



Demand for voluntary health insurance

How people's satisfaction with public healthcare affects demand for voluntary health insurance in the Beveridge countries Sweden, Denmark, and Spain

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Abstract

With a growing market for voluntary health insurance (VHI), knowing why individuals demand voluntary health insurance will be of interest for both policymakers and insurance companies. Shedding light on how people's satisfaction with the national healthcare system affects VHI uptake is therefore the aim of this study. This study is focusing on Sweden, Denmark, and Spain which all have a Beveridge healthcare system. Using SHARE data with a linear probability model. As a result this study provides that there is a relationship between dissatisfaction with the public healthcare system and VHI uptake, being found in Sweden, somewhat in Spain but with inconclusive results for Denmark. Moreover, education, income, age, and type of employment was also found to have a relationship with VHI uptake.

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1. Introduction

In general, healthcare is financed through insurance premiums or taxes. The latter is true in countries using the Beveridge model. The Beveridge model is one of the most common forms of healthcare systems in Europe, which was founded by William Beveridge in 1948 (Bhattacharya et al., 2014, p. 328). Countries with Beveridge healthcare systems provide universal health insurance to all citizens, where the government is the single-payer and provider. This system aims to provide equal and accessible care for all, but usually suffers from quality problems and queueing (Bhattacharya et al., 2014, p. 331).

During the last couple of years, consumption of voluntary health insurance plans (in short VHI) has increased to a large extent providing people with faster access to care and more choices of caregivers. Even though Beveridge countries generally aim to provide free and accessible care for all, demand is driven by both individuals and employers. Sagan and Thompson (2016), argue that people's demand for supplementary health insurance is mainly driven by people's perception of the public healthcare system, and also that education and income have a positive effect on demand. In recent years there has been a political debate foremost in Denmark with arguments for and against, pointing at a VHI market may affect the public healthcare system negatively or on the other hand providing people with high quality healthcare services and at the same time take pressure off the public system (Olejaz et al. 2012). This is also described in an article written by Gustafsson (2021), where Sweden's Minister of Social Affairs Lena Hallengren is concerned about violation of the principle of necessity and is opposing proposals from the Moderates to investigate benefit taxation with the aim of removing it.

This study will look at three countries with Beveridge structure, more precisely Sweden, Denmark, and Spain. Like most Beveridge countries, elements of market competition are implemented. This is to decrease problems associated with universal health insurance such as queues, poor quality, and low level of patient choice (Bhattacharya et al., 2014, p. 329). These strategies vary between the three countries of interest but all have some private facilities included in the public system, as well as different extents of patient choice of facilities.

In this study we try to investigate the relationship between people's satisfaction with public healthcare and VHI, looking at SHARE data for individuals over the age of 50. Since the satisfaction level of healthcare is based on each individual's perception of healthcare received or not received, this study hopes to shed light on the driving factors of consumption of this cohort, where a large share of the sample is retired. Gaining further knowledge about elderly people's uptake of VHI depending on satisfaction with the public healthcare system and other factors may be of interest for policymakers that try to increase patient satisfaction as well as insurance companies trying to meet customer demand.

The results of this study showed that there is a relationship between satisfaction and VHI uptake, and more precisely the more dissatisfied individuals are with public healthcare the more likely it is for them to have VHI compared to those being very satisfied with the public healthcare. An exception was partly found in Spain, and for Denmark the results were inconclusive. In line with prior studies, education, income, age and type of employment is also found to have a relationship with VHI uptake (Costa & Garcia, 2003; Mossiolo & Thompson, 2004).

1.1 Purpose and scope

The purpose of this thesis is to investigate how satisfaction with public healthcare affects the demand for voluntary health insurance in countries using the Beveridge model. The aim is also to look further into other factors that may affect demand for voluntary health insurance in Sweden, Denmark, and Spain. In an attempt to grow understanding of this matter, the following questions will be answered:

How do people's satisfaction with public healthcare affect their demand for voluntary health insurance in the Beveridge countries Sweden, Denmark, and Spain?

What are some of the determinants of the demand for voluntary health insurance?

This thesis is limited to focus primarily on people over the age of 50 due to the SHARE dataset content. The majority of VHI plans are purchased by employers (Mossialos & Thompson, 2004; Olejaz et al, 2012; Myndigheten för vård- och omsorgsanalys, 2020), looking at people older than 50 is suggested to clarify decision making of this group where a substantial part is retired and therefore not covered by employment contracts. Therefore it is

outside the scope of this thesis to look at potential factors of VHI purchase for the whole population eligible for insurance.

1.2 Literature

The aim of the study is to investigate how satisfaction with the public healthcare system affects demand for voluntary health insurance. There is weak evidence in previous research supporting this relationship. One obstacle is that there is not a clear definition of how satisfaction should be evaluated and interpreted. Most previous research, of our findings, suggests that quality of healthcare, waiting time, and perception might affect satisfaction and thus also affect demand for voluntary health insurance. The reviewed literature will be presented in the section below.

Costa and Garcia (2003) argues that demand for VHI is determined by perceived quality of healthcare, and more precisely the quality gap between public and private healthcare, among other factors. This quality gap may appear due to longer waiting times, worse access to healthcare, and uniformity in public healthcare (Costa & Garcia, 2003). The definition of quality that they use in their study is self-perceived healthcare quality, with a 10 scale questionnaire reaching from “excellent” to “bad”. The argument of less waiting time with VHI may also occur due to the individuals ensuring themselves to take part in the private hospital sector, and thus access to extensive healthcare services (Olejaz et al., 2012; Bernal-Delgado, 2018; Tynkkynen et al., 2018). In addition, Tynkkynen et al. (2018) point at queueing as the main driving factor for the purchase of VHI in Nordic countries, but it decreases in importance when VHI is distributed by employers and workers unions to a larger extent. This matter is further discussed in Section 2.3, looking at differences in voluntary health insurance schemes in the different countries of interest.

Numerous analysts argue that performance of public healthcare systems affects the demand for VHI. Thus, satisfaction with the statutory healthcare system is a key in understanding the determinants of the demand of VHI (Mossialos & Thomson, 2004). Kullberg et al. (2019) also point at studies (Propper, 2000; Propper et al., 2001; Costa & Garcia, 2003; Cost-font & Jofre-bonet, 2008; Aarbu, 2010) describing the importance of dissatisfaction, rather than satisfaction, with the public healthcare system in countries where healthcare is provided to all citizens regardless of social status, and that it affects demand for VHI.

Crow et al. (2002) mention that satisfaction or dissatisfaction is of importance when investigating demand of VHI, although it is not completely clear what satisfaction is. Crow et al. (2002) describe a general definition of satisfied as something that fulfills expectations, needs, or desires and thus leaves no room for complaint. Just by looking at this definition, it leaves much room for the individual's perception about their own expectations, needs, or desires, which also makes the cause of satisfaction difficult to measure. When measuring satisfaction it is most likely perception and not the actual quality that is found (Crow et al., 2002). Sagan and Thomson (2016) also suggest that people's perceptions about healthcare, which differ between countries and individuals, affects VHI uptake. They also mention that no correlation is found between actual healthcare quality and demand for VHI (Sagan & Thomson, 2016). We address the issue regarding the ambiguous definition of satisfaction using a comparable satisfaction measure between individuals and across countries in this study.

Kullberg et al. (2019) describe additional reasons for people to purchase VHI. They say that previous studies (Besley et al., 1996, Besley et al., 1999, Propper, 2000 and King & Mossialos, 2005) point out socio-economic status, wealth, and health as reasons for why individuals might demand VHI. Tynkkynen et al. (2018) also mentions the socio-economic environment as a factor. Foremost, together with political trends influencing policy making and public opinion of the healthcare system based on attitudes and preferences for individual choice and healthcare (Tynkkynen et al., 2018). Moreover, purchase of VHI is also in order to reduce out-of-pocket spendings for treatment not provided by the public (Olejaz et al., 2012). Mathur et al. (2018) also mention that premiums of health insurance compared to the costs without insurance is also discussed, but the outcome is rather mixed. The probability of being sick also raises the premium of the insurance and thus lowers the individual's demand for VHI due to the higher cost, the outcome of VHI demand is therefore ambiguous (Costa & Garcia, 2003). Other than health habits, age is a factor that increases the risk of illness and therefore affects the premium (Costa & Garcia, 2003).

Numerous studies (Besley et al., 1996; Besley et al., 1999; Propper, 2000; King & Mossialos, 2005 in Kullberg et al., 2019 and Costa & Garcia, 2003) state that income is a key factor for why individuals purchase insurance, but some studies say that the effect is ambiguous (Mathur et al., 2018). Mathur et al. (2018) present results pointing at different directions

regarding income and health insurance. In the context of South Africa, a large part of high-income earners has health insurance but the same is not true in India, instead, the high-income earners pay for healthcare by out-of-pocket spendings (Mathur et al., 2018).

Moreover, Mathur et al. (2018) argue about the importance that households have a conceptual understanding of what health insurance is, and that it is of importance for why people demand VHI. Mathur et al. (2018) argues that including a variable for educational level will not capture the effect of specific conceptual understanding of health insurance but rather people's conceptual understanding in general, making it hard to investigate. Using education as a proxy for people's ability to absorb new information, in general, is however something that is supported by other previous studies (Mossiolo & Thompson, 2004).

To summarize, previous research points at many different factors that affect individual's demand and purchase of voluntary health insurance. There are numerous studies with mixed outcomes of the same variables. In addition, satisfaction is found to be a contributing factor but nevertheless difficult to define and investigate on a large scale.

1.3 Structure

This study is structured as follows. In Section 2 the Beveridge model is described, followed by a background of the healthcare systems in the three countries of interest. In Section 3 the different theories will be presented. Followed by Section 4 where the methodology will be further explained. In Section 5 the SHARE-data set is further discussed. The different results from this study will be provided in Section 6, followed by an analysis in Section 7. In the final Section 8, the conclusion of the paper is stated.

2. Background

2.1 Beveridge model

The Beveridge model is based on the idea of equal access to care for all. The system is characterized by universal insurance coverage, with the central government as the single-payer which makes all citizens covered through taxation. There is public healthcare provision, which means hospitals and care centers are established and government-run. All

staff is also contracted by the government, making them able to regulate the supply. The cost of healthcare is free or at a low cost. (Bhattacharya et al., 2014, p. 328).

Waiting time is a common problem for countries using the Beveridge model because of excess demand, inefficiency in the system, and allocation of healthcare. These problems emerge as a result of the care being free of charge and provided to all, regardless of purchasing power. (Bhattacharya et al., 2014, p. 331)

2.2 Voluntary health insurance

Voluntary health insurance is often divided into three sub-categories depending on scope and relation to the public healthcare system. These three categories are; *Supplement*, which is medical care that is offered in the public healthcare system, but with more patient choice and faster access, *Complement*, which is medical care that is partly or not at all offered in the public healthcare system, and *Substitute*, which is insurance for people partly or not at all covered by the public healthcare system (Myndigheten för vård- och omsorgsanalys, 2020). Complementary VHI has, in general, a larger coverage in the proportion of the population than supplementary VHI. Mossialos and Thomson (2004) say that countries in the EU where complementary VHI dominate have a coverage of 20 to 70 percent, while countries in the EU where supplementary VHI dominate have coverage of around 10 percent.

2.3 Countries of interest

In this Section, the countries analyzed in this study will be presented. Information regarding their healthcare systems and how the voluntary healthcare market is structured will be explained. The countries Sweden, Denmark and Spain are chosen because they all have healthcare systems operating foremost under the Beveridge model, facilitating direct comparisons.

2.3.1 The Swedish healthcare system

The Swedish healthcare system is universal and is mainly financed by local taxes and contributions from the national government. The government is in charge of regulation and supervision while financing, purchasing, and providing health services including primary, specialist, and psychiatric care are managed on a regional level. Elderly care, care for people

with physical and mental disabilities, rehabilitation services, home, and social care are provided by each municipality.

According to numbers from the EU-SILC survey, self-reported unmet needs for a medical and dental examination or treatment due to cost, distance, or waiting times, show that Sweden has low unmet needs. In total 1.4 % of the respondents and 2.4% of low-income respondents reported unmet needs for medical examination or treatment in 2017 (OECD, Sweden: Country Health Profile 2019). Furthermore, the public perception of quality was low in 2009. In a survey conducted by the European Commission, 10% of the respondents said that the quality was bad (Sagan & Thompson, 2016).

In 2010 a reform was implemented making patients able to choose primary health centers. This was a way to increase patient choice, which has been shown to improve people's satisfaction with primary care. Patients can choose any public or private health center that is contracted with the region. (Häger & Glenngård, 2015).

The problem with waiting times is handled partly with waiting time thresholds; making patients eligible to contact a primary care center the same day, to receive a medical assessment in the primary care within three days, to see a specialist within 90 days, and to receive any necessary treatment within 90 days. If these thresholds are exceeded, patients can seek help from private providers, paid by their region which is often occurring. (OECD, Sweden: Country Health Profile 2019) In Sweden, the queue for medical operations has increased in the last couple of years with 12 percent of the people waiting for an operation more than 90 days (Tynkkynen et al., 2018).

2.3.1.1 Voluntary health insurance in Sweden

In Sweden, VHI is foremost used as a supplement to public healthcare for faster care and private elective care (Sagan & Thompson, 2016), but also as an element of complementary services where patients can receive preventable treatments as well as conversational therapy with a psychologist or treatment of addiction (Myndigheten för vård- och omsorgsanalys, 2020). VHI plans were introduced to the market in the early 1980s. At first, they were mostly used by top leaders in companies, and still unusual in the year 2000 (Myndigheten för vård- och omsorgsanalys, 2020). In 2006 there was 3.9 percent of the population of 16 to 64-year-olds who had VHI, this rose to 10.9 percent in 2018 (Myndigheten för vård- och

omsorgsanalys, 2020). In 2018, around 90 percent of all VHI was group insurance, with two-thirds signed by employers, where family members often can be included in the group insurance. The remaining part is insured through unions which in 2018 were offered by half of all unions in Sweden. VHI is most common in urban areas and Jämtland, as well as more frequent in the construction and financial sectors. (Myndigheten för vård- och omsorgsanalys, 2020) It is also more common for small businesses to ensure their employees, as well as males are more frequently ensured than women due to working in different sectors (Svensk försäkring, 2021). The average age for VHI in Sweden is 45 years old. (Myndigheten för vård- och omsorgsanalys, 2020).

Unlike the public waiting time, VHI, gives the insured help faster, usually within 14-21 days depending on the insurance company (Kullberg et al., 2019). All medical care provided through VHI is meant to be evaluated on the same basis as public medical care. The most common treatment financed by VHI is orthopedics which accounts for 30 percent of all treatments (Svensk försäkring, 2021). Eligibility requirements for age and overall health status vary amongst insurance companies and type of contract (Myndigheten för vård- och omsorgsanalys, 2020). Most companies in Sweden offer VHI for people the age of 16 up to 66, with exception of some companies offering to people up to 80 years old or for one's whole life (Kullberg et al., 2019). The price for VHI is approximately between 11-53 £ for people between 40-45 years old, and with a significantly higher price for individuals over 60 (Kullberg et al., 2019).

2.3.2 The Danish healthcare system

The Danish healthcare system has an old tradition of decentralization but has in recent years become more centralized (Olejaz et al., 2012). The more centralized system is provided by five regional councils that take care of the organization of the healthcare system but lack the possibility to receive taxes, this responsibility is instead on the government (Ström Olsson, 2013). The system is mainly funded by taxes, but with 14 percent being out-of-pocket payment (Olejaz et al., 2012).

In Denmark residents can choose between two different options in the healthcare system, Group 1 and Group 2, with only about 1 percent of Danes choosing to be part of Group 2. Members of Group 1 are registered with a General Practitioner, GP, of their choice, who works as a gatekeeper, referring patients to hospital and specialist treatment. In Group 2 the

patient can consult any GP or any specialist without a referral. Moreover, there are some parts of the healthcare system that never require a referral from the GP, regardless of Group 1 or Group 2 members. These are consulting emergency wards, dentists, chiropractors, ear, nose, and throat specialists, or ophthalmologists. (Olejaz et al., 2012)

In the LUP survey, conducted by the Danish Government and the regions, it was shown that Danes were overall satisfied with their experience with the healthcare system. (Olejaz et al, 2012). In addition, looking at self-reported unmet needs for a medical and dental examination or treatment due to cost, distance, or waiting times, Denmark has low unmet needs amongst all income quantiles. According to numbers from the EU-SILC survey, it was 1 percent of the population in 2017 (OECD, Denmark: Country Health Profile 2019). Moreover, according to a survey conducted by the European Commission in 2009, 13 percent of the respondents answered that the quality of care was bad (Sagan & Thompson, 2016).

In 1993 New Public management was used to implement competition. Free choice of hospital was introduced in Denmark in an attempt to increase efficiency and quality. The fact that few people use the free choice of hospital can be understood as a result of the short waiting times and the waiting time guarantee (Olejaz et al., 2012). In 2013 the public waiting time guarantee changed to be less beneficial for the caretakers. For less severe illnesses the waiting time guarantee was changed to 60 days compared to previously being 30 days (Ström Olsson, 2013).

2.3.2.1 Voluntary health insurance in Denmark

In Denmark private voluntary health insurance provides faster access to health care and increases patient choice for the individual including services not provided by the public healthcare (Olejaz et al., 2012; Ström Olsson, 2013). These services are eye and dental care, physiotherapy, psychiatric care, chiropractic, chiropody, and medical aids, among others (Sagan & Thomson, 2016). In addition, VHI does not cover acute care and is only relevant for about 15 percent of all hospital treatment (Pedersen, 2005).

The market for complementary insurance has existed for many decades, with supplementary insurance plans increasing rapidly since 2002 due to a new tax exemption in an attempt to expand the private healthcare sector and increase the fraction of supplementary insurance (Vrangbaek, 2016). In 2001, only 50 000 persons had supplementary VHI which increased to

around 1 million in 2010 (Olejaz et al., 2012). In 2020 slightly above 2 million Danes had supplementary health insurance, with over 90 percent of these paid for by the employer (Forsikring og Pension, 2021) and mostly in the private sector (Olejaz et al, 2012). As supplementary VHI has increased, the political debate has been enhanced with different arguments. Some argue that VHI makes the healthcare system more efficient, and some that it contributes to inequality in access to care. Also, concerns regarding specialists having a financial motive to treat patients with insurance foremost. (Olejaz et al, 2012)

As mentioned previously, the Danish VHI plays both a supplementary and complementary role. It is supplementary to hospital services and complementary for other healthcare services. The complementary VHI can be divided into four different categories; Group 1, Group 2, Group 5, and the Basic Insurance Scheme. In general, the complementary VHI covers expenses with healthcare and provides more freedom regarding choice, how this is provided differs between the four categories. (Olejaz et al, 2012)

Compared to complementary VHI, supplementary VHI has three categories. The first category covers expenses from examination and treatment at a private hospital. Preventive VHI is the second category and is designed so that people are able to work longer without being impeded by some disease. The third and smallest category is the one called Health and prevention insurance and it only covers costs related to general health examination and not care that may be a result of the examination. Both a complementary and a supplementary VHI may be purchased by all Danish citizens, but the application can be declined if the individual suffers from certain chronic diseases (Olejaz et al., 2012).

2.3.3 The Spanish healthcare system

In Spain, all citizens are guaranteed healthcare independent of employment status. The regions are responsible for both the control and some of the financing (Ström Olsson, 2013). The Spanish healthcare system is mainly funded by taxes and consists of three legislated systems that coexist. These are the Spanish National Health System (SNS), Mutual Funds catering for civil servants, the Armed Forces and the judiciary, and the Mutualities focused on assistance for Accidents and Occupational Diseases (Bernal-Delgado, 2018). The SNS consists of the 17 regional ministers of health, one for each autonomous region. Moreover, the SNS also consists of the Spanish Ministry of Health, which is responsible for the national planning and regulation while the 17 regional departments of health have primary jurisdiction

over strategic and operational planning in each autonomous region, including resource allocation, provision, and purchasing (Bernal-Delgado, 2018). The regional departments of health can also take advisory assistance from The Network of Agencies which is the department responsible for health technology evaluation (HTA), investigating cost and benefit for treatments (OECD, Spain: Country Health Profile 2019).

The Spanish healthcare system is prospectively financed according to volume and quality, where regional health services make one-year contracts with hospitals. Public primary care is almost exclusively government-run facilities in contrast to secondary care where private hospitals have a substantial contribution, which varies largely between autonomous regions. Despite this, Spain has a consistent problem with queues. (Bernal-Delgado et al., 2018). Looking at self-reported unmet needs for a medical and dental examination or treatment due to cost, distance, or waiting times, Spain has low unmet needs amongst all income quantiles. According to numbers from the EU-SILC survey, it was only 0.1 percent of the population in 2017 (OECD, Spain: Country Health Profile 2019). Moreover, 17 percent of the respondents said in a survey conducted by the European Commission in 2012 that the quality of care was bad (Sagan & Thompson, 2016).

In Spain, 70.9 percent of total spending on health is from public spending and VHI accounts for 4.4 percent. The out-of-pocket spending consisted of 24 percent in 2014. The SNS covers almost all public healthcare, but the citizens also have the option to buy their healthcare through the Mutual Fund for State Civil Servants. This is still funded by taxes, but the SNS pays the private insurers a fee to cover the healthcare cost for these individuals. Those who choose this option are expected to use private healthcare providers only and get a special health card. (Costa-i-Font, 2016).

2.3.3.1 Voluntary health insurance in Spain

Spanish VHI plans emerged during Franco's dictatorship (1939–1975) and were given to clerks as a privilege. When the SNS was founded in 1986 the insurance plans became universal and were merged into a national system funded by taxes (Costa-i-Font, 2016). In Spain nowadays, VHI is mainly supplementary in its characters with demand driven by faster access to healthcare services and thus less waiting time (Bernal-Delgado et al., 2018), but also better service in terms of kindness and interaction with the staff, and more patient choice (Rodriguez, 2001 in Mossialos & Thompson, 2004). It is mostly people that are not covered

by public insurance that purchase private health insurance. In this sense, insurance is a substitute for publicly financed healthcare (Ström Olsson, 2013). The complementary VHI in Spain is primarily for dental care for adults, chiropody, and CAM which is excluded from the public healthcare system (Sagan & Thompson, 2016). In the total population, about 13 percent has VHI (Costa-i-Font, 2016). Individuals having chronic medical conditions or suffering from addictions are among those being excluded from taking up VHI (Costa-i-Font, 2016).

Around half of all VHI in Spain are purchased through employers, and 22 percent of the total VHI are through the public sector, 35 percent through the private sector, and the rest, consisting of 43 percent, are purchased by private individuals (Costa-i-Font, 2016). Employers and self-employed purchasing VHI for their employees can deduct insurance premiums from the income tax (Bernal-Delgado et al, 2018). The premiums vary for basic VHI but reach on average from £35 to £70 per month (Costa-i-Font, 2016). The premiums are expected to increase by age and the existence of a disability, other factors that affect the price may be the number of individuals in the household who have a VHI (Costa & Garcia, 2003)

Mossialos and Thompson (2004) mention that having VHI in Spain is strongly correlated to income, and also correlated to social status and educational level of the family head, referring to studies by Vera-Hernández (1999). They also mention that it is common for people with supplementary VHI to use VHI to gain access to ambulatory specialists, but then make use of their statutory coverage when they need to use hospital services, something that is even more common in rural and smaller urban communities.

3. Theoretical Framework

3.1 Grossman model of health demand

Being in good health is something that directly contributes positively to the benefit of each individual. In the Grossman model, health is looked at from three different perspectives, consumption goods, the input of production, and as an investment. Health is consumed directly and can be seen as a consumer product. But health can also be seen as an input in production. The time when an individual is healthy can be used to be productive. That time

can be spent working, engaging in fun interests, or improving their health. Furthermore, investing in health today, like training or vaccines, affects the health level in the future as an investment. (Bhattacharya et al., 2014, p. 33) The marginal efficiency curve of health capital describes the relationship between investments in health and a certain level of health. The curve corresponds to how much an extra unit of health capital contributes to the lifetime benefit of an individual. The curve is downward sloping, demonstrating decreasing investments for individuals in better health. But also how this investment limits the chance to invest in other markets, and thus providing an opportunity cost. (Bhattacharya et al., 2014, p. 40).

All else equal, health is depreciating with age and the depreciation rate is increasing with age, and thus the cost of investment in health increases. Pushing the individual to invest more and more to stay at the same health level. As this happens the individual does not have time to spend on production and consumption, the other two aspects of health. Thus, the individual is not maximizing its utility anymore. According to the Grossman model, this leaves the aging individual less likely to invest in health. (Bhattacharya et al., 2014, p. 43)

3.1.2 Differences in the efficient production of health

A theory linked to the Grossman model is that some individuals are more efficient producers when it comes to health than others. This is linked to the level of education, where highly educated people can more efficiently allocate their resources to achieve a higher state of health. The investment and its cost are the same as the marginal efficiency curve but the state of health differs, with more educated people having a health curve further up to the right. One can also say that the more educated get more payoff, health, for each unit of investment. In addition, this means that the more educated get higher returns and are more willing to invest in health, thus the effect is double. (Bhattacharya et al., 2014, p. 42)

3.2 Economic approach

This paper is taking an economic approach which is described by Crow et al. (2002) in their systematic review. The concept of satisfaction is explained as a utility when looking at the consumption of a good or service. The modern microeconomic theory states that individuals demand goods or services for the utility they provide. When applying this for healthcare goods, consumers will choose healthcare providers depending on specific attributes that are according to the consumer's preferences. A consumer would also be considered satisfied with

their purchase if their expectation is realized. Consumer surplus is earned to the extent that the value of the utility exceeds the price. (Crow et al., 2002) Furthermore, demand for health is downward-sloping, implying that individuals will demand extensive healthcare if the price for health is low or even for free (Bhattacharya et al. 2014, p. 23).

3.3 Other theories explaining health and health insurances

3.3.1 *Fuchs Hypothesis*

The Fuchs Hypothesis assumes that differences in health are based on the individual's time, preferences, and patience. Individuals who have much patience tend to procrastinate to a larger extent than those having little patience. Therefore patient individuals generally invest more in education and health. As so, the Fuchs hypothesis can explain why some individuals have a better opportunity even before any investment in health is made. (Bhattacharya et al., 2014, p. 66)

3.3.2 *Risk aversion*

In the context of insurance one of the key features is risk aversion. An individual is risk-averse if he or she prefers a more certain payoff over a less certain, even if it means a lower expected value (Bhattacharya et al., 2014, p. 130). A risk-averse individual has a concave utility function, and as a result there is diminishing marginal utility (Perloff, 2017, p. 597). Risk-averse individuals, compared to someone being risk-neutral or risk-preferring, are more likely to buy insurance to avoid uncertainty (Perloff, 2017, p. 607).

3.3.3 *Adverse selection*

Adverse selection is a phenomenon that may occur under asymmetric information which is considerable for the insurance market. It is therefore expected that individuals have more knowledge about their health than the insurance companies have, giving individuals an advantage over companies trying to calculate potential risks. (Bhattacharya et al., 2014, p. 187; Perloff, 2017, p. 661).

4. Method

4.1 Main analysis

Due to the outcome variable, having supplementary health insurance being binary, a linear probability model (LPM) is used. The technique is similar to an OLS but differs in the interpretation of the estimates. The LPM calculates the probability that the dependent variable equals one, in this case, the respondent thus has supplementary health insurance, given the Xs. The estimates should therefore be interpreted as the change in probability that the respondent has voluntary health insurance given a unit change in X (Stock & Watson, 2020, p. 395). In general, when using the LPM, the estimates capture the average change in probability in the whole group (Wooldridge, 2013, p. 211). The interpretation changes when the regressors are binary as well, which is the case in many of the variables used in this study. Then, the estimates are instead the change in probability for that variable compared to the benchmark group (Wooldridge, 2013, p. 207).

The following equation, Equation 1, is used to estimate the main analysis:

$$VHI_i = \alpha + \sum_j \beta_j Satisfaction_{ij} + \sum_k \gamma_k X_{ik} + \varepsilon_i,$$

where j denotes a specific satisfaction level, k is the number of covariates, and ε_i is the error term. Satisfaction levels and covariates are explained in Section 4.2.

One of the shortcomings of this model is that it is a linear prediction, thus the estimates cannot on the margin decrease or increase, this might make the LPM a bad fit since the probability cannot exceed one in practice but according to the estimated model, the probability might in some cases (Wooldridge, 2013, p. 204). Since the focus of this study is descriptive and not prescriptive, the fact that some predicted probabilities will be beyond the unit interval is no hindrance to this analysis. Still it is something worth mentioning with LPM as a method. Moreover, another con with LPM is that there must be heteroskedastic standard errors. This is because part of the variance in the dependent variable is the probability of success, e.g., someone having supplementary health insurance, which is not constant for all individuals and thus not the same over the whole sample (Wooldridge, 2013, p. 205). In general, heteroskedastic standard errors mean that the conditional distribution of the error term increases as X increases, thus the variance of the error term depends on X and is not constant when increasing the number of Xs (Stock & Watson, 2020, p. 189). The problem

with heteroskedastic standard errors can be solved by taking robust standard errors in STATA, which is also done in this study. To verify the robustness of the LPM results, the probit model is also used. These findings are reported in Section 6.3.

4.2 Variables

In this section, variables included in the main regression will be presented and motivated by previous research.

Voluntary health insurance (VHI) - According to SHARE (2015), the variable *SuppHealthInsurance* is measuring whether or not the respondent has supplementary health insurance. This variable will be used as the outcome variable in this study, and measuring people having supplementary health insurance. As mentioned earlier in this study, VHI can be both complementary and supplementary in its character, which is also the case in Denmark and Spain, and partly in Sweden (Sagan & Thompson, 2016; Myndigheten för vård- och omsorgsanalys, 2020). This study will only investigate the satisfaction of respondents stating they have supplementary health insurance, regardless of also having complementary insurances. The variable will from this point be called voluntary health insurance (VHI) but referring to *SuppHealthInsurance* and the definition given by SHARE (2015).

Measures of Satisfaction - According to Crow et al. (2002), the definition of patient satisfaction is not fully established, therefore required to be defined to be able to investigate underlying factors. Häger Glenngård (2015), argues that patients' valuation of healthcare quality is in large extent based on prior experience with the healthcare system, but also positively correlated with patient choice, meaning patients choosing healthcare facilities are more satisfied than those not doing an active choice, even if the care is in other ways equal. People not being in contact with primary care in Sweden also have a more positive perception than those who have been in contact with primary care (Häger Glenngård, 2015). Crow et al. (2002) did present similar findings, that choice of the service provider is associated with higher satisfaction. The definition of satisfaction in this paper is based on prior definitions used, capturing people's experiences and perceptions based on public healthcare, without evaluating treatments by staff or changes in health outcomes. This can also be motivated by prior studies showing that difference in quality is not correlated with satisfaction (Crow et al., 2002).

The variable of interest in this study is as mentioned people's satisfaction with the public healthcare system. It is measured by the answers to multiple-choice questions from SHARE wave 6: “Overall, how satisfied are you with your own coverage in your basic health insurance/national health system?” (SHARE, 2015, p. 111). Answers were ranked in four categories from “very satisfied” to “very dissatisfied”. This made room for people to respond regardless of prior experience of the healthcare system, capturing satisfaction as expectations, needs, or desires as defined by Crow et al. (2002).

In an attempt to identify other determinants of VHI uptake, the following covariates in the specification were included.

Table 1

Definitions of covariates

<i>Age</i>	Age of the respondent at the time of SHARE intervju ¹
<i>Gender</i>	Dummy variable equals one for females
<i>Income</i>	Income divided into 10 categories, percentiles
<i>Education</i>	Grouped into three categories, corresponding to primary education or lower, secondary education, and college education or higher
<i>Body Mass Index (BMI)</i>	Measured through the categories; underweight, normal weight, overweight, and obese
<i>Chronic disease</i>	Number of chronic diseases
<i>Retirement</i>	Dummy variable equals one if the respondent is retired
<i>Form of employment</i>	Categorical variable, with three categories measuring in which sector the respondent works in, e.g. private sector, public sector, or self-employed

Notes: Gender, age, education, retirement, income, chronic diseases, and BMI was obtained directly from easySHARE, only being cleaned of answers such as “don't know” and “won't say”. Education was obtained from the variable *isced1997_r*, which codes education from the ISCED classification. Retirement was obtained from the variable *Current job situation*. Form of employment is conducted from the dataset *healthcare* from wave 6. Chronic disease is added and might capture the effect of the previous contact with healthcare, which is mentioned as something that affects VHI demand (Häger Glenngård, 2015).

¹ Wave 6 was conducted 2015 (SHARE, 2021b).

4.3 Methodological limitations

One drawback of the methodology may be that questions asked in the SHARE data survey are open for interpretation of the respondent, which may be influenced by one's knowledge about private health insurance. It is therefore arguable that people answer the question about having supplementary health insurance incorrectly due to confusion of the term, or not knowing what is included in one's employment contract. Due to the lack of survey data, it was not possible to see the reasons behind people's satisfaction with healthcare, rather their general interpretation. It may therefore be people over- or underestimating their level of satisfaction with the public healthcare system depending on little or no actual experience. Also, the fact that the questions are given in the native language may also give some room for different interpretations between the countries.

Worth mentioning again is that a large share of VHI is purchased and covered by the employer. Thus, satisfaction might not be a driving factor for VHI uptake, but individuals having VHI may still have an understanding of their satisfaction level with the public healthcare system. Thus, this study can still shed some light on the perception for those receiving insurance from their employer and not taking an active decision themselves to enroll.

5. Data

In this section, the data used in this study will be described. The data has been collected from the Survey of Health, Ageing and Retirement in Europe (SHARE) which is a micro-level database, consisting of data from different countries and years. SHARE collects data on individuals aged 50 or older with regard to their health, socio-economic, or other environmental policies and how this affects the individuals (SHARE, 2021a). The data is collected through a face-to-face interview using a special computer program (SHARE, 2021b).

SHARE contains, at this point, eight different waves, conducted in different years. Since wave 1, there have been two SHARELIFE studies, in wave 3 and in wave 7 if the respondent did not take part in wave 3. SHARELIFE includes questions regarding the respondents' life histories. Due to the COVID-19 pandemic, wave 8 of the SHARE survey was affected, and as a reaction a specific SHARE Corona Survey was conducted. (SHARE, 2021b)

In this study, a special dataset of SHARE named easySHARE is used. This dataset contains data from waves 1 to 7 but it is simplified and the variables are less complex (SHARE, 2021b). In this study, a cross-sectional analysis is done using wave 6. This is motivated by the fact that wave 6 is the most recent and complete wave, without being affected by the special SHARELIFE and the covid-19 pandemic. Wave 6 was conducted in 2015. It also includes questions regarding voluntary health insurance, which is not included in all the previous waves (SHARE, 2015). In Appendix II, an alternative approach is presented using panel data with data from wave 5 and wave 6.

Since the aim of this study is to see what behaviors, and more precisely satisfaction, affects the demand for VHI some different dataset from wave 6 were merged with the easySHARE dataset. These are *healthcare* (HC) and *Employment and Pensions* (EP). The healthcare dataset contains variables regarding doctors visits, waiting time, and health insurance (SHARE, 2021b). This study's outcome variable is from this dataset, as well as the variable measuring satisfaction. The control variable answering whether the respondent is private, public, or self-employed is taken from the Employment and Pensions dataset. Moreover, the Employment and Pensions dataset contains data regarding the respondents' work activities, income, and different information about pensions (SHARE, 2021b). The other control variables are retrieved from the original easySHARE dataset, including variables controlling for demographics (SHARE, 2020).

6. Result

The result section will begin by describing the descriptive statistics for all the variables used in the main regression. Followed by the result from the LPM, finishing with a robustness check.

6.1 Descriptive statistics

Table 2 shows the descriptive statistics for the variables used in the analysis in this study. In general, there are more individuals who do not have VHI compared to the ones who do. For the variable of interest, *satisfied*, which contains four categories, the mean value being closer to one than four suggests that people, in general, tend to be very satisfied with public healthcare.

Table 2 also shows the differences in the control variables for individuals having VHI compared to someone who does not have VHI, without showing country differences or how the variables are defined. The average age for someone having VHI in the sample is 58.74 compared to 60.38 for those without. Looking at income, the mean value indicates that those having VHI have a higher average income, where the percentile in average is 7.606 compared to 6.929 for those not having VHI. The education variable is divided into three different groups depending on education level, showing that average level is higher for those with VHI, 1.444 compared to 1.229 for those without.

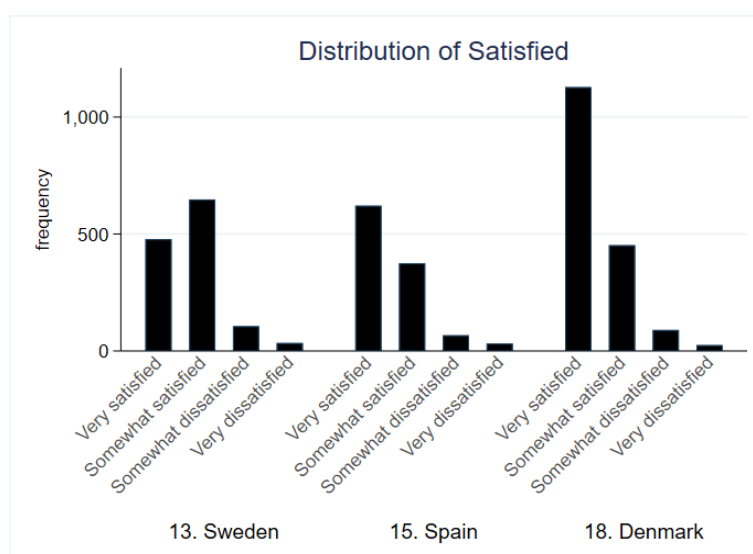
Table 2

Descriptive statistics for all variables used, divided into the two groups of having voluntary health insurance or not

VARIABLES	VHI = 0					VHI = 1				
	N	mean	SD	min	max	N	mean	SD	min	max
Female	2,616	0.507	0.500	0	1	1,440	0.503	0.500	0	1
Age	2,616	60.38	6.460	31.60	89.40	1,440	58.74	5.922	37.70	84.80
Number of chronic diseases	2,616	0.668	0.921	0	7	1,440	0.580	0.878	0	5
BMI categories	2,616	2.762	0.731	1	4	1,440	2.704	0.734	1	4
Income in percentiles	2,616	6.929	2.774	1	10	1,440	7.606	2.371	1	10
Satisfaction	2,616	1.573	0.712	1	4	1,440	1.538	0.720	1	4
Private Public Self-employed	2,616	1.703	0.732	1	3	1,440	1.660	0.738	1	3
Education	2,616	1.229	0.676	0	2	1,440	1.444	0.575	0	2
Retired	2,616	0.143	0.350	0	1	1,440	0.0861	0.281	0	1

In Figure 1, the distribution of satisfaction is shown, including the different categories, as well as the country distribution. The figure shows that overall, people are more satisfied than dissatisfied. Also, Swedes tend to be somewhat satisfied more often than very satisfied compared to Denmark and Spain. Respondents who are dissatisfied are low overall.

Figure 1



6.2 Effects of public healthcare satisfaction on uptake of VHI

Table 3 presents results from the main analysis with VHI as the binary outcome variable, and self-perceived satisfaction with public healthcare as the variable of interest. The results suggest that overall, individuals that are somewhat satisfied and somewhat dissatisfied are more likely to have VHI compared to those who are very satisfied with the public healthcare system, all else constant. These results are significant at a 10 percent level. The estimate for very dissatisfied is positive for Spain and Sweden, but insignificant for Spain. For Denmark, the estimate is negative and without significance. For Sweden, it is also significant for individuals being somewhat dissatisfied at a 5 percent level, and for Spain instead, the group somewhat satisfied is significant at 1 percent level. None of the levels of satisfaction were statistically significant for Denmark suggesting that there might be no relationship driving demand for VHI.

The results show that retirement is not significant for any of the countries or the overall estimate. One could argue that this is due to VHI being purchased by the employer and thus not affected by retirement, the effect might be zero. Looking at the estimates for form of employment, the results suggest that the respondents working in the public sector are -7.7 percentage points less likely to have VHI than someone working in the private sector, *ceteris paribus*. This is significant at a 1 percent level overall. For both Sweden and Denmark the estimate is negative, -9.2 percentage points and -14.5 percentage points respectively. The opposite was found for Spain, suggesting that someone working in the public sector is more

likely to have VHI compared to someone working in the private sector. The estimate for self-employed is not significant overall, possibly since it has negative and positive signs in different countries, even though it is significant in each respective country. In Sweden, at a 5 percent level, someone who is self-employed is more likely to have VHI compared to someone who works in the private sector. The estimate is also significant at the 5 percent level for Denmark, but someone who is self-employed in Denmark is less likely to have VHI compared to someone who works in the private sector. For Spain, someone who is self-employed is more likely to have VHI, which is significant at a 1 percent level.

Age, which is significant for Sweden at a 1 percent level, shows that age and having VHI has a negative relationship. The overall estimate is also significant at the 1 percent level and is negative, suggesting that the probability of having VHI is decreasing by 0.4 percentage points with one year increase in age, all else constant. As shown in the table both Spain and Denmark have small, negative, and insignificant estimates for age.

For Denmark and Spain, there is a significant and positive relationship between education and VHI. Compared to the benchmark group, primary education or lower, secondary and college education have almost correspondingly effects on probability of having VHI with 28.4 percentage points respectively 30.5 percentage points in Denmark. In Spain there is an increase in probability for secondary education, with 4.5 percentage points compared to the benchmark group and 15.6 percentage point increase for those having a college education, *ceteris paribus*. For Sweden, the sign for secondary education is positive but without significance. When looking at college education, the estimate is negative for Sweden, the effect is small and without significance. This may suggest that there may be no difference between the different groups of educational level in Sweden but this is not something that cannot be said for certain since none of the estimates are significant. Overall, the estimates for both secondary and college education are positive and significant at a 1 percent level. Compared to the country-specific estimates the overall estimate for a college education is smaller than those for Denmark and Spain. This is also true for the overall estimate for secondary education compared to the estimate for Denmark but not compared to the estimate for Spain.

The results from the number of chronic diseases only show significance at a 5 percent level for Sweden. For every additional chronic disease, the probability of having VHI decreases by

2.5 percentage points for Swedes. Whereas for both Spain and Denmark, 0.1 and 0.8 percentage points respectively, the estimates are small, positive, and insignificant. The overall estimate shows, just as for Sweden, a negative relationship with VHI uptake but without significance.

Having a lower or higher BMI than normal is one indicator of poor health. One could think of BMI as measuring the individual's health conditions and thus think that the ones who are in bad shape also want to ensure themselves by having VHI. This is not however supported by findings in the regression, where no significance was found in none of the categories, neither overall or for the countries separately .

The dummy variable, female, is only significant at 10 percentage points for Denmark, which shows a positive sign, suggesting that Danish females are 4.5 percentage points more likely to have VHI compared to Danish males, keeping everything else constant. In general, all the estimates have large standard errors and thus large spread in the observations, which might explain why they are insignificant, with Denmark as an exception.

The coefficient for income is overall significant and positive with the largest effect for Denmark where there is a 2.2 percentage point increase in the probability of having VHI when increasing one income percentile, holding all else equal.

Controls for each country show that respondents from Denmark are 32.4 percentage points more likely to have VHI than those from Sweden. The other dummy representing people from Spain, showed a negative sign, with people being 3.9 percentage points less likely to have VHI than Swedes. This contradicts the fact that VHI has a higher percentage coverage in Spain than Sweden but might be due to the SHARE data used in this study, only capturing the effect for people 50 years or older.

Table 3

Effect on voluntary health insurance using linear probability model

	(1) Sweden	(2) Spain	(3) Denmark	(4) All countries
Somewhat satisfied	0.019 (0.024)	0.066*** (0.025)	0.002 (0.027)	0.025* (0.015)
Somewhat dissatisfied	0.091* (0.047)	0.054 (0.052)	0.018 (0.052)	0.056* (0.029)
Very dissatisfied	0.132* (0.079)	0.127 (0.080)	-0.098 (0.105)	0.064 (0.050)
Public sector	-0.092*** (0.027)	0.076** (0.032)	-0.145*** (0.027)	-0.077*** (0.016)
Self-employed	0.077** (0.037)	0.126*** (0.031)	-0.094** (0.041)	0.034 (0.021)
Retired	0.014 (0.033)	0.037 (0.050)	-0.058 (0.054)	-0.011 (0.025)
Age	-0.008*** (0.002)	-0.004 (0.002)	-0.001 (0.002)	-0.004*** (0.001)
Female	-0.018 (0.025)	-0.004 (0.024)	0.045* (0.026)	0.005 (0.015)
Income in percentiles	0.010** (0.005)	0.013*** (0.004)	0.022*** (0.005)	0.016*** (0.003)
Secondary education	0.015 (0.048)	0.045* (0.025)	0.284*** (0.084)	0.070*** (0.022)
College education	-0.007 (0.048)	0.156*** (0.037)	0.305*** (0.085)	0.096*** (0.024)
Number of chronic diseases	-0.026** (0.012)	0.001 (0.014)	0.008 (0.014)	-0.005 (0.008)
BMI normal	0.110 (0.097)	-0.020 (0.122)	-0.003 (0.143)	0.024 (0.072)
BMI overweight	0.056 (0.096)	-0.058 (0.122)	-0.017 (0.143)	-0.007 (0.072)
BMI obese	0.103 (0.099)	-0.086 (0.124)	-0.001 (0.145)	0.010 (0.073)
Spain				-0.039** (0.020)
Denmark				0.324*** (0.018)
Constant	0.573*** (0.185)	0.230 (0.185)	0.254 (0.223)	0.289** (0.118)
Observations	1,266	1,095	1,695	4,056
R-squared	0.053	0.072	0.040	0.163

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6.3 Robustness check

In this section the main results from the LPM will be compared to the results using the probit model. These results work as a robustness check to what have been presented above, and thus provide some evidence for the results to be strong and valid when changing the method.

The probit model can be used to overcome one of the shortcomings of the LPM, but it is a bit harder to interpret the estimates. The probit model does not predict a linear model, but instead, it produces a cumulative probability distribution using a standard normal distribution (Stock & Watson, 2020, p. 397). Z-values are used to compute the probability, which computes predicted probabilities. Thus, the coefficient is not a z-value but rather the difference in the z-value which occurs due to a unit change in X, ceteris paribus (Stock & Watson, 2020, p. 400). Moreover, the probit regression uses maximum likelihood estimation (MLE) instead of OLS, due to nonlinearity (Wooldridge, 2013, p. 464). As mentioned the probit model is only used as a robustness check for the LPM results. For the coefficients to be comparable with the coefficients from LPM, one needs to find the partial effect. This can be obtained by the partial derivative (Wooldridge, 2013, p. 462).

The following equation, Equation 2, is used to estimate the probit model:

$$Pr(VHI_i = 1 | Satisfaction_i, X_i) = \Phi(\alpha + \sum_j \beta_j Satisfaction_{ij} + \sum_k \gamma_k X_{ik}),$$

where Φ is the cumulative distribution function of the standard normal distribution, and the rest are as defined in Equation 1.

In Table 4, the marginal effects from the probit model are presented, which shows some, but small changes compared to the LPM results. This demonstrates that our estimates are robust to the specification.

Table 4

Marginal effect on voluntary health insurance using the probit model

	(1) Sweden	(2) Spain	(3) Denmark	(4) All countries
Somewhat satisfied	0.019 (0.024)	0.062** (0.025)	0.002 (0.027)	0.025* (0.015)
Somewhat dissatisfied	0.091** (0.046)	0.058 (0.052)	0.018 (0.052)	0.059** (0.029)
Very dissatisfied	0.133* (0.079)	0.127 (0.081)	-0.097 (0.102)	0.065 (0.051)
Public sector	-0.087*** (0.026)	0.071** (0.031)	-0.145*** (0.027)	-0.072*** (0.016)
Self-employed	0.081** (0.038)	0.123*** (0.031)	-0.093** (0.041)	0.036* (0.021)
Retired	0.011 (0.034)	0.031 (0.048)	-0.058 (0.053)	-0.009 (0.026)
Age	-0.007*** (0.002)	-0.003 (0.002)	-0.001 (0.002)	-0.004*** (0.001)
Female	-0.021 (0.025)	-0.001 (0.024)	0.044* (0.026)	0.004 (0.015)
Income in percentiles	0.010** (0.005)	0.013*** (0.004)	0.022*** (0.005)	0.017*** (0.003)
Secondary education	0.014 (0.051)	0.045* (0.026)	0.288*** (0.087)	0.088*** (0.026)
College education	-0.009 (0.051)	0.150*** (0.037)	0.309*** (0.088)	0.112*** (0.028)
Number of chronic diseases	-0.031** (0.014)	0.003 (0.014)	0.008 (0.014)	-0.005 (0.008)
BMI normal	0.119 (0.109)	-0.004 (0.112)	-0.003 (0.138)	0.027 (0.072)
BMI overweight	0.066 (0.108)	-0.039 (0.112)	-0.018 (0.138)	-0.004 (0.072)
BMI obese	0.110 (0.111)	-0.069 (0.113)	-0.001 (0.140)	0.012 (0.074)
Spain				-0.035* (0.019)
Denmark				0.323*** (0.018)
Observations	1,266	1,095	1,695	4,056

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In Appendix II an attempt in providing a causal model is presented using panel data from SHARE data wave 5 and wave 6.

7. Analysis

The purpose of this study was to investigate a potential relationship between satisfaction with public healthcare and demand for VHI, in addition factors that might contribute to demand for VHI in the three Beveridge countries Sweden, Denmark, and Spain. Below, the results from this study are discussed.

Results from this study suggest that respondents in Sweden are more likely to purchase VHI if they are dissatisfied with the public healthcare system. This is also partly true for Spain, where the results instead showed that those being somewhat satisfied were more likely to buy VHI than those being very satisfied. Thus, this was not found for those being dissatisfied. For Denmark the effect on satisfaction level was inconclusive. This may be explained by Tynkkynen et al. (2018), stating that satisfaction is mainly a driving factor for VHI uptake until the VHI market purchased by the employer has grown to a relatively large market. Moreover, it is also stated that movements in society, such as the opportunity to choose and tax deductions, decrease the importance of satisfaction on VHI uptake. This could be the case in Denmark, which has the largest share of VHI uptake by the employer but also an opportunity to choose among the citizens. This freedom of choice can be understood as the fact that people in Denmark can choose if they want to be part of Group 1 or Group 2 in public healthcare as well as implementation of New public management (Olejaz et al., 2012). Thus, those who are dissatisfied with public healthcare have another option to change to Group 2 than to purchase VHI. Moreover, the positive relationship between satisfaction with public healthcare and VHI is supported by findings by Costa and Garcia (2003), who are investigating private health insurance in Spain. Costa and Garcia (2003) are also suggesting in their paper that waiting time has an impact on people's satisfaction when looking at the Spanish national healthcare system.

Looking at forms of employment, it was found in the main regression that Spaniards in the public sector are more likely to have VHI compared to someone working in the private sector. This contradicts the findings for Sweden and Denmark pointing that public sector employees are less likely to have VHI than private sector employees. Even though employers are more likely to purchase insurance for their employees in all countries, compared to individuals

privately, the share² in Spain is smaller than the share in Sweden and Denmark (Costa-i-Font, 2016; Myndigheten för vård- och omsorgsanalys, 2020; Forsikring og Pension, 2021). This might explain why there are different signs of the estimate. The reverse reasoning holds about the share of the population that is self-employed and have VHI, which would imply that Sweden and Denmark should be more alike, or at least have the same sign on the estimate. But as the results suggested, the respondents in Sweden and Spain who are self-employed are more likely to have VHI, and Danes who are self-employed are less likely to have VHI. These results are thus not supported by how large the shares of self-employed who have VHI are in the respective countries. One could, however, argue that the reasoning holds due to the estimate being larger for Spain than Sweden and the overall estimate even if the sign is the same.

As expected the results showed a negative impact of age on VHI in Sweden since numerous companies in Sweden have age limits for enrollment as well as an expiry date on insurance plans (Svensk Försäkring, 2020). Voluntary health insurance can be seen as an investment in health since it will provide the individual with high qualitative and faster access to healthcare. Without health insurance, people are referred to the public queue which in case of need for operation can mean waiting for a long time. Having voluntary health insurance gives people access to care in a much shorter time which could potentially reduce time being sick and missing out on time being productive. This is also in line with the Grossman model that explains the marginal efficiency curve of health capital, describing the relationship between investments in health and a certain level of health, where age is depreciating one's health, requiring more investment. This means that the alternative cost increases when getting older, suggesting that fewer should buy VHI before other goods. This is not supported for Denmark and Spain which may be affected by the fact that the sample only includes individuals older than 50, and that as a consumption commodity, it directly enters efficiency as the amount of health obtained by a given amount of health inputs such as medical care, smoking, and exercising (Bhattacharya et al., 2014, p. 43). The reasoning of the Grossman model, however, supports the small decrease in the probability of having VHI when all the three countries are merged.

² For Spain; 57%, Denmark; over 90% and Sweden; 90% is group insurance and two-thirds are purchased by employer

Education was found to have a positive impact on VHI uptake in both Spain and Denmark which is supported by prior studies (Mossiolo & Thompson 2004), which states that education is mentioned to be an influencing factor when buying VHI. This is also consistent with the extension of the Grossman model that states that highly educated people are more efficient in allocation their resources and thus demand and receive a higher level of health. This can be true if having VHI is said to imply a higher level of health.

Sweden is the only country where the number of chronic diseases is significant and has a negative effect on VHI. These findings are also supported by the fact that insurance companies usually exclude individuals with chronic diseases to enroll (Svensk försäkring, 2021). But since both Spain and Denmark also exclude individuals with chronic conditions to enroll in health insurance (Olejaz et al, 2012; Costa-i-Font, 2016), the estimates were expected to be negative, which is not the case. One argument could be that the effect of increasing the number of chronic diseases, keeping all else constant, on VHI uptake is close to zero and the effect is thus negligible. This conclusion cannot be drawn for certain since the estimates for Spain, Denmark, and overall are without significance.

7.1 Other possible determinants of demand

Apart from the factors investigated in this study, there are other factors that may contribute to VHI, some of these are discussed briefly in the following section.

As mentioned in Section 3.3.2, it is suggested that risk aversion may contribute to VHI uptake (Bhattacharya et al., 2014, p. 130). Even though the SHARE data is comprehensive and has variables measuring risk aversion, these variables contributed to substantially smaller sample size and were thus excluded in the regression. According to the theory of risk aversion, one can suggest that it would have contributed positively to VHI, with more risk-averse people tending to buy more extensive insurances, even though there are limitations of previous studies for this relationship.

Moreover, as mentioned by Costa and Garcia (2003), costs of insurance are mentioned to play a substantial role, which was noticed in Denmark when tax breaks were introduced for VHI (Vrangbaek, 2016). The effect of product pricing is outside of the scope of this thesis and is therefore not further discussed or included in the regression.

According to Fuchs hypothesis, people that are more patient usually invest more in education and future welfare (Bhattacharya et al., 2014, p. 66). Patience was found in the SHARE data, but due to substantially smaller sample size, it was not added to the regression. Since individuals with high levels of patience are also mentioned to have higher levels of education, this effect may be taken up by the variable measuring education which was significant for Denmark and Spain. This would thus imply that our model has a problem with omitted variables.

Socioeconomic background and political views is suggested by Tynkkynen et al. (2018) to have an effect which we could not include due to lack of data in wave 6 in the SHARE data. One may suggest that political views indicate how people value patient choice and fast access to care.

Waiting time and quality are mentioned by Costa and Garcia (2003) to contribute to VHI uptake. This could not be controlled specifically in the regression due to limitations in the dataset but is suggested to contribute to the satisfaction variables in general. Due to these limitations, we cannot exclude the possibility of omitted variable bias, contributing to over- or under-estimation of the variable of interest. Despite these limitations, this paper is contributing to the investigation of public healthcare satisfaction and VHI uptake and by looking further into three countries where few studies of this sort have been conducted.

7.2 External Validity

Despite finding a relationship between dissatisfaction and VHI uptake for the countries investigated, we cannot draw any conclusions for Beveridge countries in general. There were ambiguous results from each country when looking at the outcome of the main regression separately. One may suggest that a study with more than just three countries could have contributed to draw more conclusive assumptions of the Beveridge countries as a group. In addition, the healthcare systems vary between countries, applying the Beveridge model to different extents, suggesting that the systems may function in numerous ways with different outcomes in quality and self-perceived satisfaction.

7.3 Future research

The results of this study provide evidence of a relationship between satisfaction with public healthcare and having voluntary health insurance. But more studies need to be made trying to provide more causality regarding this relationship. Due to the complexity of this issue, it is suggested that more research is conducted with more extensive evidence of satisfaction level as well as including quality measurements of the healthcare system. Also looking specifically at waiting time, if that is specifically driving demand for VHI. When doing this it would be preferable to use extensive panel data with a large sample size over time. It would also be interesting to investigate further the effect of satisfaction level on VHI for people of all ages eligible to have VHI. This may also be compared to costs and people's willingness to pay. One extension of this could be to look at the relationship between satisfaction and cost. Thus, asking if people could be pleased, or somewhat satisfied, if they deem the healthcare system as cost-effective.

As this study has focused on supplementary health insurance, one could instead, with another sample, focus on complementary health insurance. Thus, including premiums and cost could be of interest. In that case, it would be plausible to measure people's willingness to pay for a certain level of care. This could also be of interest for an insurance market such as Sweden, where complementary does not exist to a larger extent and thus provide some evidence for the market to develop.

8. Conclusion

In conclusion, this study shows that there are multiple reasons why individuals demand voluntary health insurance in countries with universal healthcare coverage. This study presents results pointing to a positive relationship between dissatisfaction with public healthcare and VHI uptake. Stating that dissatisfaction with the public healthcare system increases the probability of having VHI compared to individuals being very satisfied, which is true for Sweden and partly in Spain but inconclusive for Denmark. In addition, numerous contributing factors driving demand for voluntary health insurance were investigated and supported by previous studies. The reasons for people being dissatisfied are briefly discussed but not further investigated due to lack of data available and also because of the difficulties of defining satisfaction, which is a question of interpretation. These difficulties are also mentioned in numerous previous studies investigating this relationship. Just as mentioned

previously, there are some limitations in this study, which lead to the conclusion that several factors affecting demand for VHI were added in the regression, but some were to be excluded. Still this study sheds some light on VHI uptake, and more precisely the relationship between satisfaction with the public healthcare system and having voluntary health insurance.

References

- Bernal-Delgado, Enrique et al. 2018. Spain: Health system review. *Health Systems in Transition* 20(2): 1- 179.
<https://eurohealthobservatory.who.int/publications/i/spain-healthsystem-review-2018>
(Retrieved: 21-11-09).
- Bhattacharya, Jay; Hyde, Timothy & Tu, Peter. 2014. *Health Economics* 1 ed.. Basingstoke: Palgrave Macmilian.
- Börsch-Supan, A. (2020). Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 5. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w5.710
- Börsch-Supan, A. 2020. Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 6. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w6.710
- Börsch-Supan, A., S. Gruber. 2020. easySHARE. Release version: 7.1.0. SHARE-ERIC. Data set DOI: 10.6103/SHARE.easy.710
- Börsch-Supan, A., M. Brandt, C. Hunkler, T. Kneip, J. Korbmacher, F. Malter, B. Schaan, S. Stuck, S. Zuber. 2013. Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE). *International Journal of Epidemiology*. DOI: 10.1093/ije/dyt088
- Costa, Juan & Garcia, Jaume. 2003. Demand for private health insurance: how important is the quality gap? *Health Economics* 12(7): 587-599. <https://doi.org/10.1002/hec.756>
- Costa-i-Font, Joan. 2016. Spain. In Sagan, Anna & Thomson, Sarah (red.). *Voluntary health insurance in Europe: Country experience*. United Kingdom: WHO, 139-142.
https://www.euro.who.int/_data/assets/pdf_file/0011/310799/Voluntary-healthinsurance-Europe-country-experience.pdf
- Crow, R et al. 2002. The measurement of satisfaction with healthcare: implications for practice from a systematic review of the literature. *Health Technology Assessment* 6(32): 1-244. <https://uhra.herts.ac.uk/bitstream/handle/2299/1073/102382.pdf> (Retrieved: 21-11).

Forsikring og Pension. 2021. *Sundhedsforsikringer*.

<https://www.forsikringogpension.dk/statistik/sundhedsforsikringer/> (Retrieved: 21-11-24).

Gruber, S., C. Hunkler and S. Stuck. 2014. Generating easySHARE: guidelines, structure, content and programming. SHARE Working Paper Series (17-2014). Munich: MEA, Max Planck Institute for Social Law and Social Policy.

Gustafsson, Anna. 2021. *Hallengren om privata sjukförsäkringar: "Kommer bli politisk strid"*. Dagens Nyheter.

<https://www.dn.se/sverige/hallengren-om-privata-sjukforsakringar-kommer-bli-politisk-strid/>

Last updated: 21-10-08. Retrieved: 21-12-17.

Häger Glenngård, Anna. 2015. *Primärvården efter vårdvalsreformen: valfrihet, kvalitet och produktion*. Stockholm: SNS förlag.

https://snsse.cdn.triggerfish.cloud/uploads/2020/02/primarvarden_efter_vardvalsreformen.pdf

Kullberg, Linn, et al. 2019. Health insurance for the healthy? Voluntary health insurance in Sweden. *Health Policy* 123(8): 737-746. <https://doi.org/10.1016/j.healthpol.2019.06.004>

Mathur, Tanuj, et al. 2018. Examining the influence of health insurance literacy and perception on the people preference to purchase private voluntary health insurance. *Health Services Management Research* 31(4): 218-232. doi:10.1177/0951484818760529

Mossialos, Elias & Thomson, Sarah. 2004. *Voluntary health insurance in the European Union*. Brussels: WHO.

https://www.euro.who.int/__data/assets/pdf_file/0006/98448/E84885.pdf (Retrieved: 21-11).

Myndigheten för vård- och omsorgsanalys. 2020. *Privata sjukvårdsförsäkringar: Ett kunskapsunderlag om möjliga konsekvenser för patienter och medborgare*. Stockholm: Vårdanalys.

<https://www.vardanalys.se/wp-content/uploads/2020/03/Rapport-2020-3-Privata-sjukv%C3%A5rdsf%C3%B6rs%C3%A4kringar.pdf> (Retrieved: 21-11-10).

OECD, & European Observatory on Health Systems and Policies. 2019. *State of Health in the EU, Denmark: Country Health Profile 2019*. Brussels/Paris: OECD Publishing.

<https://doi.org/10.1787/25227041>

OECD, & European Observatory on Health Systems and Policies. 2019. *State of Health in the EU, Sweden: Country Health Profile 2019*. Brussels/Paris: OECD Publishing.

<https://doi.org/10.1787/2dcb7ca6-en>

OECD, & European Observatory on Health Systems and Policies. 2019. *State of Health in the EU, Spain: Country Health Profile 2019*. Brussels/Paris: OECD Publishing.

<https://doi.org/10.1787/8f834636-en>

Olejaz, Maria et al. 2012. Denmark: Health system review. *Health Systems in Transition* 14(2): 1-192.

<https://eurohealthobservatory.who.int/publications/i/denmark-healthsystem-review-2012>

(Retrieved: 21-11-10).

Pedersen, Kjeld Möller. 2005. Voluntary supplementary health insurance in Denmark. *Public Finance and Management* 5(4): 544-566.

Perloff, Jeffrey M.. 2017. *Microeconomics: Theory and Application with Calculus* 4th ed. Global Edition. Harlow: Pearson Education.

Sagan, Anna & Thomson, Sarah. 2016. *Voluntary health insurance in Europe: Role and regulation*. United Kingdom: WHO.

https://www.euro.who.int/__data/assets/pdf_file/0005/310838/Voluntary-healthinsurance-Europe-role-regulation.pdf

SHARE. 2013. *Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE)*. Börsch-Supan, A., M. Brandt, C. Hunkler, T. Kneip, J. Korbmayer, F. Malter, B. Schaans, S. Stuck, S. Zuber (2013). *Data Resource Profile: The Survey of Health, Ageing and Retirement in Europe (SHARE)*. International Journal of Epidemiology. DOI:

[10.1093/ije/dyt088](https://doi.org/10.1093/ije/dyt088)

SHARE. 2021a. *SHARE - Survey of Health, Ageing and Retirement in Europe*.

<http://www.share-eric.eu/home0.html> (Retrieved: 21-11-15).

SHARE. 2021b. *Release Guide 1.0.0 of Wave8*.

http://www.share-project.org/fileadmin/pdf_documentation/SHARE_release_guide_1-0-0-w8.pdf

SHARE. 2015. *CAPI main questionnaire*.

http://www.share-project.org/fileadmin/pdf_questionnaire_wave_6/Generic_main_qnn_6_3_13.pdf

SHARE. 2020. *Guide to easySHARE release 7.1.0*.

http://www.share-project.org/fileadmin/pdf_documentation/easySHARE_Release_7.1.0_ReleaseGuide.pdf

SHARE. 2020. Data set Wave 5. Börsch-Supan, A. *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 5*. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w5.710

SHARE. 2020. Data set Wave 6. Börsch-Supan, A. *Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 6*. Release version: 7.1.0. SHARE-ERIC. Data set. DOI: 10.6103/SHARE.w6.710

SHARE. 2015. *Wave specific methodological documentation. Wave 5*: Malter, F. and A. Börsch-Supan (Eds.) *SHARE Wave 5: Innovations & Methodology*. Munich: MEA, Max Planck Institute for Social Law and Social Policy.

SHARE. 2017. *Wave specific methodological documentation. Wave 6*: Malter, F. and A. Börsch-Supan (Eds.) (2017). *SHARE Wave 6: Panel innovations and collecting Dried Blood Spots*. Munich: MEA, Max Planck Institute for Social Law and Social Policy.

Stock, James H. & Watson, Mark W.. 2020. *Introduction to Econometrics* 4th ed. Global Edition. Harlow: Pearson Education.

Ström Olsson, Kristina. 2013. *Vård- och omsorgssystemens utformning och finansiering - en internationell utblick*. Stockholm: Svensk försäkring.

https://www.svenskforsakring.se/globalassets/rapporter/valfard/sf_rapport3_web.pdf

Svensk Försäkring. 2021. *Så här fungerar en sjukvårdsförsäkring*.

<https://www.svenskforsakring.se/om-forsakring/vad-ar-och-hur-funkar-det/sa-har-fungerar-en-privat-sjukvardsforsakring/>. (Retrieved: 2021-11).

Tynkkynen, Liina-Kaisa, et al. 2018. Development of voluntary private health insurance in Nordic countries - An exploratory study on country-specific contextual factors. *Health Policy* 122(5): 485-492. <https://doi.org/10.1016/j.healthpol.2018.03.008>

Vrangbaek, Karsten. 2016. Denmark. In Sagan, Anna & Thomson, Sarah (red.). *Voluntary health insurance in Europe: Country experience*. United Kingdom: WHO, 139-142.

https://www.euro.who.int/_data/assets/pdf_file/0011/310799/Voluntary-healthinsurance-Europe-country-experience.pdf

Wooldridge, Jeffrey M. 2014. *Introduction to Econometrics* Europe, Middle East and Africa Edition. Hampshire: Cengage Learning.

Appendix

Appendix I: Data source

This paper uses data from SHARE Waves 5 and 6 (DOI: 10.6103/SHARE.w5.710, 10.6103/SHARE.w6.710), see Börsch-Supan et al. (2013) for methodological details.

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This paper uses data from the generated easySHARE data set (DOI: 10.6103/SHARE.easy.710), see Gruber et al. (2014) for methodological details. The easySHARE release 7.1.0 is based on SHARE Waves 1, 2, 3, 4, 5, 6 and 7 (DOIs: 10.6103/SHARE.w1.710, 10.6103/SHARE.w2.710, 10.6103/SHARE.w3.710, 10.6103/SHARE.w4.710, 10.6103/SHARE.w5.710, 10.6103/SHARE.w6.710, 10.6103/SHARE.w7.710)

Appendix II: Panel regression

Table 5

Results from panel data using fixed effects

VARIABLES	(1) Sweden	(2) Spain	(3) Denmark	(4) All countries
Somewhat satisfied	0.016 (0.027)	0.010 (0.027)	0.006 (0.018)	0.010 (0.014)
Somewhat dissatisfied	0.129*** (0.049)	0.054 (0.045)	0.033 (0.031)	0.080*** (0.025)
Very dissatisfied	0.059 (0.072)	0.038 (0.061)	-0.035 (0.062)	0.024 (0.039)
Public sector	-0.049 (0.055)	0.058 (0.049)	-0.026 (0.047)	0.001 (0.030)
Self-employed	0.064 (0.055)	-0.016 (0.051)	0.039 (0.058)	0.015 (0.032)
Retired	0.045 (0.045)	-0.004 (0.085)	-0.027 (0.047)	0.014 (0.031)
Income in logs	-0.007 (0.026)	0.017 (0.011)	-0.015 (0.016)	0.008 (0.009)
Number of chronic diseases	0.004 (0.023)	0.021 (0.019)	-0.012 (0.012)	0.006 (0.010)
BMI normal	-0.050 (0.038)	0.020 (0.041)	0.006 (0.012)	-0.002 (0.014)
BMI overweight	-0.043 (0.052)	0.027 (0.049)	0.063** (0.030)	0.023 (0.022)
BMI obese	0.071 (0.074)	0.114* (0.061)	0.093* (0.055)	0.096*** (0.035)
Wave 6	-0.021 (0.017)	0.037** (0.016)	0.010 (0.010)	0.008 (0.008)
Constant	0.326 (0.289)	-0.074 (0.129)	0.675*** (0.177)	0.217** (0.100)
Observations	2,975	2,588	3,562	9,125
Adjusted R-squared	0.012	0.016	0.004	0.006
Number of groups	1,967	1,814	2,220	6,001

Clustered standard errors in parentheses

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

To overcome one of the major problems when searching for causality, omitted variable bias, an alternative approach is presented in this section. A panel regression representing data from SHARE wave 5 and wave 6 looking at Sweden, Denmark and Spain. Using each individual as the entity and wave as the time variable. To begin with, the panel data is unbalanced. This means that there are individuals, the entity, that has missing observations for one of the time periods, in this case, waves (Stock & Watson, 2020, p. 362). This could be a problem but is handled in STATA. Moreover, a Hausman test was conducted and fixed effects were chosen over random effects, fixed effects are preferable when estimating ceteris paribus effects (Wooldridge, 2013, p. 399). Panel data fixed effects were used to overcome the problem with omitted variable bias, when they vary across, in this case, individuals but not through time (Stock & Watson, 2020, p. 367). This implies that there is an individual fixed effect, which in

reality affects the VHI uptake differently for each individual, but only affects the intercept (Stock & Watson, 2020, p. 368). This however does not imply that the regression estimated in this study is without omitted variables and presents a perfect causal relationship. In the panel regression, clustered standard errors are used, clustered around each individual. This allows for arbitrary correlation within each individual but not across different individuals. In the context of panel data, this implies that clustered standard errors allow heteroskedasticity and autocorrelation (Stock & Watson, 2020, p. 376). The estimates using the panel data is obtained by estimating Equation 3:

$$VHI_{it} = \alpha_i + \sum_j \beta_{tj} Satisfaction_{itj} + \sum_k \gamma_{tk} X_{itk} + \varepsilon_{it}$$

where subscripts i and t denote the individual and wave, respectively, α_i is the unobserved heterogeneity, and the rest are as defined in Equation 1.

In table 5, the results for the panel data are presented. The results suggest that the only estimates in column 4 who are significant, apart from the constant, are somewhat dissatisfied and BMI obese, 8.0 percentage points and 9.6 percentage points respectively. Thus, someone who is somewhat dissatisfied with the public healthcare system is 8.0 percentage points more likely to have VHI compared to someone who is very satisfied, keeping all else equal. For BMI, someone who has a BMI corresponding to obese is 9.6 percentage points more likely to have VHI than someone who has a BMI that corresponds to underweight. Moreover, when looking at the countries separately, one can see that somewhat dissatisfied is also significant for Sweden, but with a larger change in probability, 12.9 percentage points compared to 8.0. Some other interesting results are the estimate Wave 6 for Spain, suggesting that the respondents in Spain are 3.7 percentage points more likely to have VHI in Wave 6 than in Wave 5, *ceteris paribus*.

As expected, and also to some extent shown in the main analysis, respondents being dissatisfied with public healthcare are more likely to have VHI than those being very satisfied. This is also something that is supported by previous research. But when looking at BMI obese, the results are a bit more surprising. Even though previous research does not specifically look at BMI, one could think that an extreme BMI should increase the probability of developing diseases and thus decrease the probability of VHI rather than the opposite which is shown in the results. This reasoning does not however have much support in the results.