insurers i in year t in comprehensive business (in \$2009).
<i>Independent Variables</i>	
Percentage Medicaid	The percentage Medicaid enrollees in state j during year t .
Medicaid Costs	The Medicaid costs per beneficiary in state j during year t (in hundreds \$2009).
Medicaid Managed Care	Share of Medicaid beneficiaries enrolled in Managed Care Organizations in state j during year t .
Percentage Uninsured	The percentage of uninsured in state j during year t .
Average Income	The average income per capita in state j during year t (in thousands \$2009).
Population over 65	The percentage of individuals over 65 years in state j over year t .
Hospitals	The number of hospitals per thousand inhabitants in state j during year t .
Physician Salary	The average physician salary in state j during year t (in thousands \$2009).
HHI	Herfindahl- Hirschman Index of state j calculated as the sum of the squares of insurer i 's market share in comprehensive business (measured as premiums earned) in state j during year t .
Number of Lines	The number of lines in which insurer i has business during year t .
Number of states	The number of states in which insurer i operates during year t .
Capacity	Insurer i 's total premiums written divided by insurer i 's surplus during year t .
Market Share	Insurer i 's market share in comprehensive business (measured as premiums earned) in the state j during year t .

Using different subsets, we estimate a multivariate regression model with annual premiums earned per member as the dependent variable. We incorporate state-fixed effects to account for unobservable demand and cost conditions that are time-invariant across markets. Further, we incorporate year-fixed effects to capture factors

that vary over time that are common to all states. We cluster standard errors at the state level in order to account for the fact that companies in a state face the same regulatory and Medicaid environment.

Formally, we estimate the following model:

$$\begin{aligned}
 Premiums_{ijt} = & \beta_0 + \beta_1 McaidPct_{jt} + \beta_2 McaidCost_{jt} + \beta_3 McaidManagedCare_{jt} + \\
 & + \beta'_n \vartheta_{jt} + \beta'_n \mu_{it} + \gamma_j + \delta_t + \varepsilon_{ijt}
 \end{aligned} \tag{1}$$

where,

ϑ_{jt} = a vector of state-level characteristics that influence premiums in state j during year t

μ_{it} = a vector of company characteristics to control for heterogeneity of insurer i in year t

γ_j captures state-fixed effects, δ_t captures year-fixed effects, and ε_{ijt} is a random error term.

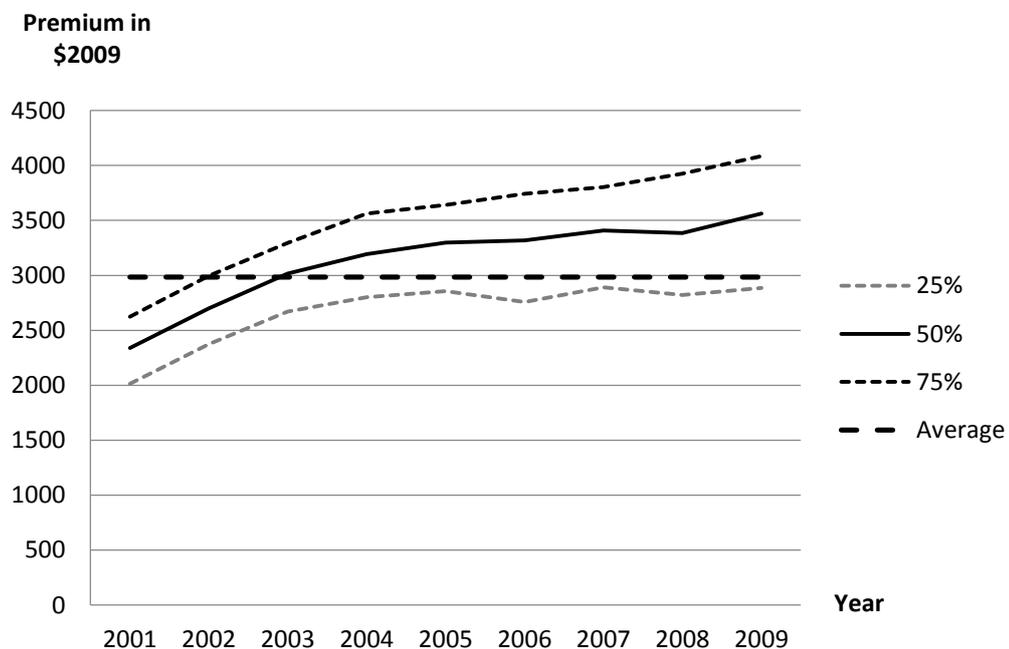
The exogenous regressors contain a set of variables, which we split into different groups. The influence of Medicaid related variables on premiums in comprehensive medical insurance are the main focus of our analysis. These include state-level measures on the percentage of Medicaid insured, Medicaid costs per beneficiary, and the proportion of managed care in the state's Medicaid market. As noted above, we further include state-level measures of the health care provider market such as the number of hospitals per thousand inhabitants, the average annual salary of physician, the Herfindahl-Hirschman Index in comprehensive medical business, the percentage of uninsured, state average (per capita) income, and the proportion of the population above 65 years. Furthermore, we use company-specific characteristics to account for insurer heterogeneity. These include the number of lines and states in which the com-

pany operates, the insurer’s market share in comprehensive medical insurance, and capacity.

4.5 Results

Before reporting the results from the empirical model, we have a closer look at how annual premiums developed in the observation period. Between 2001 and 2009, premiums in the overall sample increased on average by 49 percent, from an average annual premium of \$2,263 in 2001 to \$3,374 in 2009.⁴⁰ Technological progress, changing market conditions, and market consolidations in private health insurance are the driving factors for the premium increases. Figure 4.5 presents the 25th, 50th, and 75th percentile of premium development and the overall average premium in the observation period for our sample of insurers.

Figure 4.5: Annual Premiums per Enrollee in Comprehensive Medical Insurance, 2001-2009



Notes: Dashed black line displays the average annual premium over the sample period.
Source: NAIC Annual Data for Health Insurers.

⁴⁰ Dafny *et al.* (2012) find similar premium increases in their sample.

Table 4.2 presents the summary statistics for the two subsamples. In states without any private insurers' participation in the Medicaid program, premiums in comprehensive medical insurance are significantly higher (\$3,061) than in states with a non-state-run Medicaid environment (\$2,953). Furthermore, these states have lower Medicaid costs per beneficiary (\$5,145) and report a higher percentage of Medicaid enrollees (13 percent) and uninsured (15 percent). These numbers provide some evidence that state-run Medicaid states may operate their program more cost-effectively, but simultaneously induce higher cost-shifts towards comprehensive premiums in private health insurance.

The proportion of Medicaid beneficiaries enrolled in Medicaid managed care, in form of Medicaid-only MCOs (in a state-run) or Medicaid-only and commercial Medicaid MCOs (in a non-state-run environment), does not significantly differ. In states with private health insurers' participation in the Medicaid program, the average income (\$40,715) and relative size of the population over 65 (13 percent) is significantly higher.

Table 4.2: Summary Statistics by Medicaid Environment, 2001-2009

Variable	STATE-RUN (N=752)		NON-STATE-RUN (N=1,981)		Mean-Diff.
	Mean	Std. Dev.	Mean	Std. Dev.	
<i>Dependent Variable</i>					
Premiums in Comprehensive	3,061.983	(805.921)	2,953.531	(1,026.340)	-108.452 ***
<i>Independent Variables</i>					
Percentage Medicaid	13.191	(3.551)	12.399	(3.505)	-0.792 ***
Medicaid Costs (in \$100)	51.452	(13.272)	59.364	(16.340)	7.912 ***
Medicaid Managed Care	71.210	(24.384)	71.485	(15.371)	0.275
Percentage Uninsured	15.060	(2.984)	14.193	(5.194)	-0.866 ***
Average Income (in \$1,000)	36.383	(5.540)	40.715	(4.737)	4.331 ***
Population over 65	12.192	(1.631)	13.012	(2.030)	0.819 ***
Hospitals	25.943	(13.698)	15.299	(5.405)	-10.644 ***
Physician Salary	165.863	(21.612)	165.490	(21.444)	-0.373
HHI	3,900.483	(2,173.920)	2,004.482	(1,198.057)	-1,896.00 ***
Number of Lines	2.805	(1.648)	2.951	(1.568)	0.147 **
Number of States	1.965	(2.259)	1.543	(1.686)	-0.422 ***
Market Share	17.394	(24.440)	6.744	(11.868)	-52.652 ***
Capacity	7.456	(6.473)	8.449	(27.346)	0.993

Health care markets also differ significantly. States with state-run Medicaid systems have a substantially higher number of hospitals per thousand inhabitants (25.943), but there is no significant difference in the average physician salary. Private health insurers operating in a state-run Medicaid system face a significantly less competitive market environment in comprehensive medical business (HHI of 3,900) and have on average higher market shares (17 percent) compared to insurers in non-state-run Medicaid systems.

Table 4.3: Summary Statistics in NSR by Insurer's Participation, 2001-2009

Variable	NSR-PARTICIPATION (N=659)		NSR-NO PARTICIPATION (N=1,322)		Mean-Diff.
	Mean	Std. Dev.	Mean	Std. Dev.	
Dependent Variable					
Premiums in Comprehensive	2,963.022	(901.315)	2,948.800	(1,083.582)	-14.223
Independent Variables					
Percentage Medicaid	12.618	(3.381)	12.290	(3.562)	-0.329 **
Medicaid Costs (in \$100)	57.444	(16.414)	60.321	(16.225)	2.877 ***
Medicaid Managed Care	69.683	(15.509)	72.383	(15.227)	2.700 ***
Percentage Uninsured	14.643	(5.382)	13.969	(5.085)	-0.674 ***
Average Income (in \$1,000)	39.912	(4.398)	41.115	(4.849)	1.202 ***
Population over 65	13.084	(2.141)	12.975	(1.973)	-0.108
Hospitals	15.720	(5.566)	15.089	(5.312)	-0.632 **
Physician Salary	164.859	(23.745)	165.805	(20.201)	0.946
HHI	2,026.310	(1,360.756)	1,993.601	(1,108.468)	-32.709
Number of Lines	3.566	(1.423)	2.644	(1.547)	-0.922 ***
Number of States	1.039	(0.195)	1.794	(2.013)	0.755 ***
Market Share	8.369	(13.326)	5.934	(10.986)	-2.436 ***
Capacity	10.429	(11.513)	7.463	(32.433)	-2.966 **

Table 4.3 presents the summary statistics for insurers that operate in a non-state-run Medicaid environment with the distinction between participation and non-participation in the Medicaid program. Therefore, our main focus is on company-specific characteristics. We find that insurers that are active in Medicaid operate in significantly more lines of business (3.566) and have a larger market share in comprehensive medical business (8.4 percent) but operate in fewer states (1.039) than non-participating companies. With regard to financial situation, commercial insurers with premium income from Medicaid business have greater leverage (capacity) to bear risk

(10.429). These figures indicate that predominantly big companies with a large market share in comprehensive business and a stable financial situation engage in Medicaid business.

For the empirical model, we run a fixed effects regression on annual premiums earned in the overall comprehensive medical business for the three subsamples. Companies in the unbalanced panel are observed for an average period of 5.6 (SR), 5.6 (NSR-PAR), and 5.2 (NSR-NPAR) years, respectively. As shown in Table 4.4, we find that the impact of most Medicaid program related variables is positive and significant: A higher percentage of Medicaid enrollees in a state is associated with higher premiums in private health insurance. This result is in line with Prediction 1. In terms of economic significance, if evaluated at the mean, a 1 percent increase in the state's percentage of Medicaid beneficiaries raises annual comprehensive premiums by \$30.78 in a state-run Medicaid environment and \$100.16 in a non-state-run Medicaid environment in absence of the insurers' participation in Medicaid. These results provide support for Prediction 1 that premiums in private health insurance are significantly affected by the size of the state's Medicaid population as a result of cost-shifting activities.

Table 4.4: Insurer-level Fixed Effects Regression on Annual Premiums per Enrollee, 2001-2009

	STATE-RUN (SR)		NON-STATE-RUN (NSR)			
			PARTICIPATION (PAR)		NO PARTICIPATION (NPAR)	
Percentage Medicaid	30.783*	(16.145)	95.096***	(26.374)	100.159***	(21.502)
Medicaid Costs	3.827	(2.444)	4.873	(9.430)	9.707	(7.587)
Medicaid Managed Care	4.001**	(1.658)	-4.891	(3.742)	5.314*	(2.683)
Percentage Uninsured	11.763	(13.325)	16.113	(18.463)	56.267**	(19.874)
Population over 65	461.670***	(84.226)	209.553*	(106.057)	100.589*	(49.324)
Average Income	46.297***	(13.009)	88.029**	(37.432)	103.618***	(21.609)
Hospitals	-34.284**	(12.644)	-93.946	(73.367)	-61.715	(38.513)
Physician Salary	1.817*	(0.893)	-0.257	(3.704)	2.321	(1.600)
HHI	0.001	(0.025)	-0.052	(0.078)	0.010	(0.057)
Market Share	-5.721**	(1.931)	-24.913***	(7.649)	-2.438	(11.504)
Number of Lines	-20.602	(19.870)	-12.422	(96.834)	34.495	(47.106)
Number of States	14.817	(23.941)	-247.962	(159.747)	-60.046*	(29.036)
Capacity	-2.119	(4.297)	3.144	(2.326)	-0.444**	(0.196)
Constant	-4,589.632***	(980.385)	-2,564.129	(2,354.326)	-5,042.761***	(1,236.325)
N	752		659		1,322	
R ²	0.544		0.388		0.403	

Notes: Standard errors in brackets, * p<.1, ** p<.05, *** p<.01

The coefficient for Medicaid costs per beneficiary is not significant in any subsample, whereas the positive and significant effect of the implementation of Medicaid managed care becomes clear at a second glance: Although the coefficients are small in size, a 1 percent increase of the state's Medicaid population enrolled in Medicaid MCOs raises premiums in comprehensive business by \$4.00 (SR) or \$5.31 (NSR-NPAR) respectively. Managed care is usually associated with the potential to contain costs through the integration of the financing and delivery of health services. However, for commercial insurers, it bears the risk of cross-subsidization towards Medicaid as a result of low provider reimbursement and fully capitated Medicaid MCOs. In our analysis, this effect only becomes obvious for insurers that do not write business in Medicaid, either because of state regulation (SR) or company decisions (NSR-NPAR). Insurers offering commercial Medicaid MCOs (NSR-PAR) seem to be able to internalize these cost-shifts although the coefficient is not significant. These results provide support for Prediction 2 that premiums in private health insurance increase with the share of Medicaid managed care in a state.

Coefficients of several control variables are also significant and straightforward. We find that higher per capita income is associated with higher premiums in comprehensive medical business. If evaluated at the mean, raising average income by \$1,000 lead to a premium increases of \$46.30 (SR) and in a non-state-run environment \$88.03 (PAR) or \$103.62 (NPAR). Here, a higher willingness to pay and/or higher coverage might trigger the result. The effect of a higher percentage of individuals over 65 years is also significantly positive in all three subsamples, indicating that this population group with, on average, higher medical expenses might be cross-financed by private health insurance (although insured in public health programs as Medicare). It constitutes the largest effect in our analysis, indicating that a 1 percent in-

crease in the state's share of individuals over 65 increases premiums in private health insurance by \$100.59 (NSR-NPAR) up to \$461.67 (SR) depending on the state's Medicaid environment. Likewise, the impact of the state's uninsured percentage is similar: Here, increasing the uninsured population by 1 percent leads to premium increases of \$56.27 in comprehensive medical business when the insurer does not write Medicaid business (NSR-NPAR).

State-level measures of the provider market show that a more competitive hospital sector is associated with lower premiums in comprehensive medical insurance. We find that one additional hospital per 1,000 state inhabitants reduces premiums in comprehensive medical insurance by \$34.28 (SR). The impact of the annual physicians' salary on premiums in private health insurance is only significant in state-run Medicaid markets but negligible in economic terms.

With respect to insurer heterogeneity and the financial performance of private health insurers, the results show that insurers that increase their market share in comprehensive medical business have the potential to offer coverage at a lower premium, and thus pass on economies of scale towards the insured. If evaluated at the mean, an increase of a company's market share by 1 percent is associated with annual premium reductions of \$5.72 (SR) and \$24.91 (NSR-PAR). A positive effect of diversification into different lines of business on premiums does not become evident in our samples. However, multi-state operations are associated with lower premiums in comprehensive medical insurance: an insurer that operates in a non-state-run Medicaid state but is not active in Medicaid, writes \$60.05 lower premiums when it extends its business to an additional state. The companies' financial performance is affected as expected: a better ability to bear risk (i.e. higher capacity) results in premium reductions in comprehensive medical insurance.

4.6 Conclusion

In this study, we examine how the design and extent of the federal-state Medicaid program affects premiums in private health insurance between 2001 and 2009. Over the last decades, Medicaid has transitioned into a managed care based program. Depending on the states' regulatory Medicaid environment, state Medicaid agencies can subcontract with (1) provider networks to enroll beneficiaries in Medicaid-only managed care organizations or (2) with private health insurers to enroll parts of the state's Medicaid population in commercial managed care plans. As those individuals covered by public health care programs and those with private health insurance demand provide health services from the same providers, both markets are interrelated. We do not examine the private insurers' decision to enter the Medicaid market but rather focus on the influence of Medicaid on private health insurance accounting for the size of the public program and the regulatory environment.

With respect to market characteristics, we find that insurers that operate in state-run Medicaid environments face less competitive health insurance markets and charge higher premiums in private comprehensive business. Whereas, in states that open Medicaid to private health insurers, predominantly larger insurers that operate in more lines of business and have on average higher market shares participate in Medicaid.

In our multivariate analysis, we find evidence that premiums in private health insurance are positively related to the size of the state's Medicaid and uninsured population. Furthermore, a higher utilization of Medicaid MCOs increases premiums in private health insurance if insurers do not participate in the Medicaid program independent of the regulatory environment. These findings support our hypothesis that cost shifting from Medicaid enrollees and the uninsured towards private health insur-

ance is a consequence of low provider reimbursement, fully capitated Medicaid managed care plans, and uncompensated care.

As the U.S. health insurance market transforms in the aftermath of the PPACA, we are likely to see significant changes both in public health care and private health insurance market. As the government may play a larger role over time in providing insurance to certain populations, private insurers may have an increasingly difficult time in remaining profitable and premiums in the private market may rise.⁴¹ Our results provide an initial indication of how private insurers may be affected by the government's involvement in providing health insurance coverage; our plan for future research will explore this relationship further.

⁴¹ PPACA's effect on premiums is theoretically indeterminate. On the one hand, the reform might lead to lower premiums for employer-sponsored insurance. The creation of an insurance exchange could reduce transaction costs, especially for small employers. In addition, the individual and employer mandates, by expanding coverage, could reduce cost shifting from the uninsured. On the other hand, the reform might lead to higher premiums. If the supply of health services is upward-sloping, then the expansion in the demand for health services induced by the plan would lead prices of health services to increase, and premiums to follow prices. Any expansion of regulation through the exchange could exacerbate this effect.

5 General Conclusions

This thesis discusses and analyzes individual aspects of recent health reforms in both Germany and the U.S. Although, the two health care systems differ in its origin and alignment, the comparative consideration contributes to improve the understanding of economic problems of health insurance. The thesis shows that despite the wide differences, many aspects are relevant to both systems such as SuppHI and CDHC.

In this thesis, chapter 1 outlines the particularities and imperfections of the health care market, which mostly arise because of incomplete and asymmetric information. Furthermore, it gives an overview on the two health insurance systems of Germany and the U.S. and highlights recent reform proposals in economic context. Two trends can be observed: German SHI pursued an intensified market-based orientation characterized by benefit cuts and the implementation of economic incentives over the last two decades. Meanwhile, the U.S. focused on the most important social aspect of health insurance: Since 2010, affordable and universal health insurance coverage is available for the first time in history.

In Germany, a number of cost-control policies that restricted SHI coverage have resulted in increased out-of-pocket expenses and therefore contributed to the rising demand for SuppHI. To this end, chapter 2 empirically assesses the determinants of demand and selection effects in SuppHI in Germany. Unlike previous studies, the individuals' actual health state has been assessed by doctor-diagnosed diseases in this analysis as opposed to self-reported health states or doctor visits. The estimates from the GSOEP analyses suggest that income and insurance affinity, measured by switching behavior in SHI and the demand for life insurance, positively affect the demand for both supplemental hospital and dental benefits. While the effect of income is straightforward, the concept of insurance affinity is based on the idea that individuals have acquainted themselves with the concept of insurance and a switch of their

SHI provider indicates a conscious insurance decision in consideration of financial and quality aspects. More importantly, with regard to the individuals' health state the estimates indicate potential selection effects related adverse selection. In the sample of non-senior individuals (age 65 and younger), the estimates show that holding hospital SuppHI is associated with a higher likelihood of becoming sick in the future. The reverse is true for individuals older than 65; individuals with supplemental hospital coverage are healthier on average.

Chapter 3 gives insights on CDHC as a new trend in health insurance. The combination of tax-favored savings accounts and catastrophic health insurance plans to (partially) finance health care costs are well known from the U.S., but can also be observed in several other countries (i.e., Singapore, China, and Hong Kong). Besides a broad overview on the concept of HSAs and experiences from the U.S., the chapter discusses suitable ways to implement HSAs to German SHI building on newly defined Flexible Health Plans. It proposes an approach, which requires very little changes to the current system, while taking into consideration the particularities of SHI as well as financial and fiscal aspects. HSAs can then increase cost transparency and induce the insured to consume health care in a conscious way, therefore contributing to reduce moral hazard. Meanwhile, they would offer the insured new flexibility to design their health insurance options.

In chapter 4, the focus shifts to the U.S. health insurance system. Most particularly, it reveals the close interdependence of PHI and public health insurance programs addressing cost-shifting issues related to uncompensated care. Using financial data from private health insurers provided by the NAIC, the chapter analyzes how the price for coverage in PHI relates to the design and extent of government provided health insurance. As Medicaid is administered at the state level, the program significantly varies across states with regard to its size and private health insurers' direct

participation; as for some states, Medicaid is outsourced and private insurers operate Medicaid MCOs as a line of business. The estimates from the multivariate analysis show that premiums in PHI are positively related to the size of the state's Medicaid and uninsured population. Likewise, a higher utilization of Medicaid MCOs increases premiums in PHI. These findings indicate cost shifting from Medicaid enrollees and uninsured towards PHI as a consequence of low provider reimbursement, fully capitated Medicaid managed care plans, and uncompensated care.

To sum up, health insurance is a valuable commodity and designing equitable and affordable access meanwhile considering economic aspects are the main challenges for health policy makers in most industrial nations. Although health insurance systems have historically developed, social rethinking with regard to financing health care costs will be necessary to cope with current developments. Demographic change and technological progress will tie up more financial resources and constitute a heavy burden on the budgets of social security systems in the future. Therefore, it will be important to reduce inefficiencies and deteriorations inherent to the co-existence of public and private health insurance systems (i.e. spill over and selection effects). This thesis analyzes selected issues of recent health reforms and underlines that, despite the constant striving for cost-containment and efficiency, aspects of social justice have to be taken into consideration as well.

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Appendix A

Table A 1: Probit Regression on Hospital SuppHI - Self-Assessed Health Status

	Pr(Hospital SuppHI)	
	Model XI	
Variables of Interest		
Household income (log)	0.0626 ***	(0.0118)
SAHS (very good)	0.0043	(0.0121)
SAHS (good)	0.0080	(0.0087)
SAHS (fair)	0.0067	(0.0090)
Life insurance	0.0317 ***	(0.0056)
Change of SHI provider	0.0272 **	(0.0122)
Control Variables		
Male	-0.0087	(0.0058)
Age: younger than 26	-0.0405 ***	(0.0087)
Age: 26-35	0.0005	(0.0079)
Age: 46-55	-0.0117 *	(0.0069)
Age 56-65	0.0020	(0.0093)
BMI	-0.0009	(0.0006)
Household size	-0.0182 ***	(0.0027)
Risk attitude	-0.0048	(0.0177)
Risk attitude*income	0.0006	(0.0022)
Hospital stay in t-1	0.0069	(0.0097)
Low level of school	-0.0215 ***	(0.0065)
High level of school	0.0273 ***	(0.0076)
Blue collar worker	-0.0100	(0.0072)
Trainee	0.0144	(0.0162)
Unemployed	-0.0072	(0.0139)
Retired	-0.0012	(0.0143)
No job	0.0091	(0.0125)
SHI voluntary member	0.0106	(0.0091)
SHI family member	-0.0109	(0.0089)
SHI other member	-0.0080	(0.0116)
Observations	9,804	
Log Likelihood	-2759.4800	

Notes: Standard deviations reported in parentheses. ***, **, * significance at the 1%, 5% and 10% levels. Reference groups: self-assessed health status: Poor or very poor, Age: 36-45, Medium level of school, White-collar worker, SHI compulsory member.

Table A 2: Summary Statistics - Subsample of Compulsory Insured

Variables	Obs.	Mean	Std. Dev.
<i>Dependent variables</i>			
Hospital benefits	6,216	0.10	(0.29)
Dental benefits	6,216	0.16	(0.37)
<i>Variables of interest</i>			
Household income (log)	6,216	7.87	(0.49)
Sick in 2009	6,216	0.30	(0.46)
Life insurance	6,216	0.64	(0.48)
Change of SHI provider	6,216	0.07	(0.25)
<i>Control Variables</i>			
Male	6,216	0.48	(0.50)
Age	6,216	42.44	(11.46)
Age: younger than 26	6,216	0.08	(0.28)
Age: 26-35	6,216	0.21	(0.40)
Age: 36-45	6,216	0.29	(0.45)
Age: 46-55	6,216	0.27	(0.45)
Age: 56-65	6,216	0.15	(0.35)
BMI	6,216	25.96	(4.59)
Household size	6,216	2.79	(1.22)
Monthly net income	6,216	2,917.29	(1,397.39)
Risk attitude	6,216	4.53	(2.22)
Hospital stay in t-1	6,216	0.09	(0.28)
Self-ass. health: Very good	6,216	0.09	(0.29)
Self-ass. health: Good	6,216	0.47	(0.50)
Self-ass. health: Fair	6,216	0.31	(0.46)
Self-ass. health: Poor	6,216	0.13	(0.33)
Low level of school	6,216	0.36	(0.48)
Medium level of school	6,216	0.43	(0.49)
High level of school	6,216	0.21	(0.41)
Blue collar worker	6,216	0.33	(0.47)
White collar worker	6,216	0.53	(0.50)
Trainee	6,216	0.05	(0.21)
Unemployed	6,216	0.04	(0.19)
Retired	6,216	0.04	(0.18)
No job	6,216	0.03	(0.16)

Appendix B

The following example illustrates the possible savings within a tax treatment for low-, medium- and high-income non-married individuals (€20,000, €40,000 and €80,000 gross income after all tax deductions). We assume in all the cases an HDHP with a deductible of €1,000, which induces a bonus payment of €700. The marginal tax rates follow the German tax tables and for the sake of simplicity we assume that the premium payment does not change the marginal tax rate. We assume that the received bonus is invested risk-free at an interest rate of 4% and that individuals have to pay 25% capital gains tax outside the HSA. For the sake of simplicity, we omit the solidarity surcharge. To be precise, solidarity tax contribution and also church taxes if applicable are also reduced if the income tax burden decreases. For the sake of simplicity and as these extra taxes are much lower, we omit them in the following example.

Table B 1: Example of the Tax Subsidies of an HSA in Different Income Brackets

	€20,000	€40,000	€80,000
Marginal tax rate	28.14%	37.34%	42.00%
Deductible	€1,000	€1,000	€1,000
Contribution to an HSA	€700	€700	€700
Balance after a year in an HSA	€728	€728	€728
Bonus payment after tax	€503.02	€438.62	€406.00
Bonus payment after tax an interest of a year	€518.11	€451.78	€418.18

This example shows that the tax-favored investment of the bonus payment in an HSA leads to significant tax savings in all three cases. Yet, the high-income group has the highest savings potential. However, as the tax progression within the German taxation scheme starts much earlier than in the U.S., selection issues do not play as important a

role in Germany. Even though the absolute tax subsidy does increase with income, the relative subsidy in relation to gross income decreases in income in this example. Due to these factors, the selection issues can be assumed to be less significant in the German SHI than in the U.S. However, they may still play a role.

Appendix C

Table C 1: Sample Statistics - Overall Sample, 2001-2009

Variable	Obs.	Mean	Std. Dev.
<i>Dependent Variable</i>			
Premiums in Comprehensive	2,733	2,983.372	(971.759)
<i>Independent Variables</i>			
Percentage Medicaid	2,733	12.617	(3.535)
Medicaid Costs	2,733	57.187	(15.951)
Medicaid Managed Care	2,733	71.409	(18.294)
Percentage Uninsured	2,733	14.432	(4.706)
Average Income	2,733	39.523	(5.333)
Population over 65	2,733	12.786	(1.963)
Hospitals	2,733	18.228	(9.765)
Physician Salary	2,733	165.593	(21.487)
HHI	2,733	2,526.177	(1,748.313)
Number of Lines	2,733	2.911	(1.592)
Number of States	2,733	1.659	(1.871)
Market Share	2,733	9.674	(16.997)
Capacity	2,733	8.176	(23.530)

Table C 2: Overview on State-run Medicaid States, 2001-2009

State	Premiums in Comprehensive	HHI	No. of Insurers	Percentage Medicaid	Medicaid Costs (in \$100)	Medicaid Managed Care	Percentage Uninsured	Population over 65	Average Income (\$1,000)	Hospitals	Physician Salary (\$1,000)
AK	3,961.46	9,714.66	2.18	13.35	82.30	0.00	17.83	6.77	41.51	30.12	144.64
AL	3,132.40	8,228.68	4.39	13.97	47.88	75.03	13.43	13.28	32.38	23.64	142.54
AR	2,839.68	4,514.39	5.92	15.70	38.00	59.69	17.32	13.92	31.09	25.06	198.61
GA	2,823.33	2,447.96	12.96	12.23	37.41	69.07	17.40	9.71	35.05	16.54	186.04
ID	2,882.62	5,545.07	6.86	11.68	54.54	82.18	15.21	11.70	32.59	26.85	174.02
KY	3,178.71	3,600.90	8.17	14.57	50.41	89.70	14.01	12.63	31.50	25.03	162.09
LA	3,096.05	3,241.28	8.73	14.94	42.01	60.52	18.36	11.82	33.92	29.39	180.33
MD	2,999.97	1,597.48	14.62	8.44	70.16	84.53	13.06	11.53	46.46	8.54	155.35
ME	4,037.10	5,087.97	5.44	18.72	63.51	61.54	9.87	14.59	35.49	28.50	141.22
MS	2,901.10	8,946.04	2.79	21.07	43.09	15.09	17.24	12.30	29.22	32.73	164.62
MT	2,758.09	6,938.98	4.04	11.86	58.84	65.63	16.12	13.86	33.46	52.11	135.87
OK	2,758.69	3,064.26	7.86	13.42	42.45	90.82	17.65	13.24	34.48	32.04	163.62
SD	3,016.62	4,067.77	5.14	10.81	50.25	93.44	11.47	14.25	36.62	66.23	173.47
VT	3,654.44	3,745.72	3.52	18.96	53.97	75.57	10.17	13.29	37.60	22.74	131.03
WY	3,092.58	5,922.49	3.41	10.33	64.02	0.00	14.74	11.99	43.81	47.18	176.37

Table C 3: Overview on Non-state-run Medicaid States, 2001-2009

State	Premiums in Comprehensive	HHI	No. of Insurers (Comprehensive)	No. of Insurers (Medicaid)	Percentage Medicaid	Medicaid Costs (in \$100)	Medicaid Managed Care	Percentage Uninsured	Population over 65	Average Income (in \$1,000)	Hospitals	Physician Salary (in \$1,000)
FL	2,970.97	1,569.83	22.76	10.83	10.92	45.07	67.23	19.54	16.96	38.60	11.42	138.14
HI	2,221.43	5,630.87	4.60	2.16	11.71	44.82	82.42	8.58	13.88	39.61	19.26	152.31
MA	3,654.44	2,646.99	14.77	2.26	15.18	74.46	74.82	7.95	13.32	49.01	12.33	184.97
MN	2,831.49	3,027.31	8.62	2.10	10.77	82.10	73.99	8.34	12.16	41.94	25.98	173.25
NJ	3,379.00	2,262.81	12.33	2.40	8.64	74.04	76.21	14.25	12.96	49.17	9.16	158.51
NM	2,866.52	2,824.92	5.40	2.47	17.55	52.32	74.45	21.43	12.64	31.58	18.91	170.77
NV	2,726.28	3,475.52	9.64	2.01	7.46	44.13	77.06	18.29	11.42	39.70	12.58	179.34
NY	2,801.42	906.37	29.76	9.76	18.02	89.87	57.55	14.20	12.77	44.99	9.73	137.01
PA	2,855.83	1,387.54	25.14	3.55	11.88	61.21	86.10	10.15	15.26	38.87	16.01	171.75
RI	3,498.73	6,256.93	3.75	2.61	15.98	78.09	73.58	9.92	13.97	39.63	10.49	170.25
TX	2,460.23	2,519.04	24.14	8.47	12.74	41.95	64.85	24.59	9.90	36.78	18.68	179.26
VA	2,890.20	1,569.45	23.37	5.79	7.96	55.41	73.46	12.72	11.49	42.58	12.07	164.84
WA	2,907.53	2,044.61	19.74	7.33	12.82	47.43	95.08	12.93	11.44	41.34	13.74	146.59
WI	3,252.23	785.71	23.83	11.57	11.97	51.43	55.35	9.18	13.02	37.26	22.68	201.69
WV	3,385.44	3,688.94	7.21	2.00	15.74	62.02	56.10	14.79	15.37	30.16	31.74	175.64

Table C 4: Comments on Dropping States from the Analysis

STATE	COMMENT
AZ	6 percent of Medicaid enrollees are insured in a commercial MCO until 2003. After 2004, no commercial insurer is active in Medicaid anymore.
CA	Most health insurers operating in California did not file with the NAIC.
CO	Mixed evidence. There are no commercial MCOs reported to CMS, but some insurers file positive Medicaid premiums in some years.
CT	Policy change in 2008. Before 2008, a great amount of Medicaid was insured in commercial MCOs. In 2008 no commercial or Medicaid only MCOs existed. Since 2009 the greater share of Medicaid beneficiaries in insured in Medicaid only MCOs.
DC	Dropped due to significant overlap with Virginia and Maryland.
DE	Policy change in 2004. Before 2004, a great amount of Medicaid was in commercial MCOs. Since 2004 no commercial or Medicaid only MCOs exists insuring the greater share of Medicaid beneficiaries in insured in Medicaid only MCOs.
IA	Policy change in 2005. Before 2005, around 15-20 percent of Medicaid beneficiaries were insured in commercial MCOs. After 2005 it is only 1 percent and then 0 percent in 2009.
IN	Policy change in 2008. Before 2008, a great amount of Medicaid was in Medicaid only MCOs. In 2008, commercial MCOs started business. Since 2009, the greater share of Medicaid beneficiaries in insured in commercial MCOs.
KS	No commercial MCOs are reported by CMS, however we find one insurer reporting Medicaid business.
MI	Policy change in 2008. Until 2007, around 10 percent of the Medicaid population was insured under commercial MCO. Since 2008, there are no commercial MCOs covering Medicaid beneficiaries. But in our insurer data, we still have 5 companies reporting positive Medicaid business.

STATE	COMMENT
MO	Policy change in 2008. Until 2007, around 10 percent of the Medicaid population was insured under commercial MCO. Since 2008 there are no commercial MCOs covering Medicaid. In our insurer data no PHI is writing Medicaid business since 2006 beneficiaries. But in our insurer data, we still have 5 companies reporting positive Medicaid business.
NC	Until 2006 there was one commercial MCO covering 1 percent of the Medicaid population. Since 2007 Medicaid is completely state-run and non-commercial.
ND	Until 2005 one commercial MCO covered 1 percent of the state's Medicaid population. In 2006, this 1 percent was transferred to a Medicaid only MCO. Since 2007 Medicaid is completely state-run.
NE	Around 12-15 percent of the Medicaid population is insured by a commercial MCO. However this only one Insurance company signing premiums in Medicaid and this company fades in 2009.
NH	Had a change of regime in 2004. Since then there are no commercial MCOs in the market.
OH	Policy change. Until 2006, commercial MCOs were in the market only covering about 5 percent of the market. Since 2007, all Medicaid beneficiaries are insured under either a commercial or a Medicaid-only MCO, however our data doesn't show one single insurer writing Medicaid premiums after 2007 and claims the state to be state-run. Since 2008 it is in fact state-run with no commercial MCOs reported to the CMS.
OR	5 percent of Medicaid beneficiaries are insured in commercial MCOs over the whole observation period. There is only one single company reporting Medicaid business to NAIC and it faded in 2006.
SC	There are no commercial MCOs reported by CMS. In 2008 and 2009, three insurers reported positive premiums in Medicaid to NAIC.
TN	Policy change in 2009. Until 2008, almost 50 percent of Medicaid beneficiaries were insured in commercial MCOs. Since 2009 there are no commercial MCOs anymore. In our insurer data there is only one insurer reporting premiums in Medicaid, and in some years it fades.
UT	Policy change in 2003. After 2003 it is non-commercial. We still have one or two companies reporting small but positive premiums earned in Medicaid in 2004.

Declaration of Authorship

Declaration in lieu of oath in accordance with § 8 paragraph 2 of the regulations for the degree “Doctor of Economics” at the University of Hohenheim.

1. I, Renate Lange, declare that this thesis on “Economic Problems of Health Insurance – Reforms and Competition” and the work presented in it is my own and has been generated by me as the result of my own original research.
2. I have used no help, sources, or auxiliary means other than the ones acknowledged in this dissertation. I also have not used the illegitimate support of a third party. Where I have quoted from the work of others, the source is always given.
3. I have not used the help of a professional dissertation agency or consultancy.
4. I am aware of the meaning of this affirmation and the legal consequences of false or incomplete statements.

I hereby confirm the correctness of this declaration. I affirm in lieu of oath that I told the absolute truth and have not omitted any information.

Place, Date

Signature