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Effects of Introducing Competition and Choice in Primary Healthcare on Healthcare Consumption and Costs A Case Study of Vårdval in Sweden

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Abstract. In an attempt to improve access and generate a more patient-centered healthcare, counties in Sweden implemented a policy known as *vardval*, at different stages between 2007 and 2010, to introduce choice and competition within primary care. The purpose of this paper is to evaluate how *vardval*'s implementation of and variations in financial compensation models and the scope of required services have affected healthcare consumption and cost of both primary and specialist healthcare. Using panel data at the county-level from 2003 to 2013, we perform two-way fixed effects regression analysis to evaluate the effects of *vardval*'s implementation. We find that *vardval* has a positive effect on primary healthcare consumption and is associated with a 7.4 percent increase in visits per capita. We find no significant difference between the effects in counties with and without fee-for-service. With respect to costs, we conclude that *vardval* alone had no significant effect on per capita costs of primary or specialist care. Controlling for model of reimbursement, we find evidence that primary care costs increase in counties with no per-visit compensation. When including scope in the regressions, we find that a broader scope of required services strongly reduces the effect of *vardval* on visits in primary care. Scope also has significant implications on visits and costs in specialist care, whereby a wider scope is associated with more visits and, surprisingly, lower costs.

Keywords: Primary Healthcare, Private Sector, Public Sector, Choice, Competition.

JEL: H44, H51, I11, I18

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Glossary

Abbreviations

ACG: Adjusted Clinical Group

CNI: Care Need Index

SKL (Sveriges Kommuner och Landsting): Swedish Association of Local Authorities and Regions

SCB (Statistiska Centralbyrån): Statistics Sweden

GP: General Practitioner

Definitions

Vårdval: A policy implemented in Sweden between 2007 and 2010 to increase choice and competition within primary care, in accordance with the law (2008:962).

County: The bodies responsible for the healthcare delivery system, including all 17 Swedish counties, the regional bodies of Halland, Västra Götaland and Skåne, and the municipality of Gotland, which does not belong to a county council.

Primary Care: Healthcare services that do not require a hospital's medical or technical resources and which are responsible for the population's basic medical treatment, care, prevention and rehabilitation. In this paper, primary care refers strictly to those services provided by general practitioners, unless specified otherwise.

Primary Care Provider/Center: The venue where primary healthcare services are offered. In accordance with our definition of primary care, the staff of said venue must include general practitioners.

Specialist Care: Healthcare services requiring more specialized attention than that provided within primary care. Specialist care is conducted by doctors with a specialization other than general medicine and includes both somatic and psychiatric care.

Outpatient visit: A visit to a healthcare provider that does not require hospitalization overnight.

Coverage ratio: The measure of the number of visits to the primary care center by its listed residents in relation to the listed residents' total consumption of outpatient care. The coverage ratio is used by many counties to reduce incentives for the under provision of primary care. Economic compensation is adjusted based on whether a provider falls below or surpasses a certain threshold.

Capitation: A reimbursement received by healthcare providers per individual listed with the provider. Pure capitation refers to set equal reimbursement payments per listed individual. In other forms of capitation, compensation is weighted on the perceived need of each listed individual through factors such as age, CNI, and ACG.

Fee-for-service: A payment model whereby compensation for healthcare providers is paid per visit or service.

Scope of required services: The amount of services a primary care provider is required to provide. While all providers by our definition must ensure the provision of basic primary care administered by general practitioners, in some counties they must include additional services. The services considered in this paper include maternal care, pediatric care, medical foot care and rehabilitation.

Translations

Swedish Government Bodies and Agencies

Konkurrensverket: Swedish Competition Authority

Socialstyrelsen: The National Board of Health and Welfare

Myndigheten för Vårdanalys: The Swedish Agency for Health and Care Services Analysis

Riksrevisionen: The Swedish National Audit Office

Folkhälsomyndigheten: Public Health Agency of Sweden

Definitions: English to Swedish

General Practitioner: Allmänläkare

County: Landsting

Primary Care: Primärvård

Primary Care Provider/Center: Vårdcentral

Specialist Care: Specialiserad vård

Outpatient visit: Öppenvårdsbesök

Coverage Ratio: Täckningsgrad

Capitation: Kapitering

Fee-for-service: Besöksersättning

Scope of required services: Uppdragets bredd

Maternal care: Mödrahälsovård

Pediatric care: Barnhälsovård

Medical footcare: Medicinisk fotvård

Rehabilitation: Rehabilitering

1 Introduction

Although Sweden has been a leading example of high quality healthcare, it performs poorly in measures of accessibility and responsiveness by international comparison. For example, Sweden has long wait times in both primary and specialist care, despite having above average numbers of doctors per capita among the OECD countries (OECD 2014). Moreover, Sweden lags behind other nations in patient satisfaction (OECD 2013). Counties began implementing a policy reform, known as *vårdval*, in order to address these issues and other inefficiencies in their publicly provided healthcare system. This policy allows consumers to choose their primary healthcare provider and permits the free establishment of private providers, subject to certain requirements set by the local county council. All authorized providers are entitled to public funding on equal grounds with reimbursements for each patient (Beckman and Anell 2013). The main purpose of the reform was to strengthen the focus of primary care on the patient by stimulating competition between providers. This was expected to lead to improved access and quality, in turn strengthening the role of primary care (Anell 2011a). In 2007, Halland became the first county to implement this reform. By 2010, *vårdval* became mandatory (LOV 2008:962) and was implemented nationwide.

While the European public sector’s role in healthcare grew significantly in the 19th and 20th centuries, the increase in its share of healthcare spending came to a halt in the 1980s when many countries began privatizing certain sectors of healthcare while decreasing the government’s role in their healthcare systems (Maarse 2006). Today, Europe’s level of private sector involvement in healthcare differs significantly. On the one hand, the role of the private sector in health provision emerged and grew as of the 1990s in some countries such as France, Germany and several Eastern Europe countries. Today, some of these countries have even privatized inpatient care. On the other hand, countries such as Sweden and the UK were more hesitant to depart from the “healthcare state” and until recently provided and financed healthcare mainly through the public sector. Only in recent years has the private sector’s role in healthcare begun to emerge as a solution to the shortfalls of the public sector (Maarse 2006). The motivation behind privatization has often been dissatisfaction with public management, quality and efficiency of care. As countries continue to face challenges regarding cost and quality, the expansion of the private sector’s role in healthcare continues to be an important policy question across Europe (Albrecht 2009).

This paper evaluates the introduction of a quasi-market system into Sweden’s primary healthcare in order to provide policy makers and government officials with key insights during a critical time for public healthcare. With primary care as an entry point into healthcare, improving access and responsiveness can be a cost-effective policy measure to improve overall health, as well as an important channel to offset increasing costs

(Starfield, Shi and Macinko 2005; Kringos et al 2013). The implementation of *vårdval* in primary care allows us to study whether the presence of the private sector improves healthcare provision on the dimensions of cost and access. Moreover, this paper evaluates the effects of Sweden’s increased choice and competition in primary care on healthcare consumption and costs. It tests the assumptions that greater competition will lead to improved access and responsiveness, which in turn, will lead to a higher consumption of primary care and a lower consumption of outpatient specialist care. It also analyzes the effects that this policy has on the costs of providing primary and secondary care in order to investigate whether competition between healthcare providers induces a more efficient healthcare provision. Since the structure of Swedish healthcare funding does not allow for cost competition, we expect the cost of primary care to rise due to increased utilization and a higher number of providers. In the meantime, greater accessibility and responsiveness in the primary care will likely lead to fewer visits to (more costly) specialist care, which would decrease the growth of overall healthcare costs.

In addition, we evaluate whether the effect of *vårdval* differs according to the system of reimbursement. Due to the decentralized organization of healthcare in Sweden, models of *vårdval* vary among counties in order to achieve objectives specific to each county council. Counties place different weights on compensation components, with examples including capitation, a system based on patients listed with a provider; fee-for-service, a system based on the number of visits by a patient; and other components of reimbursement. Furthermore, there exists variation amongst counties regarding the required scope of services a provider must offer. This paper tests whether the effect of *vårdval* differs depending on the required scope in the primary care center and on the magnitude of compensation per visit to a primary care doctor.

This paper contributes to current literature on the effects of introducing choice and a quasi-market system into public healthcare systems, as it is the first study to conduct a panel data regression at the county council level in order to evaluate (1) the policy’s effect on consumption and cost of healthcare, and (2) whether the effect differs based on the system of reimbursement and the required scope. This paper uses a two-way fixed effects panel data approach at the county council level from 2003 to 2013, controlling for various demographic and socio-economic factors, as well as patient fees. Separate regressions are run using the following dependent variables: visits to general practitioners (GPs), visits to outpatient specialist care, cost of primary care and cost of specialist care. While several reports (e.g. Riksrevisionen 2014; Myndigheten för vårdanalys 2014) have examined trends in costs and visits since the implementation of *vårdval*, they do not control for other factors that may affect these trends, such as age demographics, level of education or income.

This paper will answer whether vårdval's implementation resulted in the desired improvements in healthcare; namely, did it increase access and cost efficiency? More specifically, our research questions are:

1. What is vårdval's effect on visits to general practitioners?
2. What is vårdval's effect on outpatient visits to specialist care?
3. What is vårdval's effect on the cost of primary care?
4. What is vårdval's effect on the cost of specialist care?
5. How do these effects change depending on the level of fee-for-service?
6. How do these effects change depending on the scope of required services?

After performing two-way fixed effects panel data regression analysis, we conclude that primary healthcare in Sweden has improved in the measure of access since the implementation of vårdval. This effect has been larger in counties with fee-for-service and increases with the size of the fee. Although vårdval by itself has no significant effect on visits to specialist care, it has a negative effect in counties with a narrow or zero scope. Contrary to our hypothesis, we find no significant difference between the effects of vårdval in counties with and without a fee-for-service in the capitation. With regards to costs, we obtain no evidence that vårdval alone had a significant effect on the per capita costs of primary care or that of specialist care. When controlling for reimbursement systems, we found increases in primary healthcare costs in counties with no compensation per-visit, but found no significant effect with respect to fee-for-service. Meanwhile, a higher scope of required services is strongly associated with a reduction of visits in primary care, increase in specialist visits, and, unexpectedly, a lower cost of specialist care. Since the number of visits in primary care has increased since the implementation of vårdval, the absence of an effect on cost suggests there have been overall improvements in cost-efficiency in counties with fee-for-service, but with significant variations between counties. The results are robust to the exclusion of Stockholm, a county that significantly deviates from the rest of the country in fee-for-service, as well as socio-economic and demographic factors, which include population density, education, income, etc.

In the next section, we provide an overview of the Swedish healthcare system, the challenges it faces and the recent policies that have affected access to healthcare. Subsequently, section 3 presents theoretical background about healthcare markets, incentives and the reimbursement system. Section 4 outlines results from previous studies on the effects of vårdval. This is followed by our hypotheses in section 5 and data description in section 6. Trend overviews are presented in section 7, followed by a specification of our econometric models in section 8 and results in the following section. Section 10 presents a discussion of our results and section 11 concludes this paper.

2 Background

The Swedish healthcare system has generally been regarded as a model of success. Sweden has one of the highest life expectancies, while infant mortality rates are some of the lowest in the OECD (OECD 2013). Sweden's expenditure on healthcare was approximately 9.7 percent of its GDP in 2013, with approximately 81.5 percent funded publicly (World Health Organization 2015).

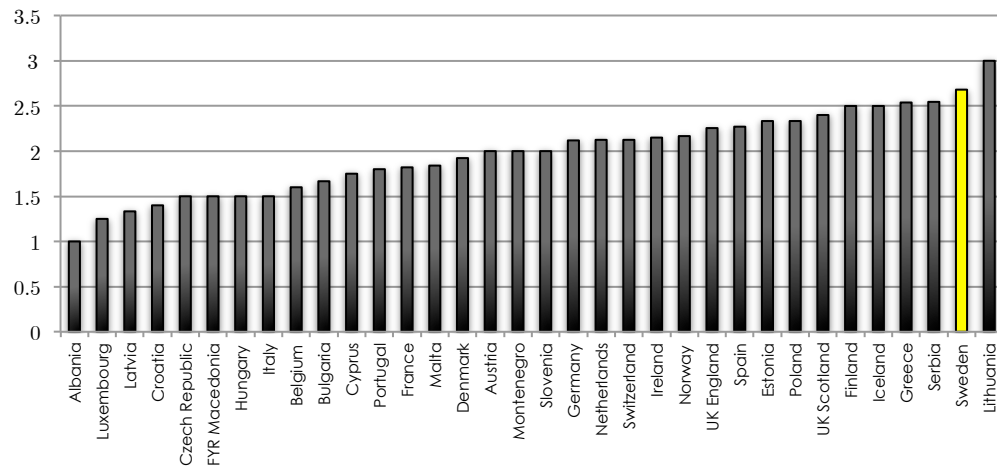
The Swedish healthcare system has been based on three main objectives: **the principle of human dignity**, where care is to be provided on equal terms for the entire population; **the principle of need and solidarity**, where those with the highest need are given priority; and **the principle of cost-effectiveness**, where healthcare is to be provided cost-effectively and cost considerations are granted only on a case-by-case basis, provided that the other two principals have been fulfilled (Anell, Glenngard and Merkur 2012).

Despite great achievements, the Swedish healthcare system is currently facing challenges related to excessively long wait times, patient dissatisfaction and a below optimum share of outpatient care being conducted by primary care.

2.1 Challenges in Swedish Healthcare

Sweden performs relatively poorly with respect to accessibility, namely, wait times and level of responsiveness. Wait times in Sweden continue to be among the longest in Europe, despite its relatively high number of doctors and healthcare expenditures in relation to other better performing countries. In a recent study, which looked at the quality of healthcare systems in 36 European countries, conducted by Health Consumer Powerhouse, Sweden ranked near the lowest in regards to whether a patient could obtain a same day appointment with a general practitioner (Figure 2.1) (Björnberg 2014). Meanwhile, Figure 2.2 demonstrates this effect is not due to an above average number of consultations per doctor.

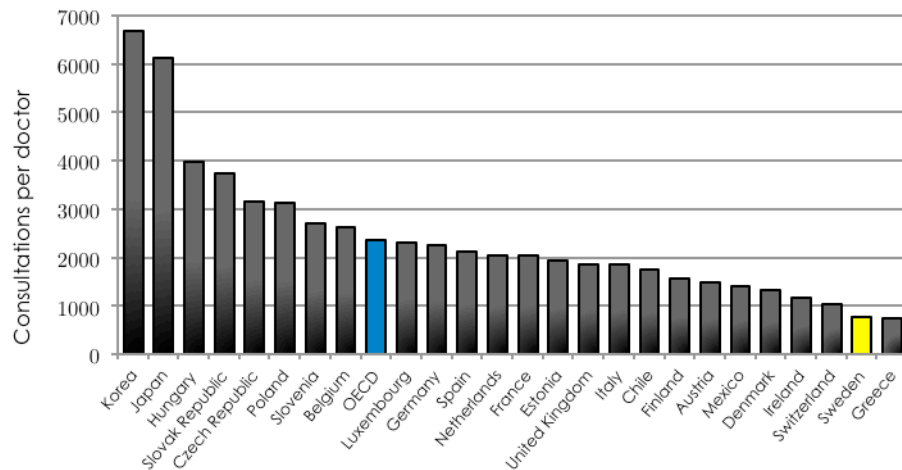
Figure 2.1 Same Day Family Doctor Visits



1-yes; 2- sometimes, not always; 3 – normally not the same day

Authors' own figure based on statistics from Björnberg (2014)

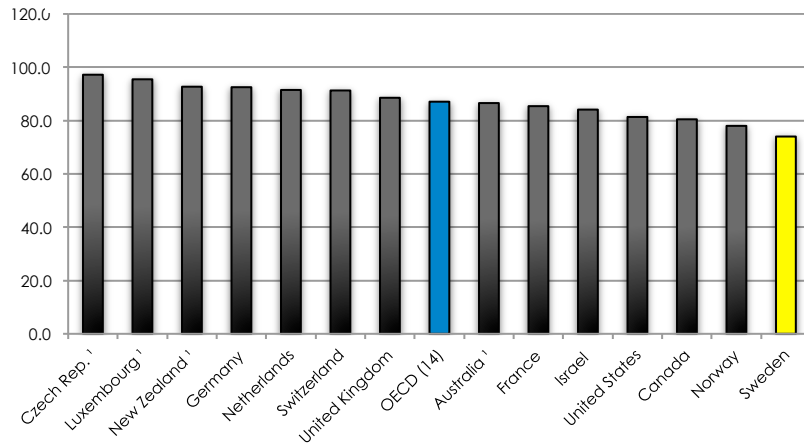
Figure 2.2 Estimated Number of Consultations per Doctor, 2009 (or nearest year)



Authors' own figure based on statistics from OECD (2014)

Patient satisfaction is another indicator where Sweden lags in comparison to its peer nations. Although its quality of care is high in comparison to the rest of the OECD countries, patients do not feel they receive the quality of care and attention from the doctors they deserve (OECD 2013). Figure 2.3 shows patient satisfaction in regards to the time spent with a doctor, where Sweden ranks significantly below OECD average and lower than all other OECD members. Sweden also ranks at the end of the OECD group in regards to patient satisfaction with respect to doctors' communication, showing that patients did not believe they received the appropriate amount of information from their doctors regarding their health.

Figure 2.3 Regular Doctor Spending Enough Time with Patient in Consultation in 2010 (or nearest year)



Authors' own figure based on statistics from OECD (2014)

In addition to low accessibility, the role of primary healthcare as a gatekeeper to specialist care remains weak in Sweden and differs among counties. Only some counties require patients to go through a general practitioner in order to obtain an appointment with a specialist (Glenngård et al. 2005). With historically low access and weak gate keeping, patients often bypass primary care and use other sources of healthcare, either by directly scheduling appointments with specialists or by seeking primary healthcare in hospital emergency rooms. Such practices reduce the role of primary healthcare and put more pressure on significantly more expensive sources of healthcare, threatening the cost-efficiency of the system (Masseria et al. 2009).

2.2 The History of Privatization of Healthcare in Sweden

In the past decades, primary care has generally been owned and operated by the local county councils (Glenngård et al. 2005). There were some attempts to bring privatization of healthcare in the early 1990s through the introduction of a general practitioner law known as *husläkarlagen*, which was implemented on January 1, 1994. This law allowed patients to choose their general practitioner, as well as authorized doctors and physiotherapists to freely establish private practices. The law also made it mandatory for counties to set the same conditions for private and public actors, including provisions for economic compensation (SOU 2008:37).

After the election of 1994, Sweden's previously ruling "right-wing" alliance was replaced by a "left-wing" regime (Anell 2011b) and by January 1, 1995, the new government removed private actors' right to freely establish themselves within healthcare (SOU 2008:37). One year later, *husläkarlagen* was abolished (SOU 2008), and the decisions regarding the organization of primary care were again allocated to each county council (Anell 2011b). Nevertheless, the already established private actors were allowed to

continue their practices and were compensated as contractors of the councils (Myndigheten för vårdanalys 2014).

After 1995, the number of private actors within primary care continued to increase through contracts and agreements with the county council, but with substantial variation between counties (Anell 2011b). Table 2.1 provides a picture of the variation, with the number of private primary care centers as a percentage of total primary care centers varying between 3 and 60 percent. It was only with the implementation of vårdval that private actors regained the right to freely establish themselves in the healthcare market. While the main argument for privatization of healthcare during the 1990s was that private providers had better productivity and lower costs, in more recent years, the argument has centered on the ability of private providers to be more innovative and deliver better service (Anell 2011b).

Table 2.1 Percentage of Primary Care Centers Driven by Private Actors Before Vårdval

County	Percentage
Västmanland	60%
Stockholm*	54%
Uppsala	40%
Skåne	35%
Halland	34%
Blekinge	29%
Gotland	25%
Gävleborg	24%
Västra Götaland	22%
Kronoberg	19%
Sörmland	18%
Kalmar	18%
Västernorrland	18%
Jönköping	15%
Östergötland	14%
Örebro	13%
Jämtland	11%
Värmland	9%
Västerbotten	6%
Norrbottn	6%
Dalarna	3%
*Excludes Norrtälje	

Source: *Konkurrensverket 2012:2*

2.3 The Structure and Financing of Swedish Primary Care

The Swedish healthcare system is highly decentralized. The government is merely responsible for principal policy decisions in regards to healthcare, while the 21 county

councils are responsible for decisions related to its organization, provision and funding. Primary care is organized in small health centers employing a multidisciplinary workforce composed of between four and ten general practitioners, nurses and other healthcare professionals, tasked with the responsibility for population health within a geographic area (Anell 2011a).

Primary care is generally funded through taxes. This is complemented by grants provided by the central government, as well as user fees (Glenngård et al. 2005). For every visit to a general practitioner, adult patients are charged a fee that differs among the counties. If costs exceed 1100 Swedish Kronor¹ within a twelve-month period, the patient is exempt from further user charges until the next twelve-month period begins (Swedish Association of Local Authorities and Regions 2013).

2.4 Freedom of Choice Law (LOV 2008:962)

The idea of *valfrihet* (freedom of choice) dates back to 1989, when the Swedish Counties Association (*Landstingsförbundet*) made a recommendation to allow patients to choose their own primary care provider and hospital (private or public) within their county of residence (Socialstyrelsen 1999). Residents living close to a county border would also be able to choose from those available in the neighboring counties.

Prior to vårdval's implementation, most counties formally allowed residents to choose their primary care providers, but this right was seldom used in practice and residents were discouraged from exercising this right. The rules were often unclear and patients rarely knew of their right to choose, while healthcare staff did not know what was expected of them (Myndigheten för vårdanalys 2012). One report estimated that between 2005 and 2007, only six percent of the Swedish population attempted to change their registered primary care doctor for reasons other than a change of address (SOU 2008:37).

The recent introduction of choice and competition reform began in Halland (2007), followed by Stockholm and Västmanland (2008). In November 2008, the law (LOV 2008:962) issued by the central government made it mandatory for all county councils to implement the principles of choice and privatization in various health and social services, including primary healthcare, by 2010. The key aspects of this law with respect to primary care include:

1. The freedom for patients to choose their primary healthcare center, provided the center was approved by and signed a contract with the county council;
2. The freedom for primary care providers to freely establish themselves, provided they meet all legal and county council requirements;

¹ The only exception is Örebro, where the ceiling is 900 Swedish Kronor.

3. The obligation of each county council to treat all primary care providers in an equal and non-discriminatory manner regardless of whether they are private or public; and
4. The obligation of each county council to provide monetary compensation to each primary care provider chosen by the patient.

According to politicians, the main purpose of this reform was to shift power to the individual by providing them with greater choice and influence, as well as by increasing the number and diversity of providers (Proposition 2008/09:29; Proposition 2008/09:74). They believed that by requiring providers to compete for consumers, the reform would create incentives to improve in measures of quality and efficiency (*Ibid*). More specifically, vårdval was expected to increase individual freedom and the responsiveness, quality, access, diversity, efficiency and number of providers (Myndigheten för vårdanalys 2014). Politicians also hoped the policy would strengthen the role of primary care in the Swedish healthcare system, thus reducing the burden on specialist care (Anell 2011a).

However, the law did not establish specific guidelines on how to implement this reform. Instead, county councils were given the autonomy to design their own systems of remuneration, with the law providing for principles and requirements for county councils to follow (LOV 2008:962). As a result, county councils adopted different strategies to address county-specific objectives, leading to a wide dispersion in vårdval systems. In addition, such differences in requirements have resulted in significant variations between counties regarding the barriers to entry as well (Konkurrensverket 2012).

2.5 Reimbursement Systems

In order to meet their objectives, county councils adopted different reimbursement schemes following the implementation of choice and competition reform (Anell 2011a). Reimbursement falls into two broad categories – “fixed” and “variable” compensation – and every county uses a combination of the two. “Fixed” compensation consists of capitation (i.e., reimbursement per listed patient) and, in some cases, geography-based reimbursement, whereby providers are given extra compensation for operating in rural areas. Since patients are free to choose their provider, this form of reimbursement is not truly “fixed”; however, it is still commonly referred to as such. Meanwhile, “variable” compensation includes fee-for-service and reimbursement for fulfilling county-specific goals.

Studying the rulebooks regarding primary care, counties can be divided into three distinct groups. The first group, consisting of five counties, uses primarily a capitation-based reimbursement system with little “variable” reimbursement and no compensation

per visit². In the second group, consisting of fifteen counties, the majority of reimbursement is still determined by capitation; however, “variable” reimbursement plays a larger role, with some degree of fee-for-service. Meanwhile, the third group consists of Stockholm and is unique in having the majority of funding coming from fee-for-service (approximately 60 percent) (Myndigheten för vårdanalys 2014). Even within these groups there are other large differences with respect to what factors determine the “fixed” and “variable” reimbursement, and to what degree. Over time, many changes have been made to the reimbursement models, although the distribution between “fixed” and “variable” has remained relatively constant.

Other important differences between counties include the scope of services the provider is required to offer, as well as the setup of the listings system. Four counties adopted a system of ‘active’ listing, whereby a citizen is only listed with a provider if they actively choose to register there. Meanwhile, the rest of the counties adopted a system of ‘passive’ listing, whereby patients who do not actively choose a provider are automatically allocated to the provider closest in proximity (Konkurrensverket 2012). Counties have also implemented different requirements for the scope of services provided by the primary healthcare center. In Norrbotten, for example, in addition to general practitioner services, a primary health center must also provide pediatric, maternal, medical foot care, and rehabilitation (Swedish Association of Local Authorities and Regions 2013). In comparison, Stockholm allows for the separate establishment of each of these healthcare services (Swedish Association of Local Authorities and Regions 2013).

2.6 Other Measures to Increase Accessibility in Healthcare

While the implementation of *vårdval* was one of the main policies to address lower accessibility in primary healthcare, several other policies were introduced during the years studied in this paper, which may have directly or indirectly affected accessibility. This section provides an overview of these policies. In Section 6.7, we will discuss the impact these policies may have on our results.

***Vårdgaranti* – Healthcare Guarantee**

The wait time in Sweden for healthcare service is regulated by a care guarantee, which is based on the need to ensure that patients receive help and treatment within a reasonable time frame. This guarantee was introduced in 1992 and involved twelve types of specialist care (Palier 2006). It places a limit of 90 days from the time a patient receives a referral to the date of the appointment with the specialist. If care is not provided within this time frame, the patient has the right to seek care in another county at the expense of the county where he/she is registered.

² We only consider compensation for regular visits by listed patients to GPs, i.e. visits that do not require extra external resources such as a translator. This excludes visits conducted by individuals registered in other counties, asylum seekers and other non-Swedish residents.

In 1996, this guarantee was extended to primary care and a patient's first visit with a specialist. The New National Agreement established an appointment guarantee (*besöksgaranti*), whereby primary care must connect with a patient either through phone or in person the same day the patient seeks help. If an in-person visit with a doctor is deemed required, the wait time must be no longer than seven days (Socialstyrelsen 1999).

As of November 1, 2005, this policy was expanded to include treatment in specialist care, whereby a treatment must be offered within 90 days after being prescribed. This was implemented through an agreement between the state and SKL, known as *vårdgaranti* (healthcare guarantee) (Palier 2006). In July 2010, *vårdgaranti* became a law (2010:349).

Kömiljarden – The Queue Billion

Kömiljarden (The Queue Billion) is a financial reward given to county councils and communes by the central government for reducing wait times for planned visits with specialist care. It was implemented at the end of 2008 as a three-year agreement and was renewed in 2011 (Socialstyrelsen 2013). According to this agreement, economic incentives are distributed to counties where at least 70 percent of patients receive specialist care within 60 days. An additional reward is provided to counties where at least 80 percent of patients are able to visit a specialist within 60 days (Socialstyrelsen 2013).

The 1177 Network

In 2003, SKL launched a healthcare advice call center project, known as *Vårdråd per telefon* (VPT). Its main objective was to implement a nationally coordinated, twenty-four hour telephone service to provide free medical advice to all residents in Sweden. In late 2005, the first counties joined this initiative in what is now known as the 1177 network. By 2010, 8.1 million Swedes had access to the number 1177 (Socialdepartementet 2010). In 2006, this project was extended to include a website with an on-line chat service. By 2013, this integrated phone and IT service was available nationwide (Inera AB 2013).

The Re-regulation of Pharmacies

Sweden's state-owned pharmacy, *Apoteket AB*, had its monopoly abolished on July 1, 2009. As of November 1, 2009, stores were permitted to sell various over-the-counter medicines, and private actors started to seek permission to enter the market and a number of pharmacies were privatized. By May 2013, the number of pharmacies had increased by 39 percent, and the average number of open hours of operation had risen from 45.5 to 52 hours per week (Statskonkoret 2013). These figures show an improvement in the accessibility of the service. Pharmacies play an important role in relieving the pressure on primary care centers as they can provide patients with advice and medication in the event of simple illnesses (Myndigheten för vårdanalys 2014).

3 Theoretical Background

In a seminal paper, K. Arrow highlighted characteristics of healthcare markets, distinguishing them from other competitive markets. Uncertainty over one's precise needs and asymmetrical information between the health service provider and the patient are distinct characteristics of healthcare markets. More specifically, the patient does not know his/her future needs for healthcare services and, with an exception to preventative care, will only demand healthcare after falling ill. In addition, healthcare service is hard to evaluate prior to consumption, as the effects of most treatments vary from person to person. Due to information asymmetries, healthcare consumers must place a higher level of trust in their doctor than in other service providers. The trust also stems from a belief that a doctor is driven more strongly by improvements in his/her welfare than profit maximization (Arrow 1963). Due to the departures from the competitive markets that arise from asymmetries of information and uncertainty, both public and private sectors have a role in aiding the achievement of optimal outcomes in the healthcare markets (Arrow 1963; Le Grand 2009).

3.1 Choice and Competition in Healthcare

The public sector is important in making healthcare markets optimal due to its distinct characteristics. However, in the case where healthcare is both provided and financed by the public sector, inefficiencies often arise. The weaknesses of publicly provided healthcare systems lie in accessibility, responsiveness and cost-effectiveness; however, the introduction of choice and competition can improve healthcare systems in these measures.

The inefficiencies in public provision of healthcare in regards to measure of responsiveness arise with the inability of a patient to choose the provider. When there are no alternatives and choice, the provider has few incentives to ensure patient satisfaction. Further, the public healthcare provider's response to low satisfaction is slower and less effective than the private sector, as it is not driven by incentives to maximize profits and retain patients. In the more extreme cases, where healthcare is funded and provided by the public sector, markets close to monopolies arise. In these systems, if a limited number of alternatives exist next to the public markets, population groups with lower socio-economic status are more likely to be affected due to their lack of ability to seek and use alternatives (Le Grand 2009). Le Grand (2009) argues that a quasi-market system, where a consumer is allowed to make a choice between alternatives, creates the right incentives for healthcare providers to improve the aspects that otherwise might be problematic with public provision: quality and responsiveness. Patient choice for healthcare providers creates incentives for improvements in these measures, because underperformance could encourage patients to change the provider and thus reduce the provider's income.

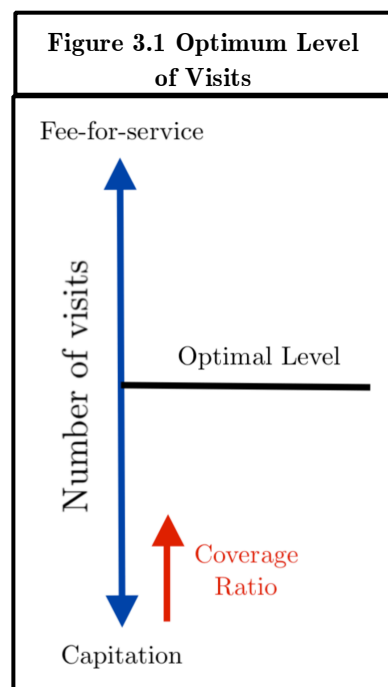
In addition to improvements in responsiveness, choice and competition in healthcare markets can bring about improved cost-effectiveness. In this system, providers can increase their profits either by increasing the number of patients or by decreasing their costs. Due to competition, the providers will have to improve their cost-efficiency without losing quality. The providers will thus be incentivized to innovate and collaborate with their peers to determine the most cost-effective treatments (Anell 2011a).

To summarize, in a system where healthcare providers cannot compete by offering lower prices for services, competition creates pressures to improve quality and efficiency in order to retain consumers and increase profits. However, the benefits of choice and competition will emerge only when competition is effective and consumers are presented with viable alternatives (Le Grand 2009).

3.2 Compensation Models and Incentives

Compensation models in healthcare are an important tool to create the right incentives, such as increased equity, improved efficiency or increased access. At the same time, these components can induce behavior that could lead to less than optimal outcomes in the healthcare services (Robinson 2001).

Robinson (2001) reviews the compensation models with respect to four performance dimensions: high productivity, risk acceptance, efficiency, and information sharing. Fee-for-service models induce high productivity, whereby physicians are encouraged to perform more services to increase their revenue. Fee-for-service is also the preferred method for risk acceptance, as treatment of chronically ill patients, which requires more services, is incentivized. This, however, does not hold if each visit by such patients is regarded as time-consuming, as the fee-for-service model is incentivizing providers to treat as many patients as possible. While a pure capitation model does not score well in the first two aspects, it is superior in efficiency and information sharing. As additional services and visits are not rewarded in capitation models, healthcare providers are incentivized to reduce the number of unnecessary services, thus increasing efficiency. Capitation models also encourage information sharing among practitioners to employ only the services and methods that results in the most cost-effective outcomes. It is therefore clear that in order to achieve high performance in all four dimensions, a model using only one compensation component will not be successful (Robinson 2001).



(Authors' own figure)

The directions of incentives towards the optimal level of visits stemming from the two most common capitation components are presented in Figure 3.1. In theory, we would expect systems purely based on fee-for-service to produce above optimum levels of visits, while systems that are purely based on capitation would produce below optimum level of visits (Robinson 2001).

Compensation models also create incentives for non-optimal behavior, such as supplier-induced demand. Supplier-induced demand arises from the asymmetric information feature of healthcare, where a patient does not know enough to correctly assess his/her exact health needs and the quality of care provided. This allows the doctors to shift the patient's demand curve depending on the preferences of the provider (Rice, Labelle 1989). The asymmetric information feature of the health market creates potential economic losses, where due to supplier-induced demand, a patient might receive an above-optimal number of services, thus increasing the costs of healthcare. As Ellis, McGuire (1993) state, the payment system plays an important role in creating incentives for supplier-induced demand. A fee-for-service payment system, where each additional service provides an additional income, is the most conducive for supplier-induced demand. This model gives direct incentives to healthcare providers to alter the demand curves of their patients in order to increase their income. With salary, or capitation-based payments, healthcare providers do not gain from increased healthcare consumption. Empirical studies have not provided conclusive results, however, most discount the role of supplier-induced demand. Several studies found no supplier-induced demand (Grytten and Sørensen 2001; Davis et al. 2000).

While capitation can prevent, or minimize supplier-induced demand, it can also incentivize cream skimming, which is another non-optimal behavior of healthcare providers. Cream skimming refers to behavior, where easier patients are given preferential treatment at the expense of more difficult, time-consuming, and chronically ill patients (Robinson 2001). Healthcare providers, who are paid for a registered patient, rather than the number or complexity of services provided, prefer easy, low-cost cases to maximize their profits. Cream skimming can be seen by the establishment of providers in areas where patients are healthier or selectively providing only certain services that exclude the more difficult cases (Anell 2011a). A compensation model based strongly on capitation creates incentives for cream skimming and threatens the equity and accessibility of healthcare.

Lastly, compensation models can also affect location decisions of providers. Both capitation and fee-for-service models encourage discrimination against rural, less populated areas (Anell 2011a). Geographic inequity can also be a result of cream skimming through geographic selection, with doctors preferring to operate in the areas with healthier patients.

To summarize, introducing choice and competition to healthcare systems can bring significant benefits; however, if the compensation systems are not modeled correctly, they can also endanger equity and quality. Incentives in private sector are more strongly driven by profit maximization and might not always align with the public sector's intent to provide equitable and high quality care to everyone. Therefore, it is important to ensure that a compensation system promotes socially optimal levels of efficiency and access, while competition incentivizes high quality of care. As none of the compensation models on their own produce optimal incentives and outcomes, hybrid compensation models are preferred (Robinson 2001). Various combinations of fee-for-service, capitation and more specific compensation components can be used to address specific goals. Table 3.1 lists various objectives that can be achieved through compensation components and shows which components encourage versus which hinder these objectives. In Sweden, for example, components for risk-adjusted capitation, called CNI (Care Need Index) and ACG (Adjusted Clinical Group), are often used to ensure that more difficult and time-consuming patients receive an adequate amount of attention (Anell 2011a). Many counties have also created disincentives for under provision by setting coverage ratio targets, whereby if the number of primary care visits by listed patients as a percentage of their total consumption of outpatient care does not reach a certain level, the provider's compensation gets reduced. In some counties this mechanism is employed as a bonus mechanism, whereby providers are given additional compensation for surpassing a threshold. As illustrated, compensation model is a strong tool to address various needs of health care systems. However, when creating a compensation model, both positive and negative incentives must be evaluated in order to achieve best results for the system's objectives.

Table 3.1 Desirable Goals and Reimbursement Models that Support/Counter the Objectives

Desirable goals	Reimbursement models that support the objective	Reimbursement models that counter the objective
Availability in time	<ul style="list-style-type: none"> • Fee-for-service • Coverage ratio 	<ul style="list-style-type: none"> • Capitation
Availability in areas of low population density	<ul style="list-style-type: none"> • Geographic compensation • Coverage ratio 	<ul style="list-style-type: none"> • Fee-for-service • Capitation
High quality of care	<ul style="list-style-type: none"> • Capitation • Goal-related compensation 	<ul style="list-style-type: none"> • Fee-for-service
Innovation and development	<ul style="list-style-type: none"> • Capitation • Value-based compensation 	<ul style="list-style-type: none"> • Fee-for-service
Cost control	<ul style="list-style-type: none"> • Capitation 	<ul style="list-style-type: none"> • Fee-for-service
High production	<ul style="list-style-type: none"> • Fee-for-service 	<ul style="list-style-type: none"> • Capitation
No crowding out of high-need patient groups.	<ul style="list-style-type: none"> • ACG • Fee-for-service* 	<ul style="list-style-type: none"> • Pure Capitation • Fee-for-service**
No crowding out of low socio-economic groups.	<ul style="list-style-type: none"> • CNI • Fee-for-service* 	<ul style="list-style-type: none"> • Pure Capitation • Fee-for-service**
Prevent supplier induced demand	<ul style="list-style-type: none"> • Capitation 	<ul style="list-style-type: none"> • Fee-for-service

*Only if the patients are not regarded as time-consuming on a per visit basis.

**Only if the patients are regarded as time-consuming on a per visit basis.

3.3 The Role of Primary Healthcare

Primary healthcare plays an important part in overall health, as it has been shown that countries where primary healthcare plays a strong role show better overall health levels, even after controlling for education and income (OECD 2013). Primary healthcare has also shown to have a positive impact on the equity of care and self-reported health where high socio-economic inequality exists.

Besides improving health outcomes, having strong primary care is also associated with lower health costs due to higher preventative services, which lead to decreased use of specialist care and lower rates of inpatient care (Starfield, Shi and Macinko 2005). As the first point of contact with the health system, primary care aids in not only preventing, but also treating illness, which do not require specialist care. Furthermore primary healthcare often plays a gate keeping role, where primary healthcare providers evaluate the illness and care needed, and either provide it themselves or refer the patient to a specialist for more expensive care. Tjerbo (2010) suggests that competition in primary care can affect visits covered by both, a general practitioner or a specialist in two ways: the general practitioner may send more patients to specialist care in order to

please the patient, or the general practitioner may also play the role of “society’s gatekeeper” and decrease referrals that are unnecessary. Tjerbo’s (2010) study found presence of the latter after competition was introduced in primary healthcare in Norway. This suggests that competition within primary care may result in a better-streamlined process in healthcare and minimize inefficiencies stemming from the unnecessary use of specialist care. A reduction in visits to specialists that do not require resources or expertise beyond what is offered by primary care physicians reduces overall costs of healthcare.

3.4 Theoretical Implications for the Case of Sweden

Based on theoretical predictions, the introduction of freedom of establishment and choice in Swedish primary healthcare should improve accessibility and responsiveness, as well as increase its role and decrease the overall cost of healthcare provision. These changes should help Sweden address current challenges and produce significant improvements in the healthcare market.

As access to primary care should increase due to a higher number of providers, fewer consumers are expected to seek outpatient specialist care as their first point of entry to healthcare. Consequently, the unnecessary use of specialized care due to a lack of gate keeping should decrease. Improved responsiveness will also increase the use of primary care due to higher patient satisfaction. Improvements in these two measures should increase the overall role of primary healthcare. The increase in the access in primary care should decrease unnecessary visits to specialist care, while improvements in the role of primary care would likely lead to better health and thus a lower need for specialist care.

Further, increasing the role of primary care could have significant effects not only on health, but also on cost-efficiency (Masseria et al. 2009). In a study of Sweden, Janlöv, Anell and Lyttkens (2013) estimate that a one percent increase in the number of visits in outpatient specialist care increases a county council’s healthcare costs by 0.18 percent. The corresponding figure for primary care is 0.10 percent. The cost of primary care is expected to rise due to a higher number of visits. However, the savings to the overall healthcare system should arise from lower use of specialist care.

Theoretical implications of how the policy affects healthcare consumption and costs also extend to the model of reimbursement. The exact effects of choice and competition will be influenced by incentives induced by levels of fee-for-service, capitation and other components of compensation models. When capitation is the main component and there is no fee-for-service, there are strong incentives to gain consumers through improving on measures of quality and responsiveness, but little incentive to achieve high productivity. In counties where compensation still relies heavily on capitation but also includes other components such as pay per visit, theory suggests that incentives to raise productivity will increase, while maintaining incentives to improve quality and responsiveness. When

fee for service is the biggest part of the compensation model, the policy would induce high productivity, but generate less incentive to improve on measures of quality and responsiveness. The highest increases in healthcare consumption should be seen in counties with high levels of fee-for-service, while improvements in cost efficiency would be most evident in counties with high capitation component.

4 Literature Review on Effects of Vårdval

Since the implementation of vårdval, numerous reviews of its effects have been published. This Section provides a brief overview of these studies regarding the effects of vårdval on choice, visits to physicians and healthcare costs.

4.1 Effective competition

A precondition for effective competition and thus improvements from vårdval arise only when citizens can make a choice between at least two providers in close proximity. There must also be an awareness of the capacity to choose one's provider. There is good reason to believe that these preconditions in Swedish primary care are met. It was estimated that by 2011, 79 percent of residents had less than a five-minute car journey to the next closest provider to their residence (Konkurrensverket 2012). A survey conducted in 2013 estimates that 95 percent of individuals knew of their ability to choose (Konkurrensverket 2014). The same survey revealed that approximately two-thirds of those interviewed perceived that they made an active choice between their primary healthcare providers. Of the 30 percent of individuals who reported they exercised their right to switch providers, 53 percent cited reasons other than a change of residence.

4.2 Entry of new providers

By August 2010, the total number of primary care providers increased by approximately 23 percent since the implementation of vårdval (Konkurrensverket 2010). Since then, the number of new providers entering the market each year has declined substantially, only increasing marginally between 2013 and 2014 (Konkurrensverket 2014). It is important to note that there is no consensus in Sweden over the exact definition of a primary care provider, which leads to variations in exact statistics among sources. Nevertheless, all studies are in agreement that the percentage of primary care providers has risen in nearly all counties.

However, the increase in providers has not been uniform across the country. Several studies concluded that new providers have predominately emerged in areas of high population density (Konkurrensverket 2010; Konkurrensverket 2012; Myndigheten för vårdanalys 2014; Riksrevisionen 2014). Myndigheten för vårdanalys (2014) argues that this is partly due to variations in vårdval systems as well as regional differences in the availability of general practitioners (a bigger issue in rural areas). Konkurrensverket

(2011) concludes that the adopted listing principle has strongly impacted the entry of new private providers, particularly during the transition to vårdval. They observe that the percentage of capitation is less important and that the relationship between the scope of required services and number of new private healthcare centers is not negative, as expected. In addition to dissimilarities in rules and requirements, the report also identifies variation in levels of trust that the county council will treat private and public providers on equal terms as a substantial barrier to entry.

Despite Konkurrensverket (2011) report not finding a strong link between the scope of required services and entry of private actors, many still argue that differences in requirements between counties with respect to how a primary care provider must operate mean that barriers to entry are not uniform throughout Sweden (Anell, Nylinder and Glenngård 2012). One of the key determinants of such barriers includes the amount of additional services that is mandatory for a provider to offer. A wider scope of such services places greater demands on the providers of primary care, in relation to items such as staff, facilities, and equipment (Anell, Nylinder and Glenngård 2012). In a survey of managers of primary healthcare centers, approximately 86.7 percent of respondents believe that the requirements placed on providers are too extensive in comparison to the economic reimbursement (Anell, Nylinder and Glenngård 2012). A wider scope is perceived as making it more difficult for entrepreneurs to establish smaller practices, resulting in the aggregation of primary care into larger but fewer providers. By setting up affiliates, the already established providers can often bypass many of these requirements; nevertheless, the growth of affiliates since the implementation of vårdval has not been substantial. By October 2011, only twelve new affiliates were established (Konkurrensverket 2012).

4.3 Number of visits

Comparing the number of weighted doctor visits per capita in primary care between 2010-2012 and 2007-2009, Myndigheten för vårdanalys (2014) reports a 12 percent average increase at a national level. Meanwhile, Riksrevisonen (2014) studies the national trend in total number of doctor visits between 2005 and 2011 and finds that it remains more or less constant for both specialist and primary care. The growth in number of visits to primary care plateaus in 2011, leading the authors to argue that improvements in access to primary care began prior to vårdval and have not succeeded in reducing the strain on specialist care. Studying Stockholm individually, Dahlgren et al. (2013) find that visits per capita to doctors within primary care increased substantially between 2007 and 2012, with a substantial reduction in specialist share of doctor visits. Similar results were found in Skåne, with an approximate 5.5 percent increase in per capita visits to primary care doctors between 2008 and 2010 and a 3.4 percent decrease in visits to specialists (Beckman, Anell 2012).

Mixed conclusions are also obtained regarding the impact of reimbursement systems on quantity of visits. Comparing only three counties (Stockholm, Skåne and Västra Götaland), Riksrevisionen (2014) observes the increase to be larger in the county with fee-for-service, as opposed to the counties with zero compensation per visit. Meanwhile, Myndigheten för vårdanalys (2014) found no evidence of such differences when grouping counties into 3 categories of reimbursement models.

4.4 Costs

There is a general consensus that although the cost of primary care has increased since the implementation of vårdval, it is in line with trends from previous years (Riksrevisionen 2014; Myndigheten för vårdanalys 2014; Dahlgren et al. 2013). Statistics also indicate that primary care's share of total costs has remained unchanged (Riksrevisionen 2014; Myndigheten för vårdanalys 2014). Observing changes within counties, Riksrevisionen (2014) finds that the percentage change in primary care costs per capita between 2008 and 2013 varies between a decrease of 10 percent to an increase of 40 percent. Comparing counties with fee-for-service to those with no compensation per visits, Myndigheten för vårdanalys (2014) finds no evidence of a significant difference.

5 Hypotheses

While the free-entry of private actors and increased choice in primary healthcare affects its provision through multiple channels, this paper focuses on vårdval's effects on access and cost efficiency only. Combining the theoretical background and empirical studies we form several hypotheses to address the changes we expect to see in the Swedish healthcare system after the introduction of vårdval:

Hypothesis 1: Number of visits per capita to general practitioners will increase, but decrease to specialist care

Due to the entry of new primary care providers as well as increased competition between existing providers to attract patients and maximize profits, we expect the number of visits per capita to general practitioners to increase. As a result of increased access to primary care, we anticipate that the number of visits per capita to outpatient specialist care will decrease.

Hypothesis 2: The magnitude of effects in visits to general practitioners and specialist care will be larger in counties with fee-for-service and will increase with the level of per-visit compensation.

With respect to variations in compensation models, we expect to see strong positive effects of fee-for-service on primary healthcare consumption, as the healthcare providers

will be incentivized to increase their revenue through increased services. More specifically, we anticipate the increase in visits to general practitioners resulting from vårdval to be larger in counties with fee-for-service and for the number of such visits to increase along with the size of the fee. Since we expect the number of specialized visits to decrease proportionally with increase in access to primary care, the decrease in specialized visits will be larger in counties with higher fee-for-service. Another reason for this effect is that the fee-for-service incentivizes against referring patients to specialists.

Hypothesis 3: Per capita costs in primary care will rise and will decrease in specialist care.

In regards to cost-efficiency, we predict that the costs of primary care will increase due to increased access and consumption. Cost improvements in the overall system would be seen from the costs of specialist healthcare, where an increased role of primary healthcare would have negative effects on costs of specialist care. Therefore, we expect to see a positive effect of vårdval on primary healthcare costs, but a negative effect on specialist healthcare costs.

Hypothesis 4: The magnitude of changes in the costs of primary and specialist care will be higher in the counties with fee-for-service and will increase with the level of per-visit compensation.

As the increases in the number of visits is predicted to be higher in the counties with fee-for-service, we expect that cost increases in primary healthcare in these counties will be higher and will increase with the level of the fee. In addition, we also expect to see higher decreases in the costs of specialist care in the counties that include fee-for-service in their compensation structure.

Hypothesis 5: The magnitude of changes in visits to general practitioners and specialist care will be lower in counties with a wider scope of required additional services.

Hypothesis 6: The magnitude of changes in the costs of primary and specialist care will be lower in counties with a wider scope of required additional services.

Since a larger scope of required services in primary care increases the barriers to entry, we expect to see a lower establishment of new practices and, hence, less competition in counties with a broad scope. In turn, this affects the impact of vårdval. More specifically, our prediction is that improvements with respect to measures of access are lower in counties with a wide scope of required services, and therefore increases in general practitioner visits will not be more modest. Consequentially, we anticipate the marginal effect of scope to be negative in terms of primary health care costs, and positive with respect to specialist care visits and costs.

6 Data Description

Data used in this paper is at a county council level, totaling 21 counties. The data presented is yearly starting from 2003 up to, and including, 2013. This represents between four to seven years of data before the implementation of vårdval and four to seven years of data after. Sources for the data include SKL, SCB, and each county council³. For a full list of variables with their descriptions and sources, see Appendix A.1.

6.1 Vårdval

In order to capture the effect of vårdval, we created a dummy variable, which equals to one if vårdval was implemented and zero otherwise. While most counties implemented vårdval on the first of January, seven counties implemented it at different times throughout the year. For these counties, we set the implementation year to be the year closest in proximity to the month of implementation. For example, if vårdval was implemented between January and June 2009, the implementation year is 2009. If instead vårdval was implemented between July and December 2009, the implementation year is set to 2010. For details on the exact date of implementation by county, see Appendix A.1 Table 2. The municipality of Norrtälje in Stockholm has its own system of reimbursement and did not implement vårdval until November 2010. However, being unable to obtain data for each variable at the level of the municipality, we do not exclude the municipality of Norrtälje from our statistics for Stockholm. In 2013, the population of Norrtälje was approximately equivalent to only 2.6 percent of the total population of Stockholm county (SCB 2014), and therefore, we do not expect this to have a significant impact on our results.

6.2 Visits

This paper uses number of visits per capita to general practitioners (*allmänläkare*) in primary healthcare centers as an indicator for primary healthcare consumption. The analysis separates visits by the patient to doctor (office visits) and by the doctor to the patient (home visits), which are assumed to be more expensive to the healthcare provider. In addition to the doctor visits, there are also phone consultations, which have been encouraged by county councils to decrease costs and increase efficiency. However, data on the exact number of telephone contacts is less reliable, especially in the early years of the dataset where statistics were not always collected in every county council. Therefore, the analysis in this paper will primarily focus on vårdval's effect on visits. In particular, we will focus on the variable *visits*, which represents the number of visits per capita weighted by type of visit (one home visit is the equivalent of two office consultations). This weighting is in line with the methods used by SKL.

In order to capture consumption of specialist care, we use the number of doctor outpatient visits per capita in psychiatric and somatic care, represented by the variable

³ Including county council websites, as well as e-mail and telephone correspondence.

visits_specialist. Just as with the variable *visits*, this includes both office and home visits⁴, however, we do not allocate more weight to home visits due to the nature of specialist care (in line with the methods used by SKL). Visits classified as day healthcare service (*dagsjukvård*) are excluded from the analysis. This type of visit is defined as more comprehensive or demanding in terms of resources than a regular visit to a specialist and includes services such as outpatient surgery or treatment that require a period of observation. Day healthcare service and inpatient specialist visits are excluded because this paper is primarily concerned with less time-consuming visits that could potentially be administered in primary healthcare centers. Although a greater utilization of primary care can lead to overall improvements in health, reducing the need for these visits, we would not expect to see these effects within the period studied in this paper.

6.3 Costs

This paper also evaluates changes to the per capita cost of primary and specialist healthcare (adjusted for inflation at 2004 prices). Data is taken from SCB, which is a more accurate measure of actual costs to society than data provided by SKL, calculating cost by taking the gross costs minus internal income and sales to other counties. Cost data was only available for 2005-2013, which slightly decreases our data size. In addition, we were unable to obtain statistics for Gotland, and thus our cost analysis is restricted to 20 counties. Finally, our cost variables do not include drugs within the pharmaceutical benefit. Even though this makes up a significant proportion of healthcare costs, we find it relevant to exclude it because spending on pharmaceuticals often varies significantly from year to year due to external factors such as patent expirations or new drugs entering the market. There is, however, a possibility that greater competition in primary care creates pressure on physicians to increase the number of prescriptions in order to increase patient satisfaction.

A factor of greater concern to data analysis is that primary care costs do not distinguish between general practitioners' care and other forms of primary care. Therefore, it includes maternal care, childcare, physiotherapy, nursing care, etc. While *vårdval* is mandatory for care provided by general practitioners, many counties have voluntarily chosen to extend this policy to other areas of primary care. However, since care provided by general practitioners is by far the largest component of primary care costs, we do not expect this to generate a significant divergence in cost between counties. While SKL has a cost variable that separates general practitioner care from other primary care, it does so by calculating net costs as the difference between a county's internal and external costs and its internal plus external revenues. Therefore, items such as patient fees and state grants are represented as sources of revenue, and thus this variable is not an accurate representation of society's actual costs of primary care.

⁴ Identified as *hembesök* and *hemsjukvårdsbesök* in Swedish

One should note that the cost variable in this paper represents each county council's cost of healthcare and therefore does not reflect out-of-pocket spending or the actual cost of operating a healthcare service.

6.4 Reimbursement System

Controlling for the system of reimbursement is complex, since there is significant variation between counties with regards to what factors determine economic compensation and to what extent. Therefore, we use reimbursement per visit (fee-for-service) in Swedish Kronor (adjusted for inflation at 2004 prices) by a patient listed with the doctor as a proxy for system of reimbursement. We find that this variable is a good indicator of what proportion of reimbursements is covered by capitation. Konkurrensverket (2011) classifies four out of the five counties that have zero fee-for-service⁵ as having between 90 and 100 percent “fixed” compensation. While Konkurrensverket (2011) also includes two other counties (Norrbotten and Jämtland) in this classification, this is due to differences between how counties administer patient fees.

In some counties patient fees belong to the provider, while in others they belong to the county council. Therefore, counties do not always perceive patient fees as fee-for-service. Since it is the county council's decision how to allocate patient fees, we interpret the decision to forfeit patient fees onto the provider to be the equivalent of a fee-for-service. Konkurrensverket (2012) classification was based on interviews with county councils and therefore may be biased by the perception of the individuals being interviewed.

In counties where fee-for-service is equivalent to the patient fee, county councils vary regarding compensation for visits, which are exempted from user charges. Such exemptions arise when a patient is a child or possesses a fee-exemption card (*frikort*). In the three counties (Östergötland, Gävleborg and Jämtland) that do not provide compensation under such circumstances, we reduced the fee-for-service by the percentage of the population below the age of 20⁶ in order to account for the fact that providers in these locations will on average earn less per visit. This reduction is made under the assumption that the consumption of primary care of this demographic group is on average the same as that of the rest of the population. This, however, does not take into account the percentage of visits conducted by patients with a fee-exemption card, and therefore it is a conservative estimate.

One key limitation of the fee-for-service variable is that it does not account for coverage ratio compensation. This is especially an issue in the case of Kalmar, where the council allocates approximately 20 percent of its reimbursement to rewarding providers for achieving desirable levels (Kalmar County Council 2010-2013).

⁵ The five counties with zero fee-for-service include Kalmar, Blekinge, Skåne, Västra Götaland, and Värmland. Kronoberg removed pay-per-visit in 2013. Only Kalmar is not classified by Konkurrensverket as having a very high proportion of capitation.

⁶ In each of these counties, children are exempt from fees until the age of 20.

6.5 Required Scope of Services

In order to capture differences for the required scope of services, we created a variable called *scope*, which takes a value between zero and four, depending on the number of additional services a primary care provider must offer. The additional services considered in this paper include maternal care, pediatric care, medical foot care, and rehabilitation. A value of zero implies that no additional services are required. In five counties, rehabilitation services are only partly required – in such cases, *scope* increases by a value of 0.5 instead of one. Data for this was obtained from each county council, Anell, Nylinder and Glenngård (2012), Socialstyrelsen (2011), and Praktikertjänst (2015). For a more detailed description, see References section 12.1.

6.6 Controls

This paper uses patient fees and various demographic and socio-economic measures as controls to isolate the effects of *vardvål*. These include population density, education, wealth, age and percentage foreign born. It is important to include these controls because they may be significant in accounting for differences in the number of providers, visits and costs.

Patient fees: During the time period under consideration, patient fees per visit to a general practitioner varied within counties by up to 87 Swedish Kronor⁷. Higher user charges of primary care are likely to create disincentives for frequent visits. Although some counties set higher charges if a patient visits a primary care center where they are not registered, we only consider the charge levied on patients visiting the provider where they are listed.

Population density: Numerous studies show that new providers have predominately established themselves in areas of high population density (Myndigheten för vårdanalys 2014; Konkurrensverket 2011). A high population density also implies a smaller distance between patients and providers increasing the convenience of seeking care, likely resulting in a higher number of visits. Having a large proportion of low population density increases the per capita costs of providing care. Therefore, we expect a negative correlation between costs per capita and population density.

Education and Income: There is a strong positive link between income, education and health status (Case, Lubotsky and Paxson 2001; Winkleby et al. 1992). myndigheten’s 2014 annual report confirms that individuals in Sweden with less years of education “report a worse general state of health” and are more prone to mental illnesses (Folkhälsomyndigheten 2014). While there are debates regarding the direction of causality, we would expect a higher proportion of lower educated individuals to have higher healthcare costs and number of visits. Conversely, if the proportion of highly educated individuals increases, we expect costs and visits to decrease.

⁷ Adjusted for inflation.

Age demographics: An ageing population is a commonly cited reason for rising healthcare costs in Europe. Older members of the population often need more extensive and frequent care, driving up visits and costs (Socialstyrelsen 2004). Therefore we control for the proportion of individuals 65 and above in order to determine whether an increase in visits/costs is simply a consequence of an ageing population. Since infants are also frequent patients we also control for the percentage of the population age six or younger.

Foreign-born: In Sweden, individuals born abroad in Southern and Eastern Europe (non EU), Asia, Africa and Latin America are generally considered as having higher healthcare needs and form a key component of the CNI index. Since we were unable to find statistics for this at the county level, we instead use the percentage of individuals born outside the European Union (EU) and the European Free Trade Association (EFTA).

6.7 Limitations

Although the ability to increase the number of providers and visits is limited by the number of doctors available, we do not control for the number of doctors. This is because we expect vårdval to increase the demand for the number of physicians and thus vårdval may be a contributing factor to the rise in quantity of general practitioners. For similar reasons, we also do not control for the number of primary care providers.

According to (Konkurrensverket 2012; 2014; 2011), there are significant differences amongst county councils regarding barriers to entry. The rules and requirements set by each county council have often been difficult to interpret and regarded as unfair towards private entrepreneurs. Quantifying these differences is a difficult task and therefore we do not take barrier to entry other than scope into consideration. Some counties introduced active listing systems after vårdval, whereby the patient had to make an active decision to be listed with a provider, rather than being automatically assigned to their previous general practitioner. While active listing could be used as a dummy to represent a barrier to entry, only four counties have an active listing system, including Gotland, which is excluded from the cost regressions. Therefore, we do not have enough variation to draw statistically conclusive results from such a variable.

While it would be interesting to control for the reimbursement system prior to vårdval, this is an extremely complex factor to measure. This is because in some counties, each community was responsible for designing the reimbursement model, and thus there was substantial variation within counties. Furthermore, changes to the reimbursement system often occurred on a yearly basis and have been poorly documented. Therefore, the implementation of vårdval was also accompanied by a simplification of the rules and regulations governing public compensation in primary care. Additionally, the low number of private primary healthcare services prior to vårdval implies that relatively few actors had incentives to maximize-profits

It is difficult to isolate the effect of vårdval from other healthcare policy reforms implemented during the time frame studied. The 1177 Network campaign may have led to a reduction in both primary and outpatient specialist care visits by discouraging patients from seeking care for minor illnesses, such as a cold. The re-regulation and privatization of pharmacies may have yielded similar effects by increasing the incidence of self-treatment through higher access to basic medical advice and pharmaceuticals. Therefore, if our hypotheses hold, these policies would reduce the effect of vårdval on visits and costs in primary care and enhance its negative effect on number of visits and costs in specialist care. Meanwhile, we would expect the enactment of *Vårdgaranti* into law to enhance visits in both primary and specialist care. However, since this law is not new in practice, we would expect the bias from this legislation to prove rather small. More significant is *Kömiljarden*, which creates incentives to reduce wait times in specialist care. We expect this policy to positively affect the quantity of visits and costs in specialist care, biasing the effect of vårdval downwards.

6.8 Summary Statistics

Summary statistics of all the variables used can be found in the Appendix, Tables A.3-5. From Table A.3, we can see that there is a relatively large dispersion within the dependent variables as well as the control variables. Table A.4 compares the means of each variable between the group of counties that have fee-for-service and those with zero per-visit compensation, before and after vårdval. It is worthy to note that the mean of scope is higher in counties with fee-for-service. Therefore, if scope is found to be statistically significant, the failure to include scope as a control variable may bias the results when comparing counties with and without fee-for-service. Table A.5 provides summary statistics including variations between counties and within years.

7 Trend Overview

7.1 Visits to Primary Care

Figure 7.1 shows the weighted visits per capita separated into groups according to the year of implementation as can be seen in Table A.2 in the Appendix. We see that the number of visits generally increases across almost all counties after the implementation of vårdval. The trends, however, are not homogenous across counties. Given that LOV came into legislation in November of 2008, due to become mandatory in 2010, it is likely that primary care providers already began making preparations for increased competition in 2009. The graphs representing groups 4a-4c in Figure 3 indicate that this is likely the case, with visits often increasing in 2009 and increasing further in 2010. Västmanland and Västernorrland both stand out as outliers with a sharp increase in 2005 and 2006 respectively followed by a sharp decline in the subsequent year.

7.2 Visits to Specialized Care

Figure 7.2 shows outpatient visits to specialist care per capita before and after vårdval. Unlike visits to primary healthcare, visits to specialized care show no clear trend or significant changes after vårdval. Halland shows a decrease after implementation of vårdval as does Stockholm and, to a lesser degree, Västmanland. Counties in Group 3 show decreasing trends prior to vårdval, as well as after the 2009 implementation. Counties in Group 4, which implemented vårdval once it became law in 2010, show no real trend, neither increasing nor decreasing. Visits in these counties vary to a small degree, but stay rather constant in the years presented in the graph.

7.3 Costs of Primary Care

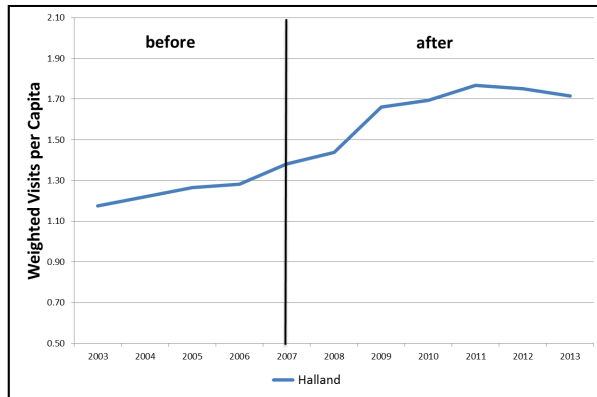
Figure 7.3 shows the per capita costs of primary healthcare over years in each county. Generally, we see slightly increasing trends of costs across counties with a few counties exhibiting a short-lived slight reduction either right before or during the year of the implementation of vårdval. However, several counties display different trends. Stockholm shows a slight decreasing cost trend after the implementation, which turns into an increasing trend in 2012, while Västmanland shows continuously increasing costs. Blekinge county is an outlier among the counties; prior to implementation of vårdval, the county showed higher increases in costs than other counties, while after vårdval there is a significant decreasing trend all the way through 2013. Jämtland also shows a decrease in costs, which start a year before the implementation of vårdval and later go back to an increasing trend. Sörmland also shows a decrease in costs in the year of the vårdval implementation, which go back to increasing trends afterwards.

7.4 Costs of Specialist Care

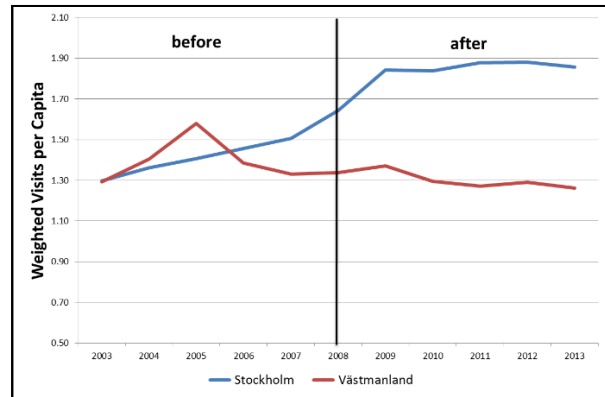
Figure 7.4 shows per capita costs of specialist care before and after the implementation of vårdval. All counties show significant increasing trends in specialist healthcare. There are no significant variations among the groups, although Group 2 shows less steep increases than the rest of the groups. For most counties, the year of vårdval implementation shows no change in the costs of specialist care. However, four counties in Group 4, namely, Västerbotten, Blekinge, Gävleborg and Dalarna, show a decrease in costs after implementation of vårdval. Nevertheless, the trend is short-lived and reverses back to an increasing trend after one year. These counties vary in their level of fee-for-service.

Figure 7.1 Weighted Visits per Capita to General Practitioners by County Before and After the Implementation of Vårdval (2003-2013)

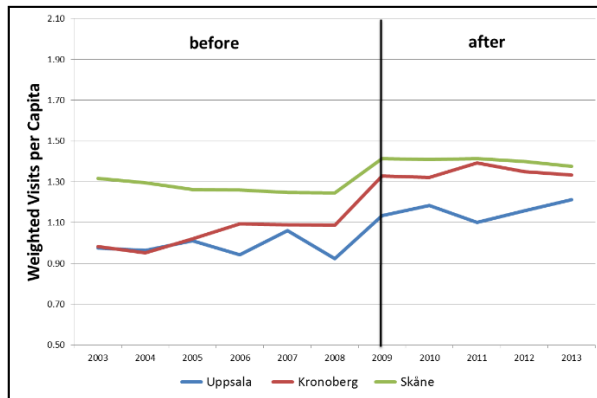
Group 1: 2007



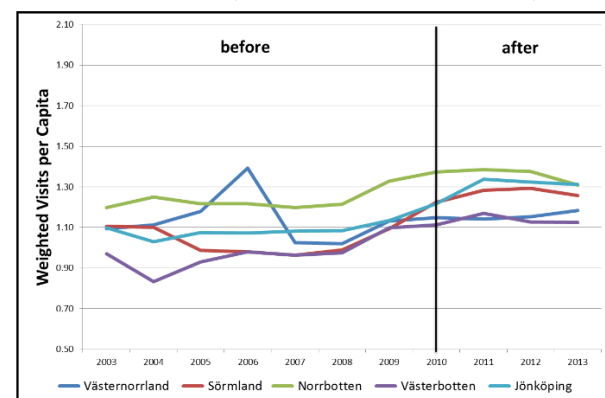
Group 2: 2008



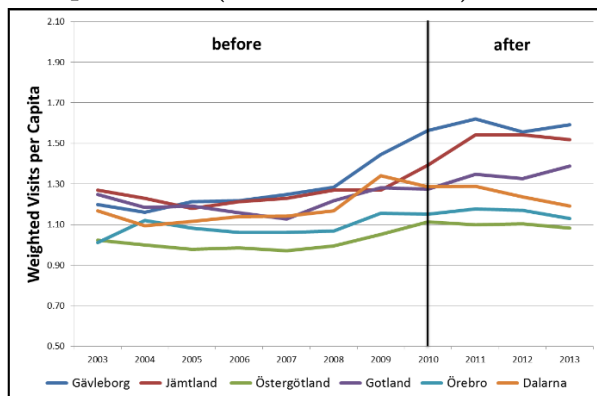
Group 3: 2009



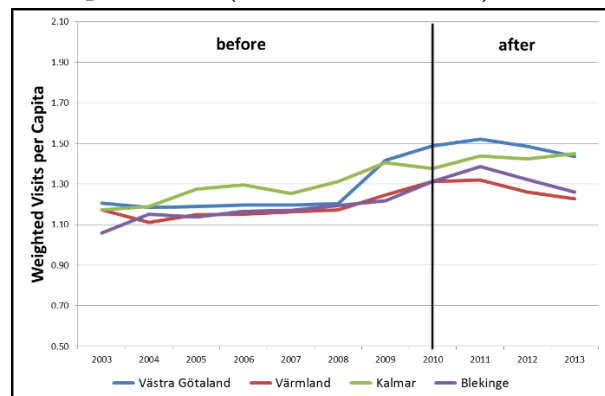
Group 4a: 2010 (medium fee-for-service)



Group 4b: 2010 (low fee-for-service)



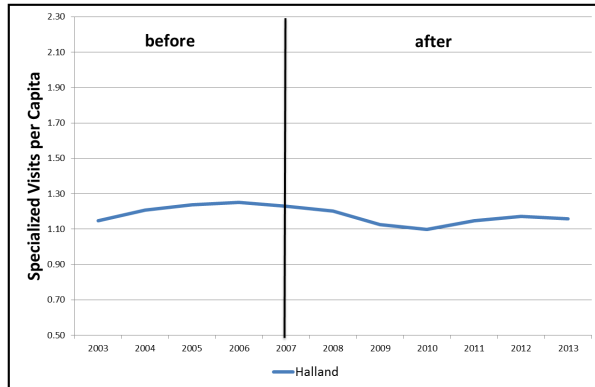
Group 4c: 2010 (zero fee-for-service)



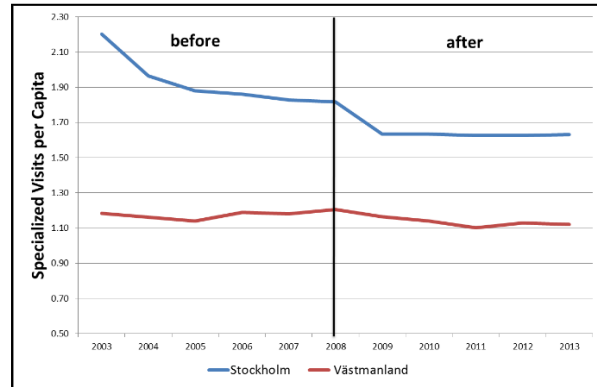
(Authors' own figures)

Figure 7.2 Outpatient Specialist Visits per Capita by County Before and After the Implementation of Vårdval (2003-2013)

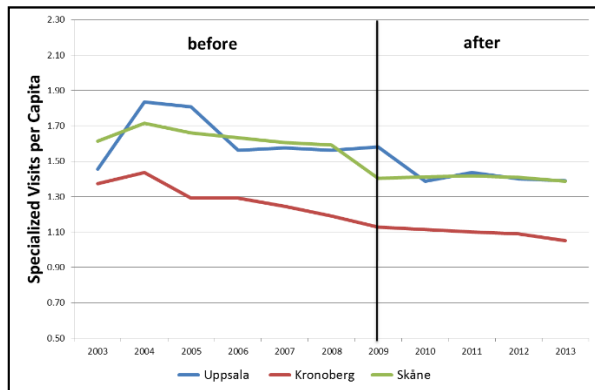
Group 1: 2007



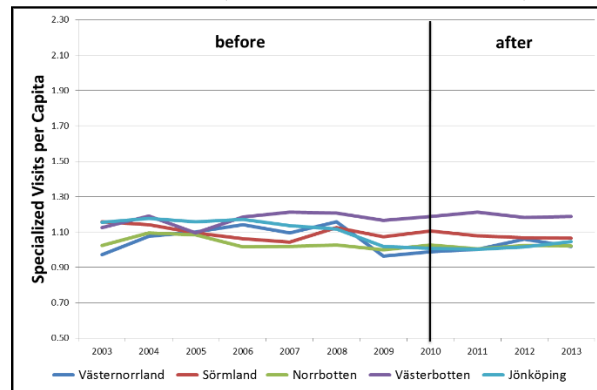
Group 2: 2008



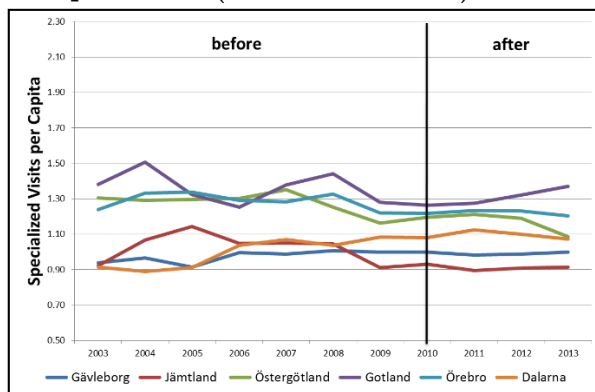
Group 3: 2009



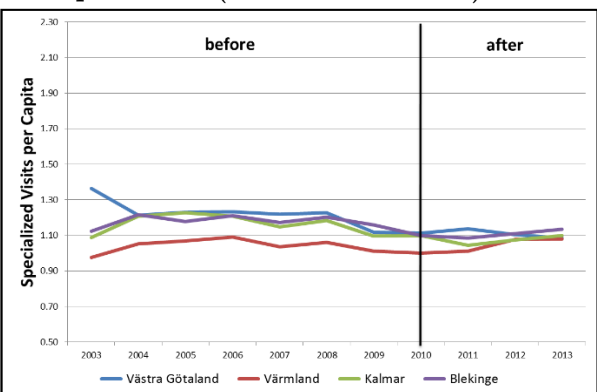
Group 4a: 2010 (medium fee-for-service)



Group 4b: 2010 (low fee-for-service)



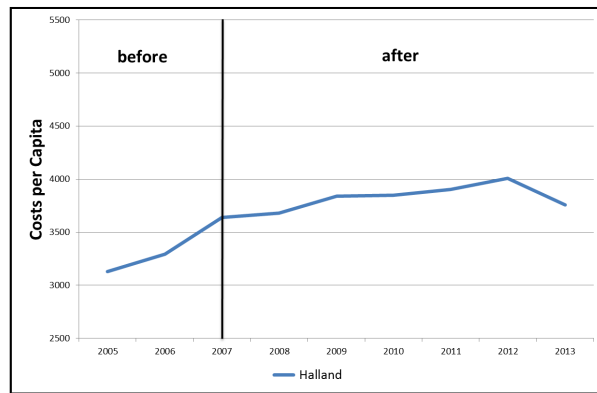
Group 4c: 2010 (zero fee-for-service)



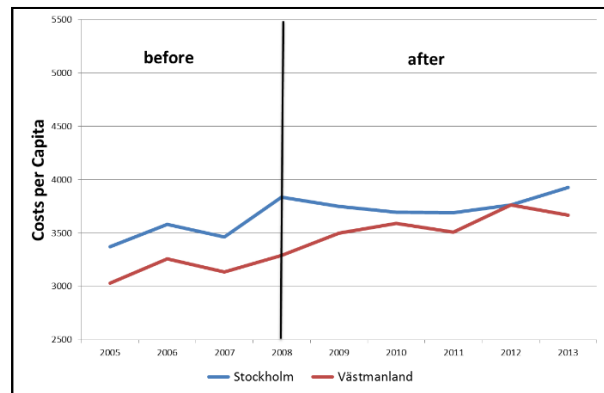
(Authors' own figures)

Figure 7.3 Per Capita Cost of Primary Care by County Before and After the Implementation of Vårdval (2005-2013)

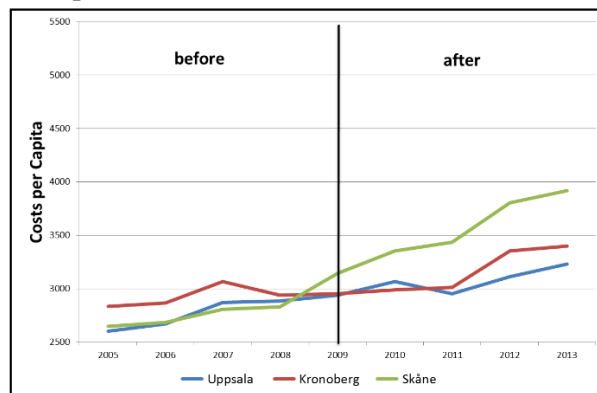
Group 1: 2007



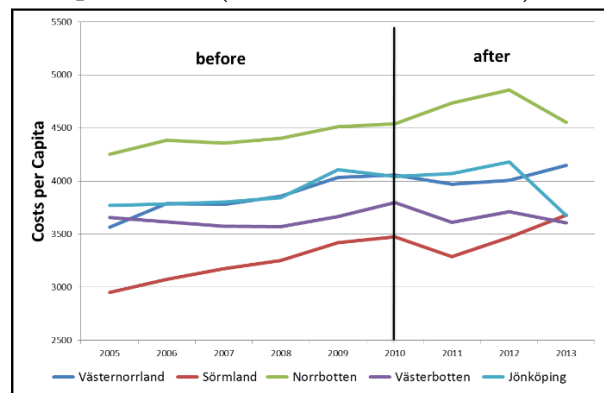
Group 2: 2008



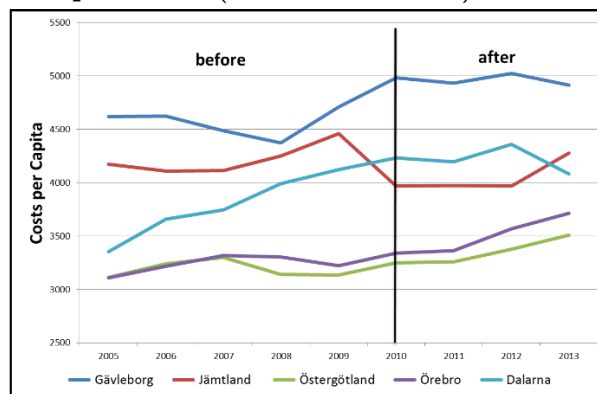
Group 3: 2009



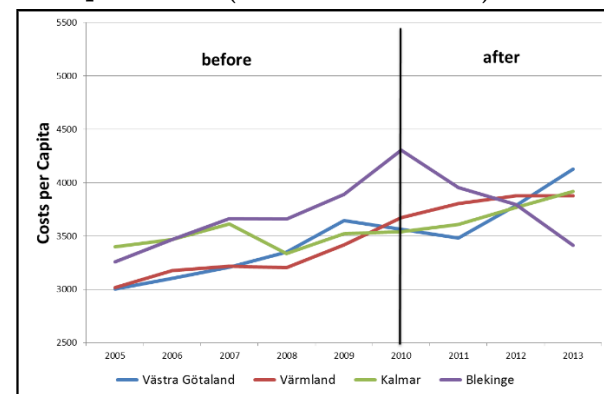
Group 4a: 2010 (medium fee-for-service)



Group 4b: 2010 (low fee-for-service)



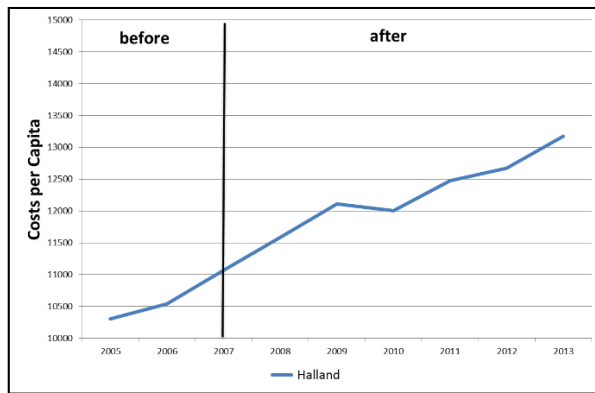
Group 4c: 2010 (zero fee-for-service)



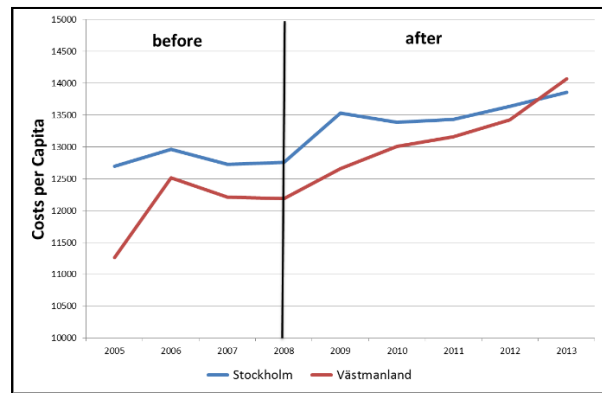
(Authors' own figures)

Figure 7.4 Per Capita Cost of Specialist Care by County Before and After the Implementation of Vårdval (2005-2013)

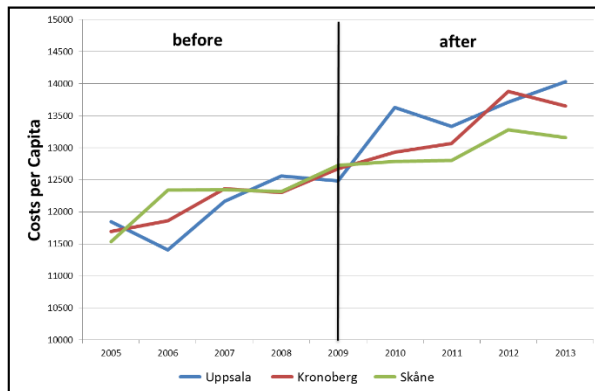
Group 1: 2007



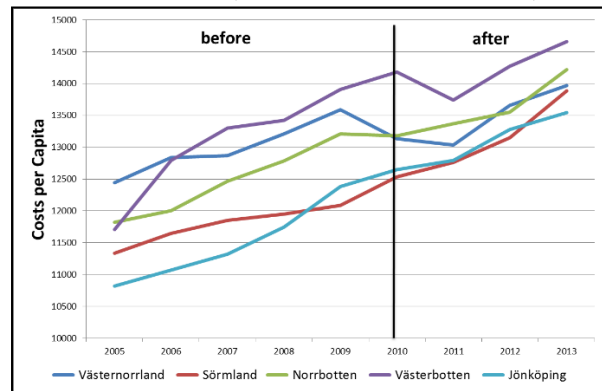
Group 2: 2008



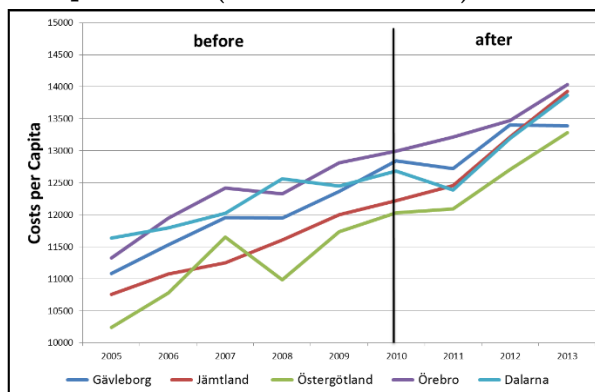
Group 3: 2009



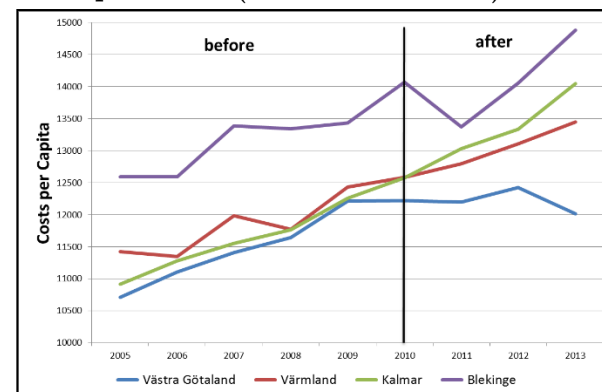
Group 4a: 2010 (medium fee-for-service)



Group 4b: 2010 (low fee-for-service)



Group 4c: 2010 (zero fee-for-service)



(Authors' own figures)

8 Econometric Model

The quantitative analysis is conducted using a two-way fixed effects balanced panel data approach in order to assess the effect of vårdval within counties. A key prerequisite for using a fixed effects model is that omitted variables, which may influence the results, are time-invariant. The fixed effects model allows us to control for time-invariant covariates affecting the dependent variable and rather estimate the effects of variables that change over time, which in our case is vårdval. This means that county characteristics that influence the dependent variable and remain constant over time do not affect the results. We prefer using fixed effects over random effects, as we expect that there might be unobserved time-invariant variables that are correlated with the independent variables. In that case, fixed effects estimates are consistent and unbiased, while random effects present biased estimates.

Running the Hausman test, we find that a fixed effects model is preferred when assessing the impact on visits; however, a random effects model is recommended when examining costs. Nevertheless, we find that a fixed effect model is more appropriate for our data and research questions. (Clark, Linzer 2012) demonstrate that the use of the Hausman test alone is an insufficient metric to determine whether fixed or random effects should be used.

In addition to controlling for various county-level characteristics, the model also includes year dummy variables, which control for temporal variations in the dependent variable. The year dummy variables are jointly significant in all regressions, confirming that they are needed in our model.

One of the shortfalls of fixed effects however is a potential increase in measurement error bias, where part of the observed changes in dependent variables over time is noise. In addition, it is impossible to know with absolute certainty that the omitted variables correlated with the independent variables are indeed constant over time. One such factor that may be of concern to our study includes other policy changes during the period of our study.

While a difference-in-difference model would be preferred, the lack of variation in the implementation dates of vårdval would only allow us to capture the immediate effects of vårdval that might have changed in the subsequent years.

In order to capture the general effect of vårdval we use the following models:

$$\ln(Y_{it}) = \alpha_i + \beta_1 \text{vardval}_{it} + \gamma_t + u_{it} \quad (1)$$

$$\ln(Y_{it}) = \alpha_i + \beta_1 \text{vardval}_{it} + \beta X_{it} + \gamma_t + u_{it} \quad (2)$$

Where Y is the dependent variable, α_i is the time-invariant fixed effect for each county,

i, γ_t represents a set of dummies for each year (excluding the first year) in the analysis, X_{it} represents a set of controls, and u_{it} is an error term. These terms remain the same in all subsequent models. The dependent variables considered include *visits*, *visits_specialist*, *cost*, and *cost_specialist*. The independent variable of interest in this equation is *vardval*, which takes a value of one when *vårdval* has been implemented in county i, and zero otherwise. Therefore, the coefficient β_1 captures the effect of *vardval*, holding all else constant. Whist both models (1) and (2) measure the impact of *vårdval* controlling for general trends in society, model (2) also controls for other factors (such as age demographics) that change over time and may influence the dependent variable.

In order to distinguish whether the general effect of *vårdval* differs depending on the scope of additional required services, we use the following model:

$$\ln(Y_{it}) = \alpha_i + \beta_1 \text{vardval}_{it} + \beta_2 \text{scope}_{it} + \beta X_{it} + \gamma_t + u_{it} \quad (3)$$

Scope takes a value between zero and four when *vårdval* has been implemented, and zero otherwise. This means that it is essentially an interaction of *scope* with *vardval*, since it only accounts for scope of required services that emerged simultaneously with *vårdval*. Therefore, the effect of *vårdval* is $\beta_1 + \beta_2 \text{scope}_{it}$ when scope is greater than zero, with β_2 capturing the marginal effect of increasing the scope by one service, holding all else constant.

In order to determine the effect of *vårdval* depending on whether a county has fee-for-service, we use the following models:

$$\ln(Y_{it}) = \alpha_i + \beta_3 \text{no_fee_for_service}_{it} + \beta_4 \text{fee} + \beta X_{it} + \gamma_t + u_{it} \quad (4)$$

$$\ln(Y_{it}) = \alpha_i + \beta_2 \text{scope}_{it} + \beta_3 \text{no_fee_for_service}_{it} + \beta_4 \text{fee} + \beta X_{it} + \gamma_t + u_{it} \quad (5)$$

No_fee_for_service is a dummy variable that takes the value of one if the county has no compensation per visit after the implementation of *vårdval*, and zero otherwise. *Fee* is another dummy variable that takes the value of one if the county has fee-for-service after the implementation of *vårdval*, and zero otherwise. Note that *no_fee_for_service* and *fee* are also interactive variables, as they only take into account the systems of reimbursement that emerged in combination with *vårdval*. That is, they take a value of zero when the variable *vardval* is zero. As a result, the effect of *vårdval* in model (4), holding all else constant, is β_4 in counties with zero fee-for-service and β_3 in counties with fee-for-service. Model (5) tests whether these effects hold when controlling for

scope. In this model, the effect of vårdval in counties with no compensation per visit is captured by the term $\beta_2 scope_{it} + \beta_3$. In counties with fee-for-service, this is $\beta_2 scope_{it} + \beta_4$.

In order to determine the effect of vårdval depending on the degree of fee-for-service, we use the following models:

$$\ln(Y_{it}) = \alpha_i + \beta_3 no_fee_for_service_{it} + \beta_4 fee + \beta_5 \ln(fee_for_service_{it}) + \beta X_{it} + \gamma_t + u_{it} \quad (6)$$

$$\ln(Y_{it}) = \alpha_i + \beta_2 scope_{it} + \beta_3 no_fee_for_service_{it} + \beta_4 fee + \beta_5 \ln(fee_for_service_{it}) + \beta X_{it} + \gamma_t + u_{it} \quad (7)$$

Fee_for_service represents the degree of compensation per visit for county i at time t. It is also essentially an interaction between *fee_for_service* and *vårdval*, taking the value of zero if vårdval has not been implemented. In Model (6) the effect of vårdval in counties with fee-for service is captured by $\beta_4 + \beta_5 \ln(fee_for_service_{it})$, whereby β_5 is the percentage change in Y_{it} resulting from an increase in compensation per visit by one percent. Model (7) tests whether these results are consistent when controlling for scope.

8.1 Additional Considerations

The regressions for each dependent variable are run twice for each model. All the counties are included in the first, while Stockholm is excluded in the second one. We decided to estimate the models excluding Stockholm because Stockholm County is unique in many ways. It possesses the highest mean income, population density, fee-for-service compensation, percentage of highly educated individuals, and foreign-born population. It also has the lowest percentage of population above the age of 65. Furthermore, Stockholm has extended vårdval to a large number of specialist care services within the studied time-frame and it is the only county where vårdval was not implemented uniformly, because the municipality of Norrtälje did not implement vårdval until 2010,

Running a Modified Wald test for group-wise heteroskedasticity, we find that we are unable to reject the null hypothesis of heteroskedasticity. Therefore, all regressions are run using robust-clustered standard errors.

The outputs of all regressions are presented in the Appendix, section A.3.

9 Results

9.1 Visits

By simply comparing the mean number of visits per capita to general practitioners before and after vårdval, we find that visits per capita increase by 17.5 percent. From

Tables A.6 and A.7 (see appendix), we observe that the increase of visits associated with vårdval is substantially lower. Column (1) in Table A.6 indicates that when only controlling for year dummies the number of visits per capita increases by 6.0 percent. Adding the rest of our control variables, this effect increases to 7.4 percent (Column 2). Excluding Stockholm (Table A.7), this effect is somewhat smaller (approximately 6.2 percent). The finding lends support to the first part of *Hypothesis 1* of an increase in primary care visits following the implementation of vårdval.

As expected, we find that the relationship between scope and visits is negative, confirming the first part of *Hypothesis 5*. Including scope in the regressions, we find that increasing the services required by one decreases the effects of vårdval by 2.5 percent (Column 3, Table A.6). Table 9.1 summarizes the effect of vårdval (controlling for scope) in three groups of counties. The first group includes all counties regardless of the system of reimbursement; the second group includes the counties with no per-visit compensation; and the final group consists of counties with fee-for-service above zero. Note that in the second group, scope takes a maximum value of three and therefore we do not include figures for the last two rows in this group. Results are shown including and excluding Stockholm. When all 21 counties are included in the analysis, the effect of vårdval when scope takes a value of zero is 12.8 percent more visits. When scope takes the maximum value of four, this figure falls down to 2.7 percent. The coefficient on scope in column (3) is only significant at the 10 percent level and becomes insignificant when excluding Stockholm (Table A.7). Nevertheless, scope has a highly significant and negative effect when controlling for models of reimbursement in columns (5) and (7) in both Tables A.6 and A.7.

The model of reimbursement also has implications on the magnitude of vårdval's effect. Columns (4) and (5) in Table A.6 indicate that, as predicted, the effect of vårdval is higher in counties with fee-for-service. By comparing coefficients on *no_fee_for_service* and *fee* in column (4), in the same table we find that the effect of vårdval on visits is approximately 1.6 percent larger on average for counties with fee-for-service than without. Holding scope constant, this figure increases to 4.9 percent (column 5). Excluding Stockholm (Table A.7), these figures become smaller: 0.3 and 3.5 percent, respectively.

Conducting an F-test for whether the two coefficients of the reimbursement components are the same, we are unable to reject the null in the model (4). Controlling for scope, we find evidence of significant differences between the two types of counties at a 9 percent level, however, this changes when we exclude Stockholm for the analysis. It implies that although, the effect of vårdval is, on average, higher in counties with fee-for-service, it is not statistically different.

Table 9.1 Effect of Vårdval on GP Visits Depending on Scope⁸

Scope	All Counties % increase in GP visits			Excluding Stockholm % increase in GP visits		
	All Counties	No fee-for- service	Fee-for- service	All Counties	No fee-for- service	Fee-for- service
-	12.8%	10.1%	15.0%	11.6%	10.0%	13.5%
0.5	11.5%	8.5%	13.4%	-	8.6%	12.1%
1	10.3%	7.0%	11.9%	-	7.2%	10.7%
1.5	9.0%	5.4%	10.3%	-	5.8%	9.3%
2	7.8%	3.8%	8.7%	-	4.4%	7.9%
2.5	6.5%	2.3%	7.2%	-	3.0%	6.6%
3	5.2%	0.7%	5.6%	-	1.7%	5.2%
3.5	4.0%	-	4.0%	-	-	3.8%
4	2.7%	-	2.4%	-	-	2.4%

From columns (6) and (7) in Table A.6 we find that there is a positive relationship between the degree of fee-for-service and number of visits to general practitioners. This effect, however, disappears when we exclude Stockholm and when we control for scope. Overall, it appears that we find no evidence to support the first part of *Hypothesis 2*, which predicted that visits would increase more in counties with per-visit compensation and have a positive relationship between quantity of fee-for-service and healthcare consumption.

In analyzing the data for specialist care visits, we find that, overall, the number of visits is approximately 4.1 percent lower in the years when vårdval is implemented as opposed to before. However, when regressing specialist care visits on vårdval and a set of controls (columns 1 and 2 in Tables A.8 and A.9), we find no evidence that vårdval alone is driving this decrease. Controlling for scope, we find statistically significant and negative effects of vårdval in columns (3), (5) and (7). The direction of the effect however changes according to the size of scope, but is predominately negative. This partly affirms the second part of *Hypothesis 1*, which anticipated a decrease in specialist visits. Table 9.2 illustrates how the effect of vårdval changes according to size of scope. The groups in the table are the same as in Table 9.1. In all cases, the effect of vårdval on specialist visits is negative when scope is between zero and two, and positive when scope is three or above. The coefficients on scope remain more or less the same in all three models in Tables A.8 and A.9, ranging between 2.2 and 2.4 percent when including Stockholm, and 2.6 and 2.7 when Stockholm is excluded. This lends support to *Hypothesis 5*, which predicted a positive relationship between scope and specialist

⁸ Only results significant at the 10 percent level or below are reported.

visits; however, we did not expect vårdval to increase utilization of specialist care. Possible explanations for this finding are discussed in the following section.

Table 9.2 Effect of Vårdval on Specialist Visits Depending on Scope⁹

Scope	All Counties			Excluding Stockholm		
	% increase in specialist visits			% increase in specialist visits		
	All Counties	No fee-for-service	Fee-for-service	All Counties	No fee-for-service	Fee-for-service
-	-5.9%	-5.5%	-6.1%	-6.5%	-6.1%	-7.1%
0.5	-4.7%	-4.3%	-4.9%	-5.2%	-4.7%	-5.7%
1	-3.5%	-3.1%	-3.7%	-4.0%	-3.4%	-4.4%
1.5	-2.3%	-1.9%	-2.5%	-2.7%	-2.0%	-3.0%
2	-1.2%	-0.7%	-1.3%	-1.4%	-0.7%	-1.7%
2.5	0.0%	0.5%	-0.1%	-0.1%	0.7%	-0.3%
3	1.2%	1.7%	1.1%	1.2%	2.0%	1.0%
3.5	2.3%	-	2.3%	2.4%	-	2.4%
4	3.5%	-	3.6%	3.7%	-	3.7%

Comparing models of reimbursement, column (5) in Table A.8 indicates that counties with fee-for-service experienced a marginally larger (0.6 percent) decrease in specialist visits than counties with no fee-for-service, holding scope constant. Not including Stockholm, this figure becomes 0.9 percent (Table A.9). However, tests of statistical differences in the coefficients on *no_fee_for_service* and *fee* in models (4) and (5), are consistently unable to reject the hypothesis of coefficient equivalence. Controlling for the degree of fee-for-service in column (6), (Tables A.8 and A.9) we find evidence of a negative relationship between specialist visits and quantity of fee-for-service, whereby a higher fee-for-service is associated with a larger reduction in specialist visits. This relationship disappears when we control for scope in column (7). The findings invalidate *Hypothesis 2*, where outpatient specialist visits were expected to decrease more in counties with fee-for-service, with the difference increasing in the quantity of the reimbursement per visit.

9.2 Costs

Looking at the raw data, the average cost of primary care is approximately 7.2 percent larger after the implementation of vårdval. However, none of the regressions in columns (1) through (3) in Tables A.10 and A.11 indicate a statistically significant relationship between vårdval and cost. The scope of required services does not have a significant effect regardless of the model and whether we include or exclude Stockholm, invalidating *Hypothesis 6*, which predicted a negative relationship between costs and scope. The only statistically significant effect is an increase in costs in counties without fee-for-service found in columns (4) through (7). This finding partly confirms *Hypothesis*

⁹ Only results significant at the 10 percent level or below are reported.

3 anticipating an increase in costs, but contradicts *Hypothesis 4*, which predicted the increase in costs to be larger in counties with fee-for-service. Controlling for scope, counties with no compensation per visit have 6.8 percent higher primary care costs (column 5, Table A.10). Excluding Stockholm (Table A.11), this figure falls to 5.5 percent. In counties with fee-for-service, vårdval has no significant effect on costs regardless of whether we control for the degree of fee-for-service.

Tables A.12 and A.13 reveal a somewhat similar result for specialist care costs, but in opposite directions. Although costs are 9.5 percent larger in the period when vårdval was implemented, there is no statistical evidence that vårdval in general is responsible for this result. In counties with no compensation per visit, costs are approximately 2.4 percent lower after the implementation of vårdval (column 4, Table A.12). However, this effect is only statistically significant at a 10 percent level and disappears when removing Stockholm (Table A.13), as well as when we control for scope. The coefficient on *fee* in columns (4) and (5) remains insignificant in all regressions except in Table A.13, where column (5) indicates that, excluding Stockholm, costs increased by 3.6 percent in counties with fee-for-service, holding scope constant. Controlling for the degree of fee-for-service, we find that it does not impact the results. Even though it is negative and significant in column (7), Table A.12, this effect again disappears when we exclude Stockholm. The results are inconsistent with *Hypothesis 3* and *4*, which anticipated a decrease in costs on specialist care with a stronger effect in counties with fee-for-service.

Unlike the results from primary care, scope has a consistently negative and significant effect in specialist care. This directly contradicts *Hypothesis 6*, predicting a larger decrease in specialist care costs in instances of a narrow scope. When increasing scope by one, costs fall by 0.9, 1.4 or 1.9 percent, depending on the chosen model (Table A.12). These statistics are robust to the exclusion of Stockholm (Table A.13), becoming 0.9, 1.5, and 1.9, respectively.

Overall, there has been a significant increase in number of visits to general practitioners associated with the implementation of vårdval, even when controlling for various socio-economic and demographic factors as well as county-specific fixed effects and time trends. This effect differs depending on a county's scope of required services, decreasing as scope widens. Although counties with fee-for-service experienced a higher increase in visits on average, this is not significantly different from other counties. Within these counties, the number of visits does not increase in the degree of fee-for-service. While there is no clear relationship between vårdval and costs of primary care in counties with fee-for-service, the absence of a significant result could suggest an overall greater cost-efficiency of primary healthcare in these counties. Although visits in counties with no

fee-for-service also increased, costs increased by a greater percentage, suggesting an average reduction in cost-efficiency.

In specialist care, we obtain mixed results regarding the effect of vårdval on visits depending on scope. The fact that scope significantly affects specialist visits and costs suggests that barriers to entry in the primary care market, resulting from a larger number of required services, have significant implications for specialist healthcare. A wider scope is associated with fewer visits to general practitioners, more specialist visits and, surprisingly, a lower cost of specialist care. Tables 9.3 and 9.4 provide an overview of the results.

9.3 Additional Considerations

Reported values of R^2 , Adjusted R^2 , Mean Sum of Square Residuals and F-test statistics values are calculated through the use of Least Squares Dummy Variables (LSDV) regressions. Values of R^2 fall between 86.5 and 94.6 percent when including the full set of controls, indicating that our fixed effects models produce little variation between predicted and observed values of the dependent variables. High R^2 is primarily the result of employing county and year fixed effect dummy variables and does not necessarily represent how well the independent variables explain the variation in the dependent variable.

Table 9.3 Summary of Results. Including Stockholm

	VISITS		COSTS	
	Primary Care	Specialist Care	Primary Care	Specialist Care
Effect of vårdval excluding other independent variables of interest (Column 2)	Positive. 7.4% higher (column 2)	No significant effect	No significant effect	No significant effect
Effect of vårdval in counties with zero fee-for-service (Columns 4 and 5)	Positive. 6.0% higher (column 4)	Negative ¹ if scope ≤ 2 . Positive otherwise.	Positive 7.5% higher (column 4)	Negative, but insignificant when controlling for scope.
Effect of vårdval in counties with fee-for-service (Columns 4 and 5)	Positive. 7.7% higher (column 4)	Negative ¹ if scope < 3 . Positive otherwise.	No significant effect	No significant effect
Difference between counties with and without fee-for-service	No significant difference	No significant difference	Lower in counties with fee-for-service	
Effect of quantity of fee-for-service	Positive, but insignificant when controlling for scope.	Negative, but insignificant when controlling for scope.	No significant effect	Negative ¹
Effect of scope on vårdval (Columns 3, 5 and 7)	Negative. Increasing scope by 1 reduces effect by 2.7% (column 7)	Positive. Increasing scope by 1 increases effect by 2.1% (column 7)	No significant effect	Negative. Increasing scope by 1 reduces effect by 1.9% (column 7)
¹ Result is only significant when controlling for scope				

Table 9.4 Summary of Results. Excluding Stockholm

	VISITS		COSTS	
	Primary Care	Specialist Care	Primary Care	Specialist Care
Effect of vårdval excluding other independent variables of interest (Column 2)	Positive. 6.2% higher (column 2)	No significant effect	No significant effect	No significant effect
Effect of vårdval in counties with zero fee-for-service (Columns 4 and 5)	Positive. 5.9% higher (column 4)	Negative ¹ if scope ≤ 2 Positive otherwise.	Positive 6.4% higher (column 4)	No significant effect
Effect of vårdval in counties with fee-for-service (Columns 4 and 5)	Positive. 6.2% higher (column 4)	Negative ¹ if scope < 3 . Positive otherwise.	No significant effect	Positive ¹ 3.6% higher (column 5)
Difference between counties with and without fee-for-service	No significant difference	No significant difference	Lower in counties with fee-for-service	Higher in counties with fee-for-service
Effect of quantity of fee-for-service	No significant effect	Negative, but insignificant when controlling for scope.	No significant effect	No significant effect
Effect of scope on vårdval (Columns 3, 5 and 7)	Negative. Increasing scope by 1 reduces effect by 2.7% (column 7)	Positive. Increasing scope by 1 increases effect by 2.3% (column 7)	No significant effect	Negative. Increasing scope by 1 reduces effect by 1.9% (column 7)

¹Result is only significant when controlling for scope

10 Discussion

Before discussing the results, we would like to clarify that we cannot precisely estimate what the trends in visits and costs would have been without vårdval and therefore our results should be treated with caution. This is primarily a concern due to the implementation of other healthcare policies in the time frame studied. Therefore, less attention should be given to the exact numbers and instead place more weight on the direction of the significant results and the magnitude of the differences stemming from scope and systems of reimbursement.

10.1 Vårdval effects and policy implications

This paper evaluates the effects of a healthcare policy on two of its objectives: increased primary healthcare consumption and improved cost-efficiency in the overall healthcare system. Our results touch only a small part of potential improvements or failures of the policy, but they have the potential to guide policy makers when evaluating tools for improvements in access and efficiency through private sector involvement in healthcare.

Our results show that vårdval is associated with a 7.4 percent increase in visits to general practitioners, with variations arising due to different levels of scope of required services. Contrary to our hypothesis, this effect has not been significantly different depending on the degree of fee-for-service. In regards to specialist care, vårdval did not have an overall significant effect. Controlling for scope, we find mixed results depending on the size of scope, with no significant difference between counties with or without fee-for-service. Overall, we conclude that vårdval was successful in improving access to and increasing the role of primary healthcare, although the extent of such progress varies significantly depending on the scope of required services.

As expected, a wider scope of required services by the county decreases the effects of vårdval on primary care visits. The effects of competition and choice can only be realized when a number of alternative providers exist, and an increase in required scope may enhance barriers to entry and lower actual competition. The results from our analysis support this hypothesis and show significantly lower increases in visits when scope is increased. A high level of required scope of services is also associated with increases in visits to specialized care, the second negative side effect of this requirement. One of the possible explanations for this result is that policies, like Kömiljarden and Vårdgaranti, led to increases in visits to specialist care during the years of our study. In counties with narrow scope, vårdval was able to offset these increases, as competition was higher. Our results also showed that in general, vårdval was associated with a decrease in visits to specialists when scope was less than or equal to two and an increase if scope was three or above. The finding that high scope has a negative effect is supported by Tjerbo (2010), who obtains evidence that competition in primary healthcare in Norway reduces the consumption of outpatient specialist care. In our case, counties with low scope are associated with higher competition. Although including multiple services under one healthcare center might facilitate the consumption of healthcare, high levels of scope create barriers for competition. Our results suggest that counties focusing on increasing access to primary healthcare should be cautious to extend the scope of services required by primary healthcare providers beyond general primary care, as it limits improvements in both access to primary care as well as the overuse of specialized care.

The second objective evaluated in this paper is improvements in cost-efficiency. We expected improved access to primary care to reduce the burden on specialist care. Since specialized healthcare services are more expensive, we anticipated the increase in costs of primary care resulting from greater utilization to be offset by lower consumption and therefore costs of specialist care, leading to an overall, more cost-efficient healthcare. The results in this paper indicate no significant relationship between cost and vårdval, in neither primary nor specialist care; nevertheless, we obtain some significant results when controlling for models of reimbursement and scope.

In counties with no fee-for-service, *vårdval* was associated with increases in primary healthcare cost. Since costs per capita increased by approximately 7.5 percent and visits by 6.0 percent, this suggests an overall increase in cost per visit. In counties with fee-for-service, *vårdval* displayed a marginally negative but insignificant effect on costs while visits increased. Although we expected to see increases in costs due to a higher utilization of primary care, taking these two findings together suggest an overall improvement in the cost-efficiency of primary care in such counties, albeit with relatively large variations between counties. Comparatively, including fee-for-service in the compensation structure achieved more favorable results than having no fee-for-service in measures of cost efficiency in primary healthcare. When assessing changes in cost one should also recall that our cost variable represents the county council's cost of healthcare and does not necessarily represent the actual costs of healthcare.

Vårdval alone had no significant effects on the costs of specialist care and controlling for compensation models did not provide much insight either. The significance of independent variables of interest depended on whether or not we controlled for scope. We expected to see decreases in specialized care costs associated with *vårdval* implementation as a consequence of fewer specialist visits. The fact that we did not observe this result suggests that perhaps decreases in utilization associated with *vårdval* were not significant enough to decrease costs. Alternatively, costs in specialist care are likely to be more strongly determined by factors other than the sheer quantity of visits. Within the time frame studied, we expected *vårdval* to reduce the amount of less complex visits that could be administered in primary care facilities. The economic gains were perhaps too small in comparison to other sources of specialist healthcare expenditures. Unexpectedly, increases in the levels of scope were associated with a lower cost of specialist care, lending further support to the argument that the number of visits is not a main determinant of specialized care costs. Although *vårdval* improved the role of primary care and decreased the need to replace primary care with specialist care, more direct tools need to be employed in order to slow the rising costs of specialist care.

Overall, our findings suggest that competition and choice in primary care can generate significant improvements in accessibility regardless of the chosen system of reimbursement. The fact that there was no significant difference between counties with and without fee-for-service may be due to the relatively low share of fee-for-service in the compensation structure. The effect of this reform on cost-efficiency is inconclusive. We also conclude that scope has significant implications in healthcare and reducing the scope of required services can be an important tool for policy makers to improve accessibility.

10.2 Limitations

While our model controls for time-invariant differences within counties, there might be internal validity limitations to our results arising from omitted variable bias. Policies

implemented during the time of our study are potential examples of such variables. Additionally, our data does not factor for the compensation structures prior to vårdval. While the motivations and incentives for public and private players differ, our results might suffer from these restrictions and create limitations to our understanding of the compensation models' effects on healthcare costs.

One of our assumptions is that increased number of visits is a proxy for improved access. We therefore associate increases in visits to general practitioners due to competition as a positive outcome. However, pressure to attend to as many patients as possible may have serious implications on quality of service. In addition, pressures to provide additional services might negatively affect doctors as well, decreasing their satisfaction and performance. This is especially a concern in counties with a higher degree of fee-for-service, where the incentives to increase visits are greater. The effects of vårdval and increases of fee-for-service on quality of care should be of interest to future studies. Therefore, we cannot draw any conclusions on the overall outcomes of introducing choice and competition in primary healthcare.

Other limitations arise from our assumptions in regards to variables. The variable scope allocates the same weight to each required service. However, there may be differences in the difficulty of providing each service. Researchers at Copenhagen Economics found that requiring providers to include pediatric care services is associated with fewer healthcare centers per municipality, while maternal care and rehabilitation had the opposite effect and medical foot care had no statistical significance (Konkurrensverket 2014). Future studies should take consideration of such differences and perhaps allocate different weights to each service. Furthermore, we focus our attention on only two compensation components. Further attention should be given to other dissimilarities in systems of reimbursement, particularly the inclusion of and weight allocated to different elements of the capitation component, such as ACG.

Although there are some limitations to our methods and results, the findings can be extended to better understand private sector's role in healthcare provision. This study can provide valuable insights to other countries with predominantly publicly provided healthcare systems considering quasi-market reforms. The results can also be further applied to other healthcare and publicly provided services looking for improvements through market mechanisms, but caution should be taken to distinguish between characteristics specific to primary healthcare markets.

11 Conclusion

Government provided and financed healthcare has been a norm in many European countries until recent years. As challenges of cost, access, responsiveness and changing demographics threatened the public healthcare systems, private sector involvement in publicly provided services became a highly discussed solution. While the private sector's

role in healthcare has grown in several countries for several years, Sweden just recently decided to decrease the role of publicly provided healthcare and bring choice and competition to primary healthcare. This paper attempts to evaluate vårdval's success in improving measures of access and cost-efficiency.

The introduction of private sector to primary healthcare was implemented to create incentives for a more patient-centered healthcare and increase the number of alternative providers, which was expected to lead to improvements in access, consumption and cost-efficiency. Vårdval's implementation provided us with an opportunity to evaluate whether private sector involvement in primary healthcare provision improved access to and the role of primary care and cost efficiency in both primary and specialized care. The variations among councils allowed us to look at the effects the different compensation models and requirements for establishment of healthcare center had on these measures.

Our results support our first hypothesis and show that vårdval is associated with improvements in the quantity of visits per capita. However, it had little significant effects on costs of primary care and only showed increases in cost in counties with no fee-for-service. Comparing the compensation components, we find that while on average increases in visits in counties with fee-for-service were higher, there is no significant difference between the effects of vårdval in counties with and without fee-for-service. This may be due to the fact that fee-for-service is generally a small proportion of the system of reimbursement. Its effects on specialized healthcare visits and costs are more limited. We find that high scope requirements and higher fee-for-service components reduce visits to specialists, while high scope also has a significant negative effect on specialist costs. The overall impact on visits, when controlling for scope, was negative for a narrow scope, and positive for larger values of scope. This suggests that vårdval was successful in reducing the burden on specialist care in counties with fewer requirements regarding the services that a primary care provider must offer. While our study is limited to only two measures, and the overall success of vårdval policy cannot be concluded from our results, it is worth noting that visits to primary healthcare centers have increased with vårdval's implementation while keeping the overall cost of primary care unchanged. Vårdval was a step towards improvements in this measure that can have long-lasting positive effects for the healthcare system in Sweden. However, wait times continue to lag to this day and policy makers must employ other tools to bring more significant improvements in access to primary healthcare.

13 References

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13.2 Data Sources

Statistics for population, population density, consumer price index (measure used to calculate inflation), mean income, education, and percentage of foreign born, were obtained from Statistics Sweden Statistical Database found through the following link: <http://www.statistikdatabasen.scb.se/pxweb/sv/ssd/?rxid=7cd7c8c9-32d3-4774-8c01-1cbf74af7f1b>

Data for visits to general practitioners was obtained from the annual tables of county council operations (*Verksamhetstabeller*) located on SKL's website: <http://skl.se/>

Source for patient fees: (Sveriges Kommuner och Landsting 2007-2014)

The following data was obtained from Municipality and County Council Database (Kommun- och landstingsdatabasen), located at <http://kolada.se>

- Primary Care Costs: Code (N71000) Source: SCB.
- Specialized Psychiatric Care Costs: Code (N74000) Source: SCB.
- Specialized Somatic Care Costs: Code (N72000) Source: SCB.
- Visits Specialized Psychiatric Care: Code (N74803). Source SKL.
- Visits Specialized Psychiatric Care: Code (N72803). Source SKL.

Values for scope were calculated by using Socialstyrelsen (2010) and Anell (2012) as reference points for 2010 and 2012 respectively. We also compared these sources with the current (2015) scope of required services listed on Praktikertjänst website (found at: <http://www.vardvalsverige.se/> Accessed on 03/04/2015). We made the assumption that when the scope of required services was the same in the two sources it did not change in the years in between. When changes did occur, we contacted the respective county council to inquire about the date of this modification. Since there was very little variation in scope between 2010 and 2015, we found it reasonable to assume that for the six counties that implemented vårdval prior to 2010, scope values did not deviate from their 2010 values.

Data regarding fee-for-service was obtained from the following sources:

Blekinge County Council 2010-2013, *Uppdragsbeskrivning och regelbok för godkännande*.

Dalarna County Council 2010-2013, *Bilaga Ersättning. Hälsoval Dalarna*.

Jämtland County Council 2010-2013, *Förfrågningsunderlag. Hälsoval Jämtlands län*.

Jönköping County Council 2010-2013, *Regelbok för vårdval i Jönköpings län*.

Kalmar County Council 2010-2013, *Ersättning för vården, bilaga 7*, Landstinget i Kalmar län.

Norbotten County Council 2010-2013, *Beställning att lämna ansökan om deltagande i Vårdval Norrbotten*.

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Östergötland County Council 2010-2013, *Erättningsmodell för vårdcentraler*.

Region of Halland 2009-2013, *Modellbeskrivning Vårdval Halland*.

Region of Skåne 2008-2013, *Förutsättningar för Ackretiring och Avtal för Vårdenhet i Hälsoval Skåne*.

Stockholm County Council 2008-2013, *Regelbok för husläkarverksamhet med basal hemsjukvård*.

The Municipality of Gotland 2010-2013, *Krav- och kvalitetsbok för primärvård på Gotland*.

Uppsala County Council 2010-2013, *Regelbok för bedrivande av primärvård i Landstinget Sörmland*.

Uppsala County Council 2009-2013, *Vårdval Uppsala Län. Regelbok för vårdcentral*.

Västernorrland County Council 2010-2013, *Ersättningsbilage till Regelbok*.

Statistics for the county councils of Halland (years 2007-2008) Kronoberg, Västra Götaland, Västmanland, Gävleborg, Västerbotten and Värmland were obtained through e-mail and telephone correspondence with the respective county council.

A Appendix

A.1 Data

Table A.1 List of Variables, Descriptions and Sources

Variable	Description	Source
vårdval	Before or after the implementation of vårdval, 0=before and 1=after	SKL
visits_office	Office visits per capita - GP	SKL
home_visits	Home visits per capita - GP	SKL
visits	Per capita weighted visits with a GP (1 home visit is equal to 2 office visits)	SKL
visits_somatic	Per capita visits with a doctor in outpatient specialist somatic care. Includes office and home visits. Excludes visits classified as dagsjukvård – i.e. outpatient care involving more extensive and/or resource-intensive effort than a visit would normally require, such as outpatient surgery.	SKL
visits_psychiatric	Per capita visits with a doctor in outpatient specialist psychiatric care. Includes office and home visits. Excludes visits classified as dagsjukvård – i.e. outpatient care involving more extensive and/or resource-intensive effort than a visit would normally require, such as outpatient surgery.	SKL
visits_specialist	Per capita visits with a doctor in outpatient specialist care. The sum of of visits_somatic and visits_psychiatric	SKL
cost	Costs per capita of primary care (excludes cost of drugs within the drug benefit) in 2004 prices (SEK). Costs equal gross expenditures minus internal revenues and sales to other counties. Primary care includes all healthcare services responsible for the population's basic medical treatment, care, prevention and rehabilitation that do not require the hospitals' medical and technical resources.	SCB
cost_somatic	Costs per capita of specialist somatic care (excluding cost of drugs within the drug benefit) in 2004 prices. Costs equal gross expenditures (excludes cost of drugs within the drug benefit) minus internal revenues and sales to other counties.	SCB
cost_psychiatric	Costs per capita of specialist psychiatric care (excluding cost of drugs within the drug benefit) in 2004 prices. Costs equal gross expenditures (excludes cost of drugs within the drug benefit) minus internal revenues and sales to other counties.	SCB
cost_specialist	Costs per capita of specialist care (excluding cost of drugs within the drug benefit) in 2004 prices. Equals the sum of cost_somatic and cost_psychiatric	SCB
fee_for_service	Compensation per visit to a GP in SEK in 2004 prices. Note we only consider regular visits, i.e. visits by listed patients that do not require extra external resources, such as a translator. This excludes visits conducted by individuals registered in other counties, asylum seekers and other non-Swedish residents. Takes a value of zero before the implementation of vårdval.	County Councils
no_fee_for_service	Dummy variable, which takes the value of 1 if the county has zero	County

	fee-for-service after vårdval has been implemented and zero otherwise.	Councils
fee	Dummy variable, which takes the value of 1 if the county has fee-for-service after vårdval has been implemented and zero otherwise.	County Councils
scope	A value between one and five depending on the number of additional services (maternal care, child care, medical foot care, and rehabilitation) a primary care provider must offer. Takes a value of zero before the implementation of vårdval	County Councils

Control Variables

income	Mean wage income, ages 20-64 (thousands of SEK) in 2004 prices	SCB
pop_density	Population per square km	SCB
higher_education	Percentage of population (ages 25-74) with higher education (3 or more years of post-high-school education)	SCB
lower_education	Percentage of population (age 25-74) with lower education (did not attend/complete High School)	SCB
patient_fees	The amount in SEK in 2004 prices an adult without a fee-exemption card is required to pay per visit to a GP at the provider, where he/she is listed.	SKL
age0_6	Percentage of population age 0-6	SCB
age80_plus	Percentage of population age 80 or above	SCB
age65_79	Percentage of population age 65-79	SCB
foreign_born	Percentage of population born abroad (excluding EU/EFTA)	SCB
year	Year dummies for 2004-2013	

Table A.2 Vårdval Implementation Dates by County

County	Date
Hallands län	1-Jan-2007
Stockholms län	1-Jan-2008
Västmanlands län	1-Jan-2008
Uppsala län	1-Jan-2009
Kronobergs län	1-Mar-2009
Skåne län	1-May-2009
Östergötlands län	1-Sep-2009
Västra Götalands län	1-Oct-2009
Södermanlands län	1-Jan-2010
Kalmar län	1-Jan-2010
Blekinge län	1-Jan-2010
Örebro län	1-Jan-2010
Dalarnas län	1-Jan-2010
Gävleborgs län	1-Jan-2010
Västernorrlands län	1-Jan-2010
Jämtlands län	1-Jan-2010
Västerbottens län	1-Jan-2010
Norrbottnens län	1-Jan-2010
Gotlands län	23-Mar-2010
Värmlands län	3-May-2010
Jönköpings län	1-Jun-2010

Source: *SKL*

A.3 Summary Statistics

Table A.3 Variable Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent Variables					
visits	231	1.244205	.1900992	.8321986	1.881244
visits_specialist	231	1.200635	.2161435	.8882	2.203
cost	180	3645.999	508.2175	2603.156	5025.764
cost_specialist	180	12567.49	928.1299	10241.41	14879.59
Independent Variables					
vardval	231	.4069264	.4923277	0	1
scope	231	0.892684	1.363116	0	4
no_fee_for_service	231	.0952381	.294181	0	1
fee	231	.3116883	0.4641891	0	1
fee_for_service	231	50.19328	94.63476	0	557.3511
Controls					
pop_density	231	45.029	63.59845	2.5	331.4
age0_6	231	.0747739	.0064811	.063353	.0941712
age80_plus	231	.0567785	.0056827	.0393968	.0651465
age65_79	231	.1374078	.0164723	.0958175	.1748634
patient_fees	231	129.5473	22.50694	88.8415	186.7095
income	231	221.2213	13.46279	182.9913	270.7
higher_education	231	.1796094	.0420151	.1105663	.3130675
lower_education	231	.5046408	.0595903	.3220686	.6228063
foreign_born	231	.0618571	.0275686	.018	.146

Table A.4 Mean of Variables Before and After Vårdval by System of Reimbursement

Variable	BEFORE VÅRDVAL			AFTER VÅRDVAL		
	Fee-for-service	No fee-for-service	Diff.	Fee-for-service	No fee-for-service	% Diff.
	Mean	Mean		Mean	Mean	
visits	1.14	1.22	-0.08	1.36	1.38	-0.02
visits_specialist	1.21	1.24	-0.03	1.17	1.16	0.01
cost	3607.6	3274.5	333.10	3789.0	3721.4	67.6
cost_specialist	12003.6	11986.9	16.7	13149.3	13091.6	57.7
scope	0	0	-	2.39	1.57	0.82
fee_for_service	0	0	-	158.83	0	-
Controls						
pop_density	36.28	50.17	13.9	51.61	56.75	-5.1
patient_fees	123.50	130.38	6.9	136.37	134.16	2.2
income	218.16	214.58	3.6	229.19	219.30	9.9
age0_6	7.3%	7.1%	0.1%	7.9%	7.7%	0.2%
age80_plus	5.6%	5.9%	-0.3%	5.6%	5.9%	-0.3%
age65_79	13.0%	13.5%	-0.5%	14.6%	15.1%	-0.5%
higher_education	16.6%	16.6%	0.0%	20.0%	19.9%	0.1%
lower_education	53.3%	53.1%	0.2%	46.4%	46.3%	0.1%
foreign_born	5.2%	5.8%	-0.7%	7.3%	7.7%	-0.3%
Counties	5	16		5	16	

Table A.5 Panel Data Summary Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations	
visits	overall	1.244205	.1900992	.8321986	1.881244	N =	231
	between		.1502131	1.026181	1.633334	n =	21
	within		.1206432	.9081576	1.526356	T =	11
visits_specialist	overall	1.200635	.2161435	.8882	2.203	N =	231
	between		.2047389	.9788182	1.791164	n =	21
	within		.0813788	1.034971	1.612471	T =	11
vardval	overall	.4069264	.4923277	0	1	N =	231
	between		.079352	.3636364	.6363636	n =	21
	within		.4861724	-.2294372	1.04329	T =	11
scope	overall	0.8982684	1.363116	0	4	N =	231
	between		.55557	0	1.909091	n =	21
	within		1.250138	-1.24026	3.443723	T =	11
no_fee_for_service	overall	.0952381	.294181	0	1	N =	231
	between		.1663318	0	.4545455	n =	21
	within		.2451103	-.3593074	1.004329	T =	11
ln(fee_for_service)	overall	1.538098	2.308253	0	6.323195	N =	231
	between		1.004941	0	3.338016	n =	21
	within		2.088548	-1.799917	4.905278	T =	11
ln(pop_density)	overall	3.196863	1.138013	.9162908	5.803326	N =	231
	between		1.163269	.9412493	5.721241	n =	21
	within		.0266956	3.067233	3.278948	T =	11
age0_6	overall	.0747739	.0064811	.063353	.0941712	N =	231
	between		.0057384	.0664964	.090271	n =	21
	within		.0032415	.0669712	.0810255	T =	11
age80_plus	overall	.0567785	.0056827	.0393968	.0651465	N =	231
	between		.0056873	.04261	.0644991	n =	21
	within		.0011635	.0519118	.0612669	T =	11
age65_79	overall	.1374078	.0164723	.0958175	.1748634	N =	231
	between		.0131698	.1034677	.1527789	n =	21
	within		.0102682	.1157275	.1654889	T =	11
ln(patient fees)	overall	4.848954	.1747801	4.486854	5.229554	N =	231

	between		.127923	4.663883	5.110242	n =	21
	within		.1220463	4.512006	5.30091	T =	11
ln(income)	overall	5.397367	.0597353	5.209439	5.601011	N =	231
	between		.0528153	5.277787	5.561747	n =	21
	within		.0300021	5.308116	5.464778	T =	11
higher_education	overall	.1796094	.0420151	.1105663	.3130675	N =	231
	between		.0389163	.1379329	.2806948	n =	21
	within		.0177942	.1413595	.2119821	T =	11
lower_education	overall	.5046408	.0595903	.3220686	.6228063	N =	231
	between		.0480893	.3650657	.5597857	n =	21
	within		.036592	.4427519	.5720594	T =	11
foreign_born	overall	.0618571	.0275686	.018	.146	N =	231
	between		.0262108	.0218182	.1250909	n =	21
	within		.0101435	.0424026	.0879481	T =	11
ln(cost)	overall	8.191862	.138164	7.86448	8.522333	N =	180
	between		.1234324	7.978924	8.463113	n =	20
	within		.0673398	8.01789	8.410406	T =	9
ln(cost_specialized)	overall	9.43612	.0746477	9.234194	9.607745	N =	180
	between		.0435431	9.366405	9.512377	n =	20
	within		.061327	9.291493	9.583579	T =	9

A.4 Regressions

Table A.6 Fixed Effect Regression on Primary Care Visits (including all counties)

VARIABLES	(1) ALL	(2) ALL	(3) ALL	(4) ALL	(5) ALL	(6) ALL	(7) ALL
vardval	0.0602*** (0.0162)	0.0736*** (0.0130)	0.128*** (0.0359)				
scope			-0.0252* (0.0130)		-0.0314*** (0.0102)		-0.0272* (0.0134)
no_fee_for_service				0.0602** (0.0238)	0.101** (0.0400)	0.0501* (0.0261)	0.0915* (0.0471)
fee				0.0765*** (0.0138)	0.150*** (0.0283)	-0.235 (0.161)	0.0176 (0.207)
Ln(fee_for_service)						0.0617* (0.0328)	0.0243 (0.0370)
Ln(pop_density)		-1.060** (0.501)	-0.975** (0.435)	-1.053* (0.509)	-0.934** (0.435)	-1.016** (0.477)	-0.935** (0.429)
age0_6		-11.91 (8.049)	-11.34 (8.151)	-11.89 (7.921)	-11.12 (7.775)	-9.120 (7.684)	-10.14 (7.615)
age80_plus		-16.48* (8.712)	-12.85 (8.269)	-16.01* (8.632)	-10.56 (7.790)	-15.65* (8.059)	-11.15 (7.901)
age65_79		-0.591 (2.187)	-3.573 (2.441)	-0.707 (2.324)	-4.659* (2.691)	0.0938 (2.228)	-3.817 (2.309)
Ln(patient_fees)		-0.0181 (0.0453)	-0.0185 (0.0443)	-0.0223 (0.0482)	-0.0315 (0.0464)	-0.0336 (0.0517)	-0.0347 (0.0483)
Ln(income)		1.523* (0.850)	1.947** (0.865)	1.262 (0.882)	1.263 (0.919)	1.406 (0.860)	1.319 (0.884)
higher_education		8.218* (4.533)	4.518 (4.135)	8.658* (4.478)	4.931 (4.255)	6.511 (4.694)	4.582 (4.297)
lower_education		-4.010 (3.157)	-4.916 (3.005)	-3.911 (3.158)	-4.841 (2.849)	-5.946* (2.896)	-5.519* (2.723)
foreign_born		4.896 (4.017)	4.576 (3.543)	4.533 (4.075)	3.405 (3.352)	5.099 (3.837)	3.779 (3.129)
2004.year	-0.00612 (0.0134)	-0.141** (0.0618)	-0.135** (0.0554)	-0.136** (0.0642)	-0.120** (0.0557)	-0.153** (0.0587)	-0.129** (0.0486)
2005.year	0.0140 (0.0160)	-0.264** (0.119)	-0.249** (0.104)	-0.255* (0.124)	-0.218* (0.105)	-0.287** (0.114)	-0.236** (0.0912)
2006.year	0.0227 (0.0184)	-0.367** (0.169)	-0.345** (0.146)	-0.355* (0.177)	-0.303* (0.148)	-0.409** (0.161)	-0.331** (0.127)
2007.year	0.0105 (0.0164)	-0.497** (0.232)	-0.462** (0.200)	-0.481* (0.243)	-0.405* (0.204)	-0.555** (0.223)	-0.444** (0.173)
2008.year	0.0196 (0.0166)	-0.569* (0.279)	-0.515** (0.237)	-0.554* (0.291)	-0.455* (0.243)	-0.649** (0.264)	-0.505** (0.202)
2009.year	0.108*** (0.0206)	-0.582* (0.331)	-0.514* (0.281)	-0.564 (0.346)	-0.440 (0.290)	-0.680** (0.315)	-0.502** (0.241)
2010.year	0.0917***	-0.690*	-0.595*	-0.669	-0.510	-0.794**	-0.581*

	(0.0228)	(0.380)	(0.324)	(0.397)	(0.335)	(0.368)	(0.281)
2011.year	0.118***	-0.742*	-0.627*	-0.720	-0.533	-0.864**	-0.615*
	(0.0233)	(0.424)	(0.361)	(0.443)	(0.373)	(0.409)	(0.310)
2012.year	0.106***	-0.865*	-0.738*	-0.837	-0.624	-1.002**	-0.717*
	(0.0214)	(0.477)	(0.408)	(0.500)	(0.422)	(0.461)	(0.349)
2013.year	0.0954***	-0.900*	-0.740	-0.881	-0.642	-1.059**	-0.744*
	(0.0216)	(0.512)	(0.435)	(0.531)	(0.450)	(0.492)	(0.375)
Constant	0.130***	-1.906	-3.222	-0.629	0.306	-0.335	0.297
	(0.0144)	(4.454)	(4.341)	(4.665)	(4.768)	(4.979)	(4.811)
Observations	231	231	231	231	231	231	231
R-squared	0.856	0.880	0.887	0.880	0.890	0.885	0.891
F test	38.18	34.80	36.34	33.89	36.38	34.51	35.56
Adj R-squared	0.834	0.855	0.863	0.854	0.866	0.860	0.866
MSS	4.235	4.353	4.390	4.354	4.405	4.379	4.408
RSS	0.712	0.594	0.557	0.592	0.542	0.568	0.539
Root MSE	0.0598	0.0559	0.0543	0.0560	0.0537	0.0550	0.0537
DoF	199	190	189	189	188	188	187
Number of code	21	21	21	21	21	21	21

Note: MSS, R^2 , adjusted R^2 and F-test statistics have been corrected using a LSDV Model.

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.7 Fixed Effect Regression on Primary Care Visits (excluding Stockholm)

VARIABLES	(1) NO STHLM	(2) NO STHLM	(3) NO STHLM	(4) NO STHLM	(5) NO STHLM	(6) NO STHLM	(7) NO STHLM
vardval	0.0500*** (0.0145)	0.0618*** (0.0111)	0.116*** (0.0383)				
scope			-0.0226 (0.0135)		-0.0278** (0.0102)		-0.0267* (0.0135)
no_fee_for_service				0.0592** (0.0226)	0.0999** (0.0419)	0.0570** (0.0245)	0.0978* (0.0474)
fee				0.0624*** (0.0126)	0.135*** (0.0276)	-0.143 (0.189)	0.0905 (0.224)
Ln(fee_for_service)						0.0421 (0.0395)	0.00860 (0.0406)
Ln(pop_density)		-1.135*** (0.387)	-1.059*** (0.343)	-1.133*** (0.389)	-1.024*** (0.344)	-1.104*** (0.385)	-1.023*** (0.345)
age0_6		-14.02* (7.830)	-13.80* (7.702)	-14.02* (7.816)	-13.70* (7.493)	-12.06 (7.615)	-13.31* (7.414)
age80_plus		-14.06* (7.907)	-11.35 (7.577)	-13.98* (7.818)	-9.868 (7.273)	-14.07* (7.635)	-10.05 (7.454)
age65_79		-0.472 (2.570)	-3.199 (2.698)	-0.493 (2.651)	-4.056 (2.885)	0.0652 (2.465)	-3.800 (2.683)
Ln(patient_fees)		-0.0350 (0.0489)	-0.0345 (0.0477)	-0.0358 (0.0517)	-0.0430 (0.0500)	-0.0437 (0.0542)	-0.0444 (0.0523)
Ln(income)		1.707* (0.942)	2.092** (0.960)	1.654 (0.993)	1.587 (1.011)	1.684 (0.981)	1.596 (0.998)
higher_education		4.608 (4.091)	1.678 (3.954)	4.715 (3.952)	2.196 (4.117)	3.851 (4.250)	2.120 (4.199)
lower_education		-8.349** (3.302)	-8.818*** (2.912)	-8.311** (3.357)	-8.507*** (2.764)	-9.185*** (3.045)	-8.678*** (2.743)
foreign_born		6.547* (3.716)	6.165* (3.296)	6.470 (3.803)	5.227 (3.082)	6.628* (3.699)	5.309* (2.987)
2004.year	-0.00888 (0.0138)	-0.182*** (0.0606)	-0.175*** (0.0550)	-0.181*** (0.0633)	-0.162*** (0.0541)	-0.189*** (0.0591)	-0.164*** (0.0502)
2005.year	0.0107 (0.0164)	-0.339*** (0.116)	-0.322*** (0.103)	-0.337** (0.122)	-0.295*** (0.102)	-0.351*** (0.114)	-0.300*** (0.0940)
2006.year	0.0181 (0.0187)	-0.483*** (0.163)	-0.457*** (0.142)	-0.480** (0.171)	-0.420*** (0.141)	-0.505*** (0.158)	-0.427*** (0.129)
2007.year	0.00407 (0.0158)	-0.649** (0.227)	-0.609*** (0.198)	-0.645** (0.239)	-0.559** (0.197)	-0.680*** (0.221)	-0.569*** (0.178)
2008.year	0.0129 (0.0158)	-0.752** (0.270)	-0.691*** (0.234)	-0.748** (0.282)	-0.636** (0.233)	-0.792*** (0.260)	-0.649*** (0.208)
2009.year	0.101*** (0.0199)	-0.803** (0.322)	-0.728** (0.278)	-0.799** (0.337)	-0.660** (0.278)	-0.855** (0.309)	-0.677** (0.246)
2010.year	0.0921*** (0.0216)	-0.940** (0.371)	-0.842** (0.322)	-0.935** (0.388)	-0.765** (0.322)	-0.998** (0.359)	-0.785** (0.287)
2011.year	0.119***	-1.021**	-0.904**	-1.016**	-0.818**	-1.089**	-0.840**

	(0.0222)	(0.414)	(0.359)	(0.433)	(0.359)	(0.399)	(0.319)
2012.year	0.106***	-1.181**	-1.050**	-1.174**	-0.947**	-1.257**	-0.973**
	(0.0200)	(0.468)	(0.407)	(0.490)	(0.407)	(0.452)	(0.360)
2013.year	0.0955***	-1.242**	-1.078**	-1.237**	-0.986**	-1.329**	-1.014**
	(0.0202)	(0.506)	(0.438)	(0.524)	(0.438)	(0.484)	(0.392)
Constant	0.124***	0.308	-1.087	0.556	1.345	0.759	1.355
	(0.0133)	(4.843)	(4.741)	(5.186)	(5.154)	(5.408)	(5.199)
Observations	220	220	220	220	220	220	220
R-squared	0.830	0.865	0.873	0.865	0.875	0.868	0.875
F test	30.73	29.67	30.67	28.77	30.26	28.44	29.39
Adj R-squared	0.803	0.836	0.844	0.835	0.846	0.837	0.845
MSS	3.212	3.349	3.378	3.350	3.385	3.358	3.385
RSS	0.658	0.521	0.493	0.521	0.486	0.513	0.485
Root MSE	0.0590	0.0538	0.0525	0.0540	0.0522	0.0537	0.0524
DoF	189	180	179	179	178	178	177
Number of code	20	20	20	20	20	20	20

Note: MSS, R^2 , adjusted R^2 and F-test statistics have been corrected using a LSDV Model.

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.8 Fixed Effect Regression on Outpatient Specialist Care Visits (including all counties)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ALL	ALL	ALL	ALL	ALL	ALL	ALL
vardval	-0.00651 (0.0154)	-0.00806 (0.0134)	-0.0585** (0.0253)				
scope			0.0234** (0.00835)		0.0242** (0.00861)		0.0212** (0.00948)
no_fee_for_service				-0.0238 (0.0239)	-0.0552** (0.0259)	-0.0162 (0.0225)	-0.0484* (0.0272)
fee				-0.00459 (0.0127)	-0.0613** (0.0271)	0.230** (0.0978)	0.0340 (0.108)
Ln(fee_for_service)						-0.0465** (0.0206)	-0.0175 (0.0204)
Ln(pop_density)		0.461 (0.339)	0.383 (0.321)	0.469 (0.339)	0.378 (0.317)	0.441 (0.337)	0.379 (0.321)
age0_6		4.253 (7.320)	3.724 (6.901)	4.283 (7.333)	3.697 (6.903)	2.197 (6.513)	2.987 (6.437)
age80_plus		11.11 (7.901)	7.749 (7.489)	11.66 (7.975)	7.465 (7.458)	11.38 (7.793)	7.883 (7.542)
age65_79		1.754 (2.921)	4.522* (2.488)	1.617 (3.117)	4.657* (2.448)	1.013 (3.027)	4.052 (2.769)
Ln(patient_fees)		0.0673 (0.0403)	0.0677** (0.0320)	0.0623 (0.0402)	0.0693** (0.0319)	0.0707 (0.0426)	0.0716** (0.0338)
Ln(income)		-0.0462 (0.613)	-0.440 (0.582)	-0.354 (0.628)	-0.355 (0.559)	-0.462 (0.558)	-0.395 (0.531)
higher_education		-8.378 (5.428)	-4.942 (4.352)	-7.860 (5.495)	-4.993 (4.384)	-6.241 (4.704)	-4.742 (4.288)
lower_education		-1.027 (2.576)	-0.186 (2.327)	-0.911 (2.610)	-0.195 (2.296)	0.624 (2.631)	0.292 (2.422)
foreign_born		-1.369 (3.738)	-1.072 (3.295)	-1.794 (3.766)	-0.927 (3.177)	-2.221 (3.732)	-1.195 (3.176)
2004.year	0.0435** (0.0177)	0.0786 (0.0629)	0.0733 (0.0546)	0.0840 (0.0627)	0.0714 (0.0524)	0.0970 (0.0642)	0.0779 (0.0560)
2005.year	0.0250 (0.0214)	0.108 (0.128)	0.0942 (0.110)	0.119 (0.126)	0.0904 (0.105)	0.143 (0.130)	0.103 (0.113)
2006.year	0.0247 (0.0196)	0.138 (0.185)	0.118 (0.160)	0.153 (0.184)	0.113 (0.153)	0.194 (0.190)	0.133 (0.164)
2007.year	0.0180 (0.0190)	0.167 (0.242)	0.134 (0.208)	0.186 (0.241)	0.127 (0.199)	0.241 (0.249)	0.155 (0.214)
2008.year	0.0242 (0.0197)	0.198 (0.291)	0.148 (0.248)	0.216 (0.290)	0.140 (0.238)	0.288 (0.301)	0.177 (0.258)
2009.year	-0.0413* (0.0229)	0.152 (0.344)	0.0883 (0.292)	0.174 (0.343)	0.0791 (0.280)	0.262 (0.356)	0.124 (0.304)
2010.year	-0.0427 (0.0256)	0.170 (0.396)	0.0825 (0.337)	0.194 (0.396)	0.0719 (0.324)	0.289 (0.411)	0.123 (0.351)
2011.year	-0.0426	0.186	0.0799	0.212	0.0682	0.320	0.127

	(0.0266)	(0.442)	(0.376)	(0.442)	(0.361)	(0.459)	(0.392)
2012.year	-0.0352	0.214	0.0960	0.246	0.0818	0.370	0.149
	(0.0275)	(0.494)	(0.420)	(0.493)	(0.402)	(0.512)	(0.437)
2013.year	-0.0417	0.225	0.0755	0.247	0.0634	0.382	0.137
	(0.0286)	(0.527)	(0.444)	(0.528)	(0.428)	(0.551)	(0.469)
Constant	0.178***	-0.611	0.610	0.891	0.172	0.670	0.179
	(0.0181)	(2.689)	(2.455)	(2.930)	(2.664)	(2.780)	(2.601)
Observations	231	231	231	231	231	231	231
R-squared	0.907	0.929	0.934	0.930	0.934	0.932	0.935
F test	62.89	62.34	65.67	60.89	63.81	61.22	62.24
Adj R-squared	0.893	0.914	0.920	0.914	0.920	0.917	0.920
MSS	5.598	5.733	5.765	5.735	5.765	5.749	5.767
RSS	0.571	0.437	0.405	0.434	0.404	0.420	0.403
Root MSE	0.0536	0.0479	0.0463	0.0479	0.0464	0.0473	0.0464
DoF	199	190	189	189	188	188	187
Number of code	21	21	21	21	21	21	21

Note: MSS, R^2 , adjusted R^2 and F-test statistics have been corrected using a LSDV Model.

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.9 Fixed Effect Regression on Outpatient Specialist Care Visits (excluding Stockholm)

VARIABLES	(1) NO STHLM	(2) NO STHLM	(3) NO STHLM	(4) NO STHLM	(5) NO STHLM	(6) NO STHLM	(7) NO STHLM
vardval	0.00181 (0.0160)	-0.00388 (0.0148)	-0.0652** (0.0291)				
scope			0.0256*** (0.00850)		0.0270*** (0.00871)		0.0230** (0.00898)
no_fee_for_service				-0.0212 (0.0251)	-0.0608* (0.0292)	-0.0179 (0.0243)	-0.0531* (0.0295)
fee				0.000479 (0.0132)	-0.0706** (0.0314)	0.295** (0.113)	0.0942 (0.116)
Ln(fee_for_service)						-0.0605** (0.0248)	-0.0316 (0.0233)
Ln(pop_density)		0.524 (0.349)	0.438 (0.330)	0.534 (0.352)	0.428 (0.324)	0.492 (0.341)	0.422 (0.327)
age0_6		9.188 (7.162)	8.938 (6.283)	9.218 (7.202)	8.911 (6.260)	6.411 (6.259)	7.491 (5.893)
age80_plus		13.96* (7.741)	10.90 (6.913)	14.49* (7.780)	10.49 (6.885)	14.62* (7.674)	11.16 (7.060)
age65_79		2.155 (2.962)	5.243** (2.462)	2.010 (3.157)	5.480** (2.329)	1.208 (3.153)	4.537 (2.659)
Ln(patient_fees)		0.0665 (0.0409)	0.0659* (0.0333)	0.0612 (0.0409)	0.0682* (0.0327)	0.0726 (0.0450)	0.0731* (0.0355)
Ln(income)		-0.262 (0.575)	-0.698 (0.528)	-0.623 (0.604)	-0.558 (0.543)	-0.666 (0.537)	-0.590 (0.507)
higher_education		-8.836 (5.795)	-5.519 (4.417)	-8.115 (5.940)	-5.662 (4.472)	-6.875 (4.862)	-5.385 (4.330)
lower_education		-0.182 (3.572)	0.349 (3.041)	0.0719 (3.647)	0.263 (2.959)	1.326 (3.226)	0.889 (2.918)
foreign_born		-2.299 (3.863)	-1.867 (3.398)	-2.818 (3.903)	-1.608 (3.302)	-3.045 (3.875)	-1.909 (3.275)
2004.year	0.0514*** (0.0166)	0.103 (0.0633)	0.0946* (0.0536)	0.110* (0.0632)	0.0909* (0.0514)	0.121* (0.0630)	0.0993* (0.0533)
2005.year	0.0343 (0.0203)	0.149 (0.130)	0.129 (0.110)	0.162 (0.129)	0.122 (0.104)	0.182 (0.128)	0.139 (0.108)
2006.year	0.0344* (0.0178)	0.190 (0.194)	0.161 (0.164)	0.209 (0.194)	0.150 (0.156)	0.245 (0.193)	0.178 (0.162)
2007.year	0.0278 (0.0168)	0.230 (0.255)	0.185 (0.215)	0.255 (0.255)	0.171 (0.204)	0.304 (0.254)	0.209 (0.214)
2008.year	0.0339* (0.0178)	0.266 (0.309)	0.196 (0.259)	0.291 (0.309)	0.181 (0.247)	0.354 (0.309)	0.231 (0.259)
2009.year	-0.0308 (0.0210)	0.232 (0.366)	0.146 (0.305)	0.262 (0.366)	0.127 (0.290)	0.342 (0.366)	0.189 (0.305)
2010.year	-0.0385 (0.0259)	0.254 (0.426)	0.143 (0.357)	0.287 (0.428)	0.122 (0.340)	0.378 (0.427)	0.194 (0.357)
2011.year	-0.0382	0.276	0.143	0.313	0.120	0.417	0.203

	(0.0271)	(0.476)	(0.398)	(0.478)	(0.379)	(0.477)	(0.398)
2012.year	-0.0304	0.317	0.169	0.361	0.140	0.480	0.236
	(0.0280)	(0.532)	(0.446)	(0.534)	(0.424)	(0.534)	(0.445)
2013.year	-0.0375	0.329	0.143	0.363	0.118	0.494	0.224
	(0.0291)	(0.570)	(0.475)	(0.574)	(0.454)	(0.577)	(0.480)
Constant	0.147***	-0.593	0.987	1.083	0.314	0.791	0.278
	(0.0157)	(2.700)	(2.467)	(2.901)	(2.698)	(2.794)	(2.616)
Observations	220	220	220	220	220	220	220
R-squared	0.876	0.902	0.910	0.902	0.910	0.907	0.911
F test	44.60	42.29	45.45	41.37	44.16	42.12	43.37
Adj R-squared	0.857	0.880	0.890	0.881	0.890	0.885	0.890
MSS	3.621	3.726	3.762	3.729	3.763	3.747	3.767
RSS	0.512	0.407	0.370	0.403	0.370	0.386	0.366
Root MSE	0.0520	0.0475	0.0455	0.0475	0.0456	0.0466	0.0455
DoF	189	180	179	179	178	178	177
Number of code	20	20	20	20	20	20	20

Note: MSS, R^2 , adjusted R^2 and F-test statistics have been corrected using a LSDV Model.

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.10 Fixed Effect Regression on Primary Care Costs (including all counties)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ALL	ALL	ALL	ALL	ALL	ALL	ALL
vardval	0.0158 (0.0169)	0.00653 (0.0157)	0.0221 (0.0231)				
scope			-0.00727 (0.00837)		0.00585 (0.00786)		0.00562 (0.00937)
no_fee_for_service				0.0752*** (0.0260)	0.0681** (0.0305)	0.0768*** (0.0264)	0.0686* (0.0342)
fee				-0.00942 (0.0193)	-0.0232 (0.0252)	0.0337 (0.0941)	-0.0160 (0.124)
Ln(fee_for_service)						-0.00851 (0.0181)	-0.00131 (0.0219)
Ln(pop_density)		0.623 (0.504)	0.626 (0.487)	0.591 (0.435)	0.585 (0.448)	0.587 (0.436)	0.585 (0.446)
age0_6		14.37 (8.579)	14.76* (8.438)	10.53 (6.248)	9.918 (6.392)	9.922 (6.176)	9.848 (6.379)
age80_plus		9.036 (9.377)	9.887 (9.297)	3.382 (7.783)	2.253 (7.968)	3.378 (7.791)	2.297 (7.927)
age65_79		1.594 (5.531)	0.684 (6.006)	0.561 (4.689)	1.213 (5.072)	0.563 (4.757)	1.188 (5.254)
Ln(patient_fees)		-0.112*** (0.0313)	-0.111*** (0.0302)	-0.0860** (0.0341)	-0.0841** (0.0330)	-0.0840** (0.0361)	-0.0838** (0.0353)
Ln(income)		-0.108 (0.867)	0.0505 (0.903)	1.335 (1.053)	1.320 (1.041)	1.308 (1.062)	1.317 (1.045)
higher_education		-0.382 (7.460)	-1.655 (7.787)	-4.098 (6.418)	-3.364 (6.718)	-3.634 (6.146)	-3.321 (6.416)
lower_education		2.906 (3.770)	2.476 (3.656)	1.706 (3.572)	1.959 (3.464)	1.993 (3.766)	1.993 (3.742)
foreign_born		-0.876 (5.420)	-0.930 (5.514)	1.701 (5.047)	1.946 (5.035)	1.632 (5.137)	1.926 (5.232)
2006.year	0.0336*** (0.00643)	0.0480 (0.0902)	0.0481 (0.0909)	0.0337 (0.0869)	0.0325 (0.0866)	0.0361 (0.0896)	0.0329 (0.0907)
2007.year	0.0536*** (0.0104)	0.0834 (0.186)	0.0861 (0.188)	0.0559 (0.176)	0.0515 (0.176)	0.0601 (0.181)	0.0524 (0.184)
2008.year	0.0605*** (0.0136)	0.0993 (0.273)	0.106 (0.276)	0.0827 (0.254)	0.0757 (0.256)	0.0890 (0.262)	0.0770 (0.268)
2009.year	0.0990*** (0.0160)	0.164 (0.370)	0.175 (0.375)	0.137 (0.343)	0.127 (0.344)	0.145 (0.352)	0.128 (0.361)
2010.year	0.107*** (0.0249)	0.192 (0.461)	0.209 (0.468)	0.162 (0.426)	0.146 (0.430)	0.170 (0.436)	0.148 (0.449)
2011.year	0.0987*** (0.0227)	0.201 (0.551)	0.223 (0.560)	0.170 (0.507)	0.150 (0.512)	0.180 (0.519)	0.152 (0.535)
2012.year	0.137*** (0.0261)	0.266 (0.649)	0.290 (0.660)	0.209 (0.599)	0.185 (0.604)	0.221 (0.613)	0.188 (0.631)
2013.year	0.137***	0.285	0.320	0.277	0.249	0.289	0.252

	(0.0288)	(0.731)	(0.747)	(0.662)	(0.670)	(0.677)	(0.700)
Constant	8.103***	4.036	3.653	-1.911	-2.069	-1.946	-2.068
	(0.0124)	(3.790)	(3.936)	(4.510)	(4.404)	(4.530)	(4.416)
Observations	180	180	180	180	180	180	180
R-squared	0.898	0.916	0.917	0.929	0.929	0.929	0.929
F test	47.37	42.04	41.03	48.41	47.12	46.92	45.61
Adj R-squared	0.879	0.895	0.895	0.910	0.909	0.909	0.909
MSS	3.068	3.131	3.134	3.174	3.175	3.174	3.175
RSS	0.349	0.286	0.283	0.243	0.242	0.243	0.242
Root MSE	0.0481	0.0449	0.0448	0.0415	0.0416	0.0417	0.0417
DoF	151	142	141	141	140	140	139
Number of code	20	20	20	20	20	20	20

Note: MSS, R^2 , adjusted R^2 and F-test statistics have been corrected using a LSDV Model.

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.11 Fixed Effect Regression on Primary Care Costs (excluding Stockholm)

VARIABLES	(1) NO STHLM	(2) NO STHLM	(3) NO STHLM	(4) NO STHLM	(5) NO STHLM	(6) NO STHLM	(7) NO STHLM
vardval	0.00556 (0.0187)	0.00254 (0.0184)	0.0189 (0.0297)				
scope			-0.00689 (0.00873)		0.00762 (0.00776)		0.00708 (0.00818)
no_fee_for_service				0.0654** (0.0252)	0.0547* (0.0288)	0.0664** (0.0254)	0.0558* (0.0306)
fee				-0.0152 (0.0217)	-0.0355 (0.0293)	0.0451 (0.125)	-0.0139 (0.139)
Ln(fee_for_service)						-0.0124 (0.0253)	-0.00412 (0.0264)
Ln(pop_density)		0.634 (0.528)	0.638 (0.512)	0.598 (0.457)	0.588 (0.473)	0.590 (0.456)	0.586 (0.469)
age0_6		10.61 (8.995)	11.16 (8.754)	6.561 (7.308)	5.479 (6.933)	5.478 (6.913)	5.194 (7.152)
age80_plus		5.373 (10.56)	6.280 (10.23)	-0.318 (8.900)	-1.994 (8.789)	-0.449 (8.971)	-1.920 (8.691)
age65_79		0.849 (6.005)	0.0695 (6.468)	-0.509 (4.851)	0.193 (5.338)	-0.636 (4.918)	0.102 (5.542)
Ln(patient_fees)		- 0.0982*** (0.0337)	- 0.0987*** (0.0328)	-0.0736* (0.0381)	-0.0702* (0.0378)	-0.0701 (0.0430)	-0.0693 (0.0422)
Ln(income)		-0.339 (0.920)	-0.191 (0.945)	1.139 (1.090)	1.150 (1.072)	1.132 (1.101)	1.147 (1.079)
higher_education		2.690 (7.452)	1.529 (7.589)	-1.505 (6.370)	-0.717 (6.496)	-1.062 (6.070)	-0.625 (6.271)
lower_education		5.814 (4.272)	5.448 (4.030)	4.199 (4.000)	4.412 (3.929)	4.450 (4.147)	4.481 (4.116)
foreign_born		-1.371 (5.561)	-1.467 (5.652)	1.259 (5.220)	1.675 (5.229)	1.259 (5.265)	1.646 (5.339)
2006.year	0.0322*** (0.00661)	0.0784 (0.0991)	0.0784 (0.0992)	0.0616 (0.0946)	0.0595 (0.0948)	0.0641 (0.0972)	0.0605 (0.0983)
2007.year	0.0555*** (0.0109)	0.144 (0.204)	0.146 (0.204)	0.113 (0.191)	0.106 (0.193)	0.117 (0.196)	0.108 (0.199)
2008.year	0.0588*** (0.0141)	0.182 (0.302)	0.189 (0.304)	0.160 (0.279)	0.150 (0.282)	0.166 (0.286)	0.153 (0.293)
2009.year	0.102*** (0.0163)	0.280 (0.409)	0.289 (0.412)	0.245 (0.375)	0.231 (0.379)	0.254 (0.384)	0.235 (0.394)
2010.year	0.118*** (0.0249)	0.340 (0.507)	0.354 (0.513)	0.303 (0.465)	0.283 (0.471)	0.313 (0.475)	0.288 (0.488)
2011.year	0.110*** (0.0225)	0.371 (0.605)	0.390 (0.612)	0.333 (0.552)	0.308 (0.560)	0.346 (0.564)	0.314 (0.580)
2012.year	0.150*** (0.0259)	0.463 (0.712)	0.483 (0.720)	0.398 (0.652)	0.368 (0.660)	0.412 (0.666)	0.374 (0.684)

2013.year	0.147*** (0.0304)	0.492 (0.804)	0.523 (0.817)	0.478 (0.723)	0.443 (0.733)	0.494 (0.738)	0.450 (0.760)
Constant	8.102*** (0.0131)	3.761 (4.202)	3.353 (4.300)	-1.989 (4.617)	-2.217 (4.548)	-2.052 (4.667)	-2.222 (4.575)
Observations	171	171	171	171	171	171	171
R-squared	0.900	0.922	0.923	0.933	0.934	0.934	0.934
F test	47.46	44.30	43.15	50.39	49.17	48.83	47.56
Adj R-squared	0.881	0.902	0.902	0.915	0.915	0.914	0.914
MSS	3.055	3.132	3.135	3.170	3.172	3.170	3.172
RSS	0.341	0.263	0.261	0.226	0.224	0.226	0.224
Root MSE	0.0488	0.0443	0.0443	0.0412	0.0412	0.0413	0.0414
DoF	143	134	133	133	132	0.934	0.934
Number of code	19	19	19	19	19	19	19

Note: MSS, R^2 , adjusted R^2 and F-test statistics have been corrected using a LSDV Model.

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.12 Fixed Effect Regression on Specialist Care Costs (including all counties)

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ALL	ALL	ALL	ALL	ALL	ALL	ALL
vardval	-0.00776 (0.00678)	-0.00983 (0.0108)	0.00932 (0.0128)				
scope			-0.00894* (0.00446)		-0.0136*** (0.00424)		-0.0192*** (0.00475)
no_fee_for_service				-0.0238* (0.0131)	-0.00718 (0.0131)	-0.0225 (0.0138)	0.00549 (0.0136)
fee				-0.00657 (0.0114)	0.0256 (0.0148)	0.0289 (0.0910)	0.198** (0.0860)
Ln(fee_for_service)						-0.00699 (0.0180)	-0.0315* (0.0154)
Ln(pop_density)		0.0887 (0.146)	0.0931 (0.169)	0.0952 (0.136)	0.108 (0.160)	0.0921 (0.133)	0.0990 (0.154)
age0_6		0.906 (4.538)	1.384 (4.133)	1.689 (4.274)	3.122 (3.547)	1.188 (3.850)	1.440 (2.830)
age80_plus		2.145 (4.772)	3.191 (4.592)	3.298 (4.121)	5.930 (3.827)	3.295 (4.129)	6.978* (3.914)
age65_79		5.618 (3.416)	4.498 (3.050)	5.828* (3.220)	4.308* (2.355)	5.830* (3.237)	3.701* (1.980)
Ln(patient_fees)		0.00824 (0.0273)	0.00837 (0.0246)	0.00303 (0.0275)	-0.00143 (0.0223)	0.00466 (0.0279)	0.00408 (0.0185)
Ln(income)		0.104 (0.322)	0.299 (0.320)	-0.190 (0.324)	-0.156 (0.257)	-0.212 (0.327)	-0.242 (0.282)
higher_education		2.088 (3.572)	0.523 (3.419)	2.846 (3.244)	1.136 (2.885)	3.226 (3.522)	2.159 (2.635)
lower_education		-3.326*** (0.984)	-3.856*** (0.976)	-3.082*** (0.965)	-3.670*** (0.942)	-2.846** (1.114)	-2.845*** (0.960)
foreign_born		0.229 (1.048)	0.162 (1.049)	-0.297 (1.097)	-0.869 (0.983)	-0.353 (1.084)	-1.354 (0.821)
2006.year	0.0313*** (0.00735)	-0.0325 (0.0264)	-0.0324 (0.0248)	-0.0296 (0.0279)	-0.0268 (0.0246)	-0.0276 (0.0262)	-0.0167 (0.0196)
2007.year	0.0611*** (0.00714)	-0.0700 (0.0570)	-0.0666 (0.0532)	-0.0644 (0.0598)	-0.0542 (0.0519)	-0.0609 (0.0564)	-0.0346 (0.0404)
2008.year	0.0719*** (0.00650)	-0.127 (0.0894)	-0.118 (0.0843)	-0.123 (0.0908)	-0.107 (0.0803)	-0.118 (0.0851)	-0.0768 (0.0623)
2009.year	0.107*** (0.00772)	-0.166 (0.120)	-0.154 (0.113)	-0.161 (0.121)	-0.137 (0.106)	-0.154 (0.114)	-0.0968 (0.0820)
2010.year	0.130*** (0.0110)	-0.214 (0.152)	-0.193 (0.144)	-0.207 (0.154)	-0.170 (0.134)	-0.200 (0.146)	-0.124 (0.104)
2011.year	0.133*** (0.0109)	-0.284 (0.182)	-0.257 (0.172)	-0.277 (0.183)	-0.231 (0.159)	-0.269 (0.174)	-0.176 (0.123)
2012.year	0.168*** (0.0106)	-0.317 (0.210)	-0.288 (0.198)	-0.305 (0.213)	-0.250 (0.184)	-0.296 (0.201)	-0.184 (0.141)
2013.year	0.196***	-0.352	-0.310	-0.351	-0.284	-0.340	-0.212

Constant	(0.0118) 9.340*** (0.00626)	(0.236) 8.979*** (2.247)	(0.223) 8.508*** (2.115)	(0.234) 10.19*** (2.453)	(0.203) 10.56*** (1.829)	(0.222) 10.16*** (2.499)	(0.157) 10.58*** (1.745)
Observations	180	180	180	180	180	180	180
R-squared	0.916	0.935	0.939	0.937	0.944	0.937	0.948
F test	58.56	55.05	56.7	54.82	60.43	53.27	63.45
Adj R-squared	0.9	0.918	0.922	0.92	0.928	0.919	0.933
MSS	0.913	0.932	0.936	0.934	0.942	0.934	0.946
RSS	0.0841	0.065	0.0613	0.0632	0.0559	0.0630	0.0518
Root MSE	0.0236	0.0214	0.0208	0.0212	0.02	0.0212	0.0193
DoF	151	142	141	141	140	140	139
Number of code	20	20	20	20	20		0.00562

Note: MSS, R^2 , adjusted R^2 and F-test statistics have been corrected using a LSDV Model.

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A.13 Fixed Effect Regression on Specialist Care Costs (excluding Stockholm)

VARIABLES	(1) NO STHLM	(2) NO STHLM	(3) NO STHLM	(4) NO STHLM	(5) NO STHLM	(6) NO STHLM	(7) NO STHLM
vardval	-0.00983 (0.00774)	-0.00921 (0.0124)	0.0131 (0.0155)				
scope			-0.00937* (0.00456)		-0.0154*** (0.00454)		-0.0189*** (0.00483)
no_fee_for_service				-0.0234 (0.0151)	-0.00175 (0.0153)	-0.0230 (0.0153)	0.00534 (0.0149)
fee				-0.00521 (0.0130)	0.0356* (0.0185)	0.0200 (0.107)	0.178* (0.0906)
Ln(fee_for_service)						-0.00515 (0.0221)	-0.0271 (0.0171)
Ln(pop_density)		0.0834 (0.138)	0.0898 (0.163)	0.0915 (0.127)	0.111 (0.152)	0.0885 (0.125)	0.0992 (0.147)
age0_6		-0.277 (5.389)	0.465 (4.745)	0.635 (5.140)	2.820 (4.047)	0.184 (4.570)	0.941 (3.366)
age80_plus		0.860 (5.471)	2.094 (5.191)	2.142 (4.797)	5.525 (4.405)	2.087 (4.730)	6.011 (4.317)
age65_79		5.311 (3.773)	4.251 (3.309)	5.617 (3.583)	4.199 (2.474)	5.565 (3.515)	3.598 (2.182)
Ln(patient_fees)		0.0131 (0.0296)	0.0125 (0.0271)	0.00756 (0.0294)	0.000659 (0.0244)	0.00903 (0.0301)	0.00679 (0.0209)
Ln(income)		0.117 (0.352)	0.318 (0.358)	-0.216 (0.361)	-0.238 (0.271)	-0.219 (0.369)	-0.259 (0.312)
higher_education		2.811 (3.614)	1.233 (3.481)	3.756 (3.203)	2.164 (2.897)	3.941 (3.381)	2.773 (2.634)
lower_education		-2.639** (1.202)	-3.136** (1.227)	-2.275* (1.164)	-2.707** (1.086)	-2.170* (1.218)	-2.253* (1.145)
foreign_born		0.145 (0.992)	0.0146 (0.993)	-0.448 (1.036)	-1.288 (0.823)	-0.447 (1.039)	-1.479* (0.748)
2006.year	0.0319*** (0.00774)	-0.0253 (0.0266)	-0.0253 (0.0238)	-0.0216 (0.0288)	-0.0175 (0.0223)	-0.0205 (0.0276)	-0.0111 (0.0199)
2007.year	0.0642*** (0.00673)	-0.0549 (0.0584)	-0.0517 (0.0523)	-0.0478 (0.0624)	-0.0351 (0.0476)	-0.0459 (0.0599)	-0.0225 (0.0418)
2008.year	0.0752*** (0.00578)	-0.105 (0.0918)	-0.0956 (0.0828)	-0.0999 (0.0946)	-0.0794 (0.0735)	-0.0971 (0.0904)	-0.0600 (0.0642)
2009.year	0.109*** (0.00761)	-0.140 (0.124)	-0.127 (0.112)	-0.132 (0.127)	-0.103 (0.0977)	-0.128 (0.122)	-0.0766 (0.0850)
2010.year	0.136*** (0.0107)	-0.179 (0.158)	-0.159 (0.144)	-0.171 (0.162)	-0.130 (0.125)	-0.166 (0.156)	-0.0976 (0.109)
2011.year	0.138*** (0.0103)	-0.244 (0.190)	-0.218 (0.173)	-0.235 (0.193)	-0.184 (0.149)	-0.230 (0.186)	-0.146 (0.129)
2012.year	0.175*** (0.00927)	-0.271 (0.219)	-0.243 (0.199)	-0.256 (0.226)	-0.195 (0.172)	-0.250 (0.217)	-0.149 (0.149)
2013.year	0.203***	-0.300	-0.258	-0.296	-0.225	-0.290	-0.174

Constant	(0.0104) 9.335*** (0.00586)	(0.248) 8.649*** (2.337)	(0.227) 8.094*** (2.268)	(0.248) 9.944*** (2.560)	(0.191) 10.40*** (1.892)	(0.238) 9.918*** (2.609)	(0.167) 10.37*** (1.872)
Observations	171	171	171	171	171	171	171
R-squared	0.922	0.935	0.939	0.937	0.946	0.937	0.949
F test	62.94	53.79	55.65	53.68	60.8	51.97	61.88
Adj R-squared	0.908	0.918	0.922	0.92	0.93	0.919	0.933
MSS	0.887	0.9	0.904	0.902	0.91	0.902	0.912
RSS	0.0747	0.0623	0.0584	0.0604	0.052	0.0603	0.0495
Root MSE	0.0228	0.0216	0.0209	0.0213	0.0198	0.0214	0.0194
DoF	143	134	133	133	132	132	131
Number of code	19	19	19	19	19	19	19

Note: MSS, R^2 , adjusted R^2 and F-test statistics have been corrected using a LSDV Model.

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$