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The (Insignificant) Effects of Privatisation on Healthcare Staffing Levels and Other Healthcare Metrics

by

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Abstract

This paper sets out to investigate what effects healthcare privatisation has on healthcare staffing levels and other healthcare metrics in regional Swedish healthcare. Using econometric techniques and relying on public data of public healthcare spending on private actors as a proportion of total regional healthcare spending, this paper finds that privatisation in general has no significant effects on regional healthcare. The paper calls first and foremost for more and better data to be released to the public. It also calls for future research to rely more heavily on proper controls and cross-regional analysis, as these were important factors in terms of this study's results. Lastly, it discusses the implications for policy makers, concluding that as long as no decisive answers to the vices and virtues regarding privatisation will be found, the debate will likely continue to be drawn along ideological lines in the future.

Keywords: private healthcare, Swedish healthcare, healthcare staffing, healthcare productivity

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Chapter 1 – Introduction

Swedish healthcare needs health care professionals (SCB, 2017; UKÄ, 2019). The coming decades are likely going to be characterised by increasing pressures on the healthcare sector, as Sweden deals with challenging changes in its demographical composition (Stiernstedt, 2016).

In Sweden, the discussion regarding healthcare often focuses on increasing marketisation and privatisation of healthcare – a topic for political debate often following strict ideological lines (e.g. Omni, 2018). Despite a recognition by commentators on all sides of the debate (e.g. Dahlgren, 2018; Almega, 2019) that staffing levels of tertiary educated healthcare professionals is a key issue in regards to the progression of Swedish healthcare, no attempts have been made to measure how private governance of publicly funded healthcare affects healthcare staffing levels in a region. Due to the way the majority of mixed-competitive Swedish healthcare markets are funded, competition in quality is encouraged between actors. Since one of the few ways in which consumers can perceive quality in healthcare is through staffing, this paper hypothesises that increased privatisation would lead to higher staffing levels as firms compete for patients to enlist.

This paper's overarching question is: Does regional healthcare privatisation in Sweden have any discernible effects on healthcare staffing levels in particular and healthcare quality and costs in general? Sweden is a particularly apt country to perform this research in. Firstly, policy changes in the late 2000s led to an increase in privatisation (Konkurrensverket, 2014; Häger Glenngård, 2015). Secondly, Sweden's devolved healthcare governance, with 21 fairly diverse regions each controlling a separate geographical healthcare area, lends itself well to measurements of privatisation effects.

The overall finding of this paper is that privatisation has a no significant effect on staffing levels. This paper expands to include other key healthcare metrics, namely expenditure, productivity and salary, finding similar results of insignificance.

One should note that this paper just provides a rough estimate. In essence, it tests whether there is something inherent in privatisation and a shift away from a near-monopoly system

that affects staffing levels and other key healthcare metrics – as elementary economic theory would suggest. This study is a mere starting point. The paper makes no attempts to draw definite conclusions, nor does it seek to praise or criticise previous policy implementations. It is in no position to do so, as information and previous research on staffing levels is scarce. As authors have done before, this paper calls for more and better information to be made available for academics, stakeholders and healthcare consumers (Myndigheten för vårdanalys, 2013; Häger Glenngård, 2015; Myndigheten för vårdanalys, 2018). Thus, this paper is aware that the results are indicative rather than definitive. However, the results are nonetheless of importance as staffing levels play an important role in the quality of healthcare (e.g. Aiken et.al., 2018), therefore the effects of policy implementations on staffing ought to be analysed.

Following this introductory chapter, there is going to be a chapter on relevant literature relating to this essay. Chapter two is split into three parts. The first provides an overview of the Swedish healthcare system with a particular focus on the last few decades of privatisation. The second part discusses the literature on how staffing levels matters for healthcare results, establishing that staffing levels are of importance for healthcare quality. The third section starts by discussing literature on healthcare markets in general, how increased privatisation could affect the markets and finding its way to this paper's hypotheses – that Swedish healthcare privatisation should lead to higher staffing levels. It will also introduce three research questions, relating to how privatisation affects other healthcare metrics. Thereafter, there is a chapter on the data and methods used in this paper, where key data is explained and presented as well as the models used in this paper are discussed. This third chapter also includes a discussion regarding the empirical shortcomings of this study as it relates to the data. This is followed by Chapter four in which the results are presented which in turn is followed by a chapter discussing the results. The discussion is split into three parts: (1) what the results say about this paper's hypotheses and research questions, (2) how the results relate to existing literature and (3) shortcoming of the study and implications for policy. Lastly, there will be a short conclusion, summarising this paper's most important contributions.

It is important to note early that when this paper refers to nurses it means tertiary-educated nurses [Swedish: sjuksköterskor], unless otherwise stated.

Chapter 2 – Literature review

This chapter will provide a background and a review of relevant literature. It will be divided into three sections. The first section will provide an overview of the Swedish healthcare system with a particular focus on the last few decades of privatisation. The second part discusses the literature on how staffing levels matters for healthcare results, establishing that staffing levels are of importance for healthcare quality. The third section starts by discussing literature on healthcare markets in general, moving on to how increased privatisation could affect the markets and finding its way to this paper's hypotheses – that Swedish healthcare privatisation should lead to higher staffing levels. It will also introduce three research questions, asking how privatisation affects salaries, healthcare expenditure and productivity.

2.1 Swedish healthcare marketisation – Background and research of effects

Swedish regional healthcare expenditure can be divided into four categories: somatic care, primary care, psychiatric care and 'other care' [Swedish: övrig vård]. Each of these sectors have over the past decades faced different policies as it relates to marketisation and overall structure (Anell, 2016; Andersson et.al., 2014) and thus also face varying levels of privatisation. In terms of the discussion of these categories, the focus will primarily be on somatic care and primary care. These are the largest branches in terms of costs, with an average of 57 percent and 17 percent of regional healthcare budgets being spent on somatic care and primary care in 2018 across all regions respectively. Further, it is in terms of primary care that privatisation has gone the furthest, with an average of 29 percent of regional primary care costs going to private actors in 2018 across all 20 included regions – the other categories average 3,5 percent to 5 percent in 2018. In terms of somatic care it is worth a lengthier discussion as it makes up such a large portion of total costs. Therefore, this section will include two longer sections on the organisation and brief history of primary care and somatic care, and shorter paragraphs on psychiatric care and other care.

Starting with primary care, it is the form of healthcare at the centre of the privatisation debate (e.g. Häger Glenngård, 2015; Ellegård & Häger Glenngård, 2018; Stockholms Läns Landsting, 2017). As mentioned, primary care stands for roughly one fifth of the total healthcare costs and the average degree of privatisation across the regions is almost 29 percent, making it the, by far, most privatised branch of Swedish regional healthcare.

Primary care is "the first line of care" along with somatic care (Myndigheten för vårdanalys, 2018a: p. 5). It should generally be a patient's first contact with the healthcare sector in non-emergency situations. It is envisioned as a more accessible and local form of healthcare, compared to the large-scale hospital-centred somatic care (Socialstyrelsen, 2020). It is Sweden's most visited healthcare sector, with roughly two-thirds of all Swedes visiting a primary care facility each year (Myndigheten för vårdanalys, 2017).

In Sweden, certain policy steps have been taken in the past 30 years which have seen the share of private actors increase dramatically (Häger Glenngård, 2015). Perhaps the most significant reform was the 2010 'Freedom of Choice Act' [Swedish: Lagen om valfrihet, LOV]. This law mandated all of Sweden's regions to allow private actors in their primary care markets (Dahlgren, 2018). Proponents of the reform argued that increased marketisation would lead to more efficient, accessible and individualised care, as well as lower costs (Konkurrensverket, 2009; Häger Glenngård, 2015). Critics feared that it would lead to higher costs as firms would profit-maximise through unnecessary procedures and that it would lead to greater inequality among patients (Dahlgren, 2018; Myndigheten för vårdanalys, 2012).

In the immediate years following the reform, Sweden saw an increase in both the number of primary care units as well as patient visits (Andersson et.al., 2014; Häger Glenngård, 2015). In 2014, The Swedish Agency for Health and Care Services Analysis [Swedish: Myndigheten för vårdanalys] declared that "The goals of [the reforms] as it relates to freedom of choice and improved accessibility has been met for a majority of the population" (2014: p. 12). What the agency is alluding to, when stating "the majority of the population" is that most of the private resources went to urban areas leading some commentators to argue that the reform created greater social divisions between urban and rural parts of Sweden (e.g. Stiernstedt, 2018; Dahlgren, 2018).

In general, previous studies composed on the privatisation of primary care has primarily focused on costs and productivity. Whilst this paper has found no clear consensus on how marketisation has affected either, the general view is that increased primary care privatisation has not led to higher costs and that it is unclear whether it has increased productivity (e.g. Häger Glenngård, 2015; Stiernstedt, 2018; Dahlgren, 2018; Stockholms Läns Landsting, 2017).

One should note that previous studies on the efficiency and productivity of private primary care have seldom relied on econometric modelling, but rather on case studies involving one or a few regions, simple trend lines and comparisons between public and private facilities. A very small number of econometrics-oriented research has been published, which will be discussed in more depth at the end of this section.

In terms of funding, the dominant way to remunerate healthcare providers in the primary care market in Sweden is through so called capitation (SKR, 2020a). This means that healthcare providers raise revenue by enlisting more patients. The more patients that enlist at a facility, the more revenue is given to that facility. About two-thirds of the regions also have some kind of reimbursement based on activity, such as visit, contact or examination – so called fee-for-service, or FSS, systems (SKR, 2020b). Stockholm is a slight exception, where capitation makes up 40 percent of the remuneration whilst FSS makes up the additional 60 percent – in other regions the divide is generally about 80 percent capitation and 20 percent FSS (Glenngård, 2015).

In terms of specialised somatic care, it is Sweden's most costly type of care – standing for more than half of the regional healthcare costs across all regions. It can be defined as a type of care that "demands more specialised actions than what can be given by primary care" (Ekonomifakta, 2019). It is closely related to hospitalised care.

Compared to the primary care sector, somatic care faces considerably lower levels of privatisation, with an average of just under 4 percent. There is however quite a spread between the regions. In 2018, private somatic care stood for less than 1 percent of the total costs of somatic care in 4 regions, with Jämtland region being the lowest with 0,14 percent. 3 regions, Halland, Gävleborg and Stockholm had more than 8 percent private somatic care. Stockholm Region is once again unique, with a total of 21 percent of the region's total somatic care budget going to private actors in 2018.

Whereas the debate concerning private primary care focuses primarily on effects of increased primary care marketisation, the debate regarding private somatic care still centres on whether or not to privatise the sector at all. In 2014, Lindblad and Lindström warned against privatising somatic care, stating that "Economic research encourages privatisation and competition of simple services where it is easy to ascertain quality [eds. i.e. primary care], but

propagates greater caution under more complicated conditions [eds. i.e. somatic care]" (Andersson et.al., 2014: preface). SKL (2013) makes a similar claim, stating that privatised somatic care risks leading to the costlier somatic care handling things that the relatively cheaper primary care could handle. The report does however see private actors acting as a good complement to public care, when public care faces accessibility issues regarding long waiting times.

Private somatic care is funded based on performance, such as by procedure, based on either the reason for the visit or the action taken by the care giver. This is "a strong force for increased production, regardless of patient utility" (SKR, 2020c).

In terms of psychiatric care and other care, there have been little discussion as to the privatisation of these sectors. This is likely due to them both standing for a relatively small proportion of healthcare expenditure as well as not being very marketised. Thus, whilst it is certainly of interest to ascertain how privatisation affects these sectors, it is not quite as relevant in terms of costs or patient care.

In general, academic economic research on how privatisation has affected Swedish healthcare staffing levels is inexistent. However, there have been a few academic research papers in recent years on how increased privatisation has affected other healthcare metrics in Sweden. The findings of a couple of these will be discussed in the paragraphs ahead.

Dackehag and Ellegård (2019) gathered data on all visits to public health centres in the years 2008-2011 in the Swedish region of Skåne. Using a differences-in-differences model, the authors set out to see if public primary healthcare providers reacted to increased competition (competition measured as number of healthcare providers). The authors found modest, yet significant, effects. They found that as competition increased, the total number of diagnosis registrations increased as well. They underline the need to analyse a healthcare markets as a whole, rather than comparing private providers with public providers in the same market, stating that "effects of competition […] need not solely be due to responses among private providers" (p. 415). They also underline that the results, whilst significant, are still small in magnitude.

A second example is the study by Dietrichson et.al. (2020). Their approach is in many ways similar to that of Dackehag and Ellegård (2019), in that it relies on a differences-in-differences method and explores the effects of privatisation on a few key metrics in Swedish primary care. The authors find no consistent significant effects on avoidable hospitalisation rates or waiting times. They do however observe a small uptick in patients' impression of care quality.

2.2 Why staffing levels matter

In order to underpin the policy-relevance of this paper, it is important to establish why staffing levels matter. Therefore, this short section will provide an overview on what the projected need for physicians and nurses is, and what has been written on the importance of staffing levels in healthcare.

Firstly, it is the prevalent opinion in Western countries that the demand for physicians and nurses is going to increase in the upcoming years. In the United States, the need for physicians is expected to increase by 7 percent in the years 2018-2028, a growth characterised as "faster than average" (Bureau of Labor Statistics, 2020a). In terms of nurses, the growth in demand is expected to be almost twice as large in percentage points, with a projected growth of 12 percent in the same time-span, or "much faster than average" (Bureau of Labor Statistics, 2020b). The same trends of increasing demand have been written about in terms of the NHS in the UK (National Health Service, 2019; Buchan, 2019), as well as the OECD in general (OECD, 2016).

In terms of Sweden, the same projections are made (e.g. Myndigheten för vårdanalys, 2018a; SCB, 2017; Vårdförbundet 2015, UKÄ, 2019). Whilst shortages of nurses are often the primary objective of discussion, the increased demand extends to physicians as well (Myndigheten för vårdanalys, 2018b).

Thus, policies that aim to increase staffing levels are necessary. Policies that have an adverse effect on staffing should be avoided. However, staffing levels matter not only in the long-term. The rest of this section will be devoted to highlighting a few studies that have discussed the effects of staffing levels on health results.

Aiken et.al. composed a study in 2014. The authors analysed if nurse-to-patient ratios and nurses' educational attainment affected hospital mortality rates after common surgical procedures. Using surveys of over 26 000 nurses in 300 hospitals in nine European countries (including Sweden) in 2009-2010 and regressing the data from these on hospital mortality rates, they found that both educational attainment and nurse-to-staff ratios decreased hospital mortality rates. In the case of the United States and Canada, a 2007 meta-analysis provides similar results (Clarke & Donaldson, 2007). Here, the authors analyse the findings across 94 studies between 1990 and 2006 asking, among other things, how nurse-to-patient ratios affects patient outcomes. They find consistent evidence of increases in university educated nurses were associated with reductions in hospital-related mortality as well as reducing the length of the stay for the patient.

In terms of physicians there are seemingly fewer studies composed on the subject, however certain studies have pointed to similar effects of staffing on patient outcomes in terms of physicians (Hurst & Williams, 2012). The shortage of physician analysis could perhaps be attributed to the comparative lack of subsequent policy implications available to policy makers, due to the length of time it takes to educate a physician. This is, however, entirely speculative.

To conclude, staffing levels are seemingly important for the quality of healthcare, as well as being important from a long-term perspective as discussed in the first part of this section. Thus, it is relevant to see how the Swedish trend towards privatisation is affecting healthcare staffing levels.

2.3 Theoretical framework

This section is going to present the theoretical framework used in this paper, starting off in the basic shortcomings of the healthcare market and finishing in how increased privatisation ought to be expected to affect healthcare staffing levels from a theoretical point of view.

According to economic theory, a well-functioning, 'perfect' market model is based on seven assumptions (Olsen, 2017):
1. Full information, where buyers can ascertain quality and necessity of goods,
2. Impersonal transaction, where there is no relationship between buyers and sellers,

3. Private goods, where the consumption of a good only affects the buyer,
4. Selfish motivation, where buyers get selfish satisfaction and sellers selfish profits,
5. Multiple actors on both the demand and supply side,
6. Free entry for sellers to start operating in the market place, and
7. Homogenous products, where buyers cannot distinguish between sellers' goods.

From just a quick reflection upon the above points it is clear that the healthcare market inherently suffers from multiple market failures. This section is going to be discussing the most relevant ones.

Firstly, there is the issue of asymmetric information (relating to point one above), known to be one of the prime issues in terms of the healthcare market (Culyer, 2005; Andersson et.al., 2014). Asymmetric information "exists when one party possesses more information than the other, and when this information is of a kind that is considered important to the latter." (Olsen, 2017: p. 53). In terms of healthcare, the most discussed information discrepancy is that between the healthcare professional and the patient. Certain scholars (e.g. McPake et.al., 2020; Olsen, 2017) point to this not necessarily being an issue. Discussing so called 'perfect agency', they state that in an ideal situation healthcare professionals will always act in the best interest of their patient as well as the society they live in. This would mean that information asymmetry would not matter, as the benevolence of the healthcare provider would ensure the best action for all stakeholders. The authors are however quick to point out that this situation is not particularly realistic. In 'reality', there is a real risk of healthcare professionals acting in their own best interest at the expense of the patient's best interest (Nguyen, 2011). One example of this market imperfection is supplied-induced demand (henceforth SID), in which physicians (or other healthcare professionals) recommend care that the perfect agent would not recommend (McPake, 2020), thus driving up demand for their services.

Secondly, there is the issue of externalities, relating to point 3 and 4 above. Externalities can be defined as a situation when an actor's consumption decisions directly affect the utility of other actors (Varian, 2014). One example is choosing to get a vaccine or getting treatment for a virus, which is not only beneficiary for the consumer getting the treatment but also good for other citizens who now run less of a risk of being infected. Another example is how being in general bad health is usually detrimental for the economy of a community, as unhealthy

people are less productive (Zweifel et.al., 1997; Olsen, 2017). Healthcare consumption is therefore not exclusionary beneficial to the consumer, but rather a shared good.

In terms of the other points put forward by Olsen (2017), there are a number of ways in which the healthcare market is deemed unsuitable for a perfect market model – these will however not be discussed more deeply in this paper.

This unsuitability leads scholars to conclude that the healthcare market needs to be regulated to function the best or most efficient. As stated by Culyer (1971), "observations of market 'imperfection' is not sufficient to infer inefficiency even by comparison with the hypothetical ideal" (p. 208), meaning that despite a free-market model being the ideal it does not mean that other systems are more inefficient in practise. The healthcare markets in the Western world, including Sweden, are characterised by large degrees of regulation and systems of public funding of healthcare (Andersson et.al., 2014).

In the case of a public-controlled monopoly, where the public sector is in full control of both funding and production, the issues discussed above can be avoided. If healthcare professionals are reimbursed for their labour through set salaries, the SID issue will likely be avoided as there is no personal incentive for the healthcare professional to increase demand for their service. In terms of externalities, the consumer will not have to take (direct) costs into account when deciding whether or not to get treatment – meaning that it is easier to maintain a healthy population. However, the consumer no longer has to take price into account, thus creating a risk of overconsumption of care when the consumer will "purchase all visits which for him had a marginal value greater than €0" (McPake et.al., 2020: p. 58). As Sheaf et.al. (2002) point out, the demand is not the same as the need (i.e. 'rational demand') for consumers in health situations. In a fully public-controlled system this can however be counteracted by healthcare professionals having both their patients' and their community's best interest in mind simultaneously, being "the agent of both the state and the individual patient" (McPake et.al., 2020: p. 50).

The prime issue with this publicly governed system is however the one that it shares with other monopolies – the high risk of inefficiencies in the absence of competition – demonstrated through inefficient use of technology and other production inputs (Andersson et.al., 2014; Jehle & Reny, 2011).

Here, the rationale for allowing publicly-funded but privately run healthcare comes in. By allowing competition, production becomes more efficient and cheaper than under monopolistic conditions (Konkurrensverket, 2009). In a system where the costs still fall on the public, actors have to compete on quality rather than pricing (Gaynor & Town, 2011), leading to better care for the same or lower price.

The issue with SID could potentially re-emerge, depending on the way the financing is structured. As mentioned at the start of this chapter, in the Swedish case most of the primary care and by extension all care remuneration occurs through capitation, meaning that the healthcare facilities get paid per person registered with them. A smaller portion is, in about two-thirds of all regions, funded through FFS-systems.

In general, the capitation system does not encourage SID as opposed to FFS-systems of payment, rather it can have an adverse effect on individual firm productivity as costlier procedures are referred to other specialists (Andersson et.al., 2014). Theoretically, it mainly encourages quality competition between firms, as firms will want to increase their revenue by attracting more customers (Olsen, 2017). Here a so-called *moral hazard* might occur. The financier, i.e. the region, will struggle to watchdog the provider of healthcare as efficiently, since the region has given up some of its control of the healthcare sector to a private provider. The consumer wants the best care possible, and does not have to take costs into account. The provider now has an incentive to meet consumer demand in such a way that the consumer feels like it has gotten the most out of their healthcare – a consumer that does not have the expertise to fully appreciate the quality or quantity of the care it is receiving. Here is where the relation to staffing levels come in.

There is information asymmetry in the market, meaning that the consumer faces difficulties asserting what is necessary and unnecessary care. Rather, the consumer can be seen as acting on *perceived* quality of care. Previous studies in Sweden have found certain points of information of interest here: 1) Few consumers experience what is referred to as 'unnecessary tests' (Myndigheten för vårdanalys, 2016) and 2) the number of physicians in a clinic is one of the most important factors for patients when choosing a primary care provider (Konkurrensverket, 2014). This leads one to believe that firstly, patients want to consume

healthcare at least at the rate that they currently are during visits and secondly, that they judge quality of care based on some metric of staffing levels.

Since firms are competing for the consumer, they will want to attract consumers by meeting the consumer demand. As the stated objective of privatised healthcare is to increase production and efficiency (Myndigheten för vårdanalys, 2018; Häger Glenngård, 2015; Myndigheten för vårdanalys, 2018), it is likely that there is room for the firms to grow and expand production to increase profits (as would be the firms' objective according to Olsen (2017)). Thus, competing firms will meet the consumer demand by meeting their requirements for good healthcare, i.e. by increasing production through more tests etc., as well as increasing staffing levels as this is a metric that consumers judge the providers on. Since regions have given up some of their inspection abilities by not controlling the healthcare themselves, as well as seeing a need for higher staffing levels, they will not intervene.

Admittedly scarce, there have already been studies composed on the effects of privatisation and competition on productivity (Dackehag & Ellegård, 2019; Dietrichson et.al., 2020), however no studies have thus far looked into how privatisation affects staffing levels.

This paper infers that according to the theory on privatisation effects on a mixed healthcare system like Sweden's, based largely on a capitation funding structure:

> H_1: An increase in privatisation will lead to higher levels of staffing of nurses and physicians.

Further, as physicians seem to be of relative more importance than other healthcare professionals, this paper further infers that:

> H_2: An increase in privatisation will lead to stronger increasing levels on physicians than levels of nurses.

However, it is worth noting that the effects are expected to be moderately small. This is due to there not being too many places for healthcare professionals to go, apart from healthcare (SCB, 2017). Nonetheless, in a system like Sweden's, firms can attract professionals from

other regions as well as from abroad – so some effect can definitely be recorded. Nevertheless, healthcare employment levels in the short- to medium term are rather sticky.

Whilst there have been some studies composed on the subject of productivity, as well as discussions regarding salaries and costs, it is still of interest to continue this analysis – especially in the context of staffing levels and their effects on productivity and expenditure.

Therefore, using the same models specified in an upcoming chapter, this paper will also provide answers the following three research questions:

> *RQ*: Does general healthcare privatisation have an effect on
> 1) overall healthcare expenditure?
> 2) healthcare professionals' salaries?
> 3) healthcare productivity, in the form of number of care moments and number of visits?

Chapter 3 – Data & Methodology

This chapter is divided into three sections. The first is concerned with where and how the data used in this paper has been gathered and generated. The second section will be a descriptive statistics section, in which key descriptive statistics are presented and discussed. The third will be a methods section, in which the econometric methods used in this paper are presented.

3.1 Data collection and discussion

The first necessary step is to gain a variable for staffing levels. Statistics Sweden [Swedish: Statistiska centralbyrån, henceforth: SCB] provide employment metrics across a range of occupations on a regional level. This paper gathered the data on so called "day-population" [Swedish: dagbefolkning], meaning the people who work in each region into two variables; nurses and physicians. As the data is divided into various nurse and physician specialisations, the data was aggregated into one physician category and one nurse category. It would undeniably be interesting to analyse the data split into the various occupational categories. However, the SCB changed their occupational categories in 2014 and whilst the change has had no observable effect on the aggregate numbers of nurses and physicians it has changed how the specialisations are recorded. Therefore an aggregate number has been compiled, consisting of all nurses and physicians. Used with a population metric also gathered from SCB, the variable used has been number of nurses and physicians per 10 000 citizens in each region.

It is very important to note that the variable is staff employed *in* the regions, not *by* the regions, meaning that both privately and publicly employed staff are included in this variable.

Secondly, a measure for privatisation levels is necessary. This paper has used data from Kolada, a database with municipal and regional data run by the Swedish government and Sweden's Municipalities and Regions [Swedish: Sveriges Kommuner och Regioner, SKR]. Kolada has data on the net expenditure on healthcare (excluding dentistry but including drug prices) as well as on somatic care, primary care, psychiatric care and other care individually (excluding drug prices), and on how much money the individual regions pay to non-public actors (companies and not-for-profits; excluding drug prices). Using these individual

variables, a variable of the proportions spent on private healthcare is created, both in each of the four sections as well as on the total. The variable is per capita.

It should be noted that the measurement used is not in regard to how many separate actors that are active in the market. Whilst analyses of these kinds are of certain merit, they suffer from not being able to account the relative size of the varying actors in the market – an entry by a new actor is treated the same regardless of size and influence in the market. The measurement of privatisation in this paper instead focuses on the shift away from a monopoly or near-monopoly system – an increase in privatisation level undeniably represents a shift from a one-dominant-actor market.

Thirdly, a considerable amount of the nurses included in this analysis will be employed by the municipalities rather than the regions. As the premise of this paper is that privatisation affects staffing levels, it is necessary to control for municipal privatisation level changes when analysing nurse staffing levels. Thus, an average municipal privatisation level has been calculated for each region. This has been generated by taking the total amount of money spent on municipal healthcare across all municipalities in each region and the amount spent on private providers in each region. This is then used as a controlling factor in the regressions involving nurse employment levels in the regions, so as to not catch effects of municipal privatisation. As municipalities employ zero or very close to zero physicians, it has not been used when analysing physicians staffing levels.

Other variables have been gathered from Kolada or SCB. Data on healthcare productivity has been taken from Kolada and data on employment, population etc. has been gathered from SCB. The sole exception is the wage data, which has been gathered from Vårdförbundets lönesök, the salary database of the Swedish union for tertiary-educated nurses. Prices have been converted into 2018 value using Statistics Sweden's price calculator [Swedish: Prisomräknaren].

Data has been gathered on 20 out of Sweden's 21 regions. The Gotland region, due to its unique organisation of healthcare in terms of combined municipal and regional healthcare, has been excluded. The time period is 2011 to 2018. The reason for this time span is twofold. Firstly, the policy changes in 2010 makes the years around this year an apt starting point for analysis. Since then privatisation has increased, especially in the primary care sector.

Secondly, the salary and municipal privatisation data only stretches back to 2011, making it a reasonable starting point.

Admittedly, there are a number of shortcomings in terms of the data. The following paragraphs will carefully address these. The first has already been alluded to: That physicians and nurses are treated as aggregated variables, despite being very diverse occupations with various educational requirements depending on specialisation. Secondly, it does not account for the extent to which the employees are working. There are some suggestions (e.g. Almega, 2019) that there is some variation between part-time and full-time employment in public and private actors, with private firms having a higher proportion of part-time employed nurses. Should it turn out that nurses increase as privatisation increases, this is important to be wary about. Thirdly – albeit not a shortcoming as much as a comment – this paper's base analysis makes no difference between who employs the staff. This paper is primarily concerned with how privatisation can affect staffing levels per capita on a regional basis; it is not concerned with which form is comparatively better within a region.

In terms of the privatisation variable, this has the shortcoming that it is a rough aggregate to treat the privatisation of all four healthcare factors equally. The four types are structurally different and do not lend themselves particularly well to aggregate analysis. Ideally, the employment data should have also been divided along these four lines. This is however not the case, thus ruling out a more "sophisticated analysis".

Summarily, this paper will provide a rather rough analysis of how privatisation affects healthcare staffing levels. The analysis is however not without merit. Strong correlations would point to there being something inherent in healthcare privatisation that affects staffing levels – as elementary economic theory would suggest. No or insignificant results would also be interesting – as it would suggest that privatisation is not fundamentally more efficient in terms of increased staffing and would call into question some of the rationale behind healthcare marketisation.

3.2 Descriptive statistics

The first thing to establish is a relationship between staffing levels and privatisation levels at the most basic level. Figure 1-4 are scatterplots showing the variation of privatisation across

regions and their staffing levels, as well as figures displaying the development of privatisation over time.
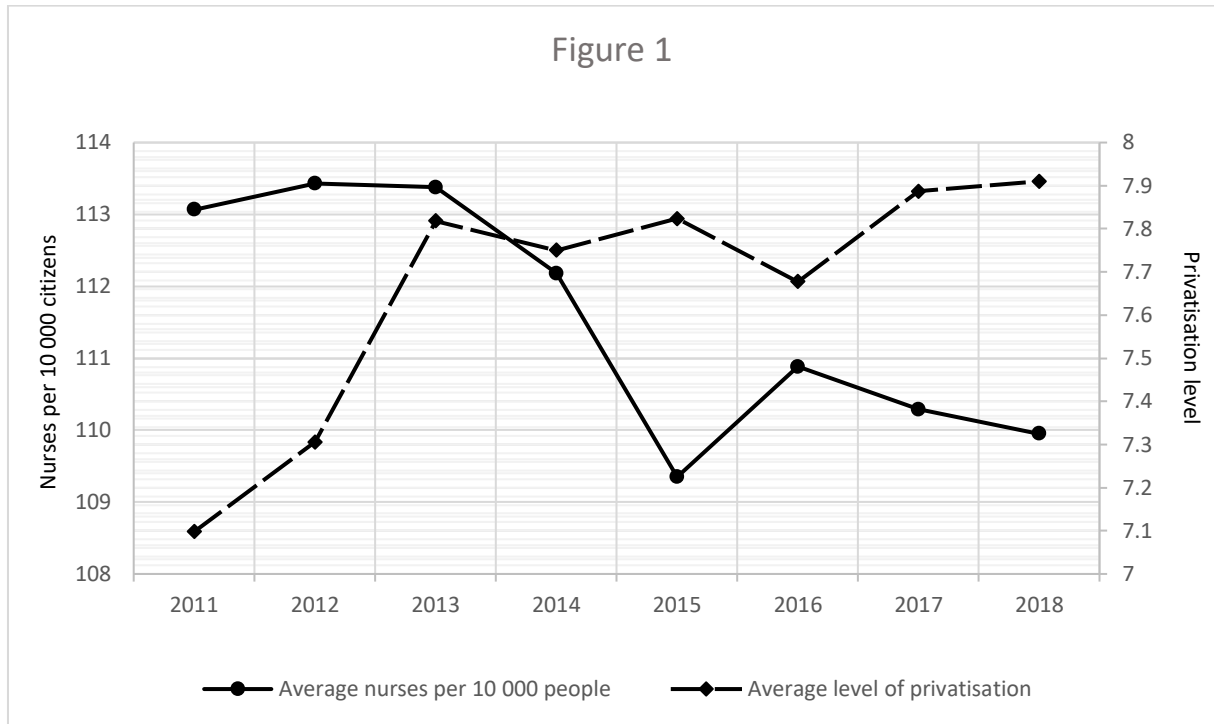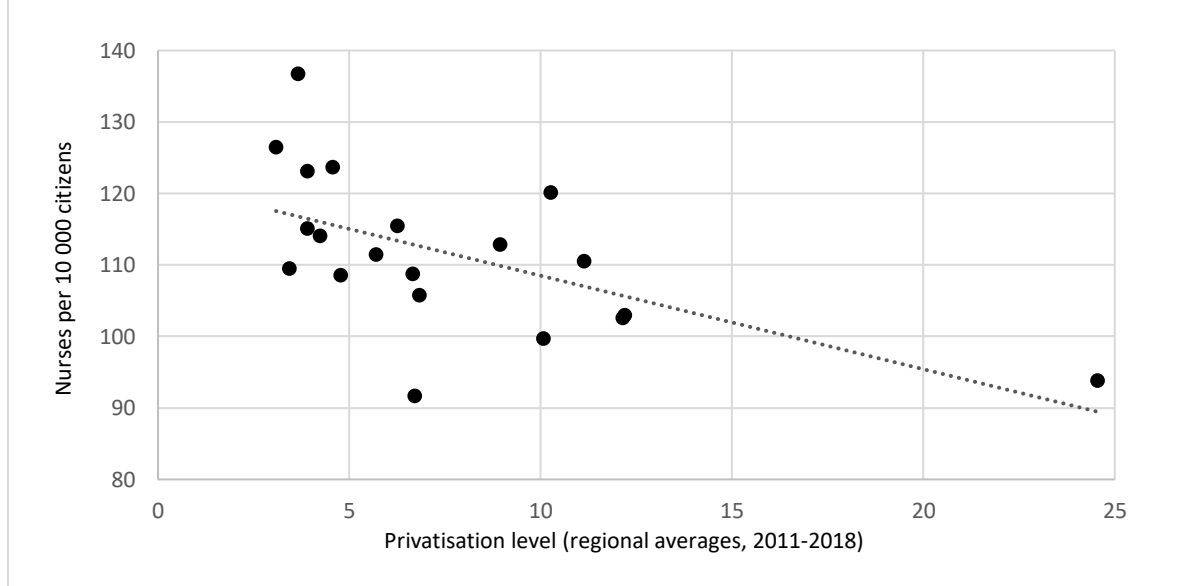

Figure 1

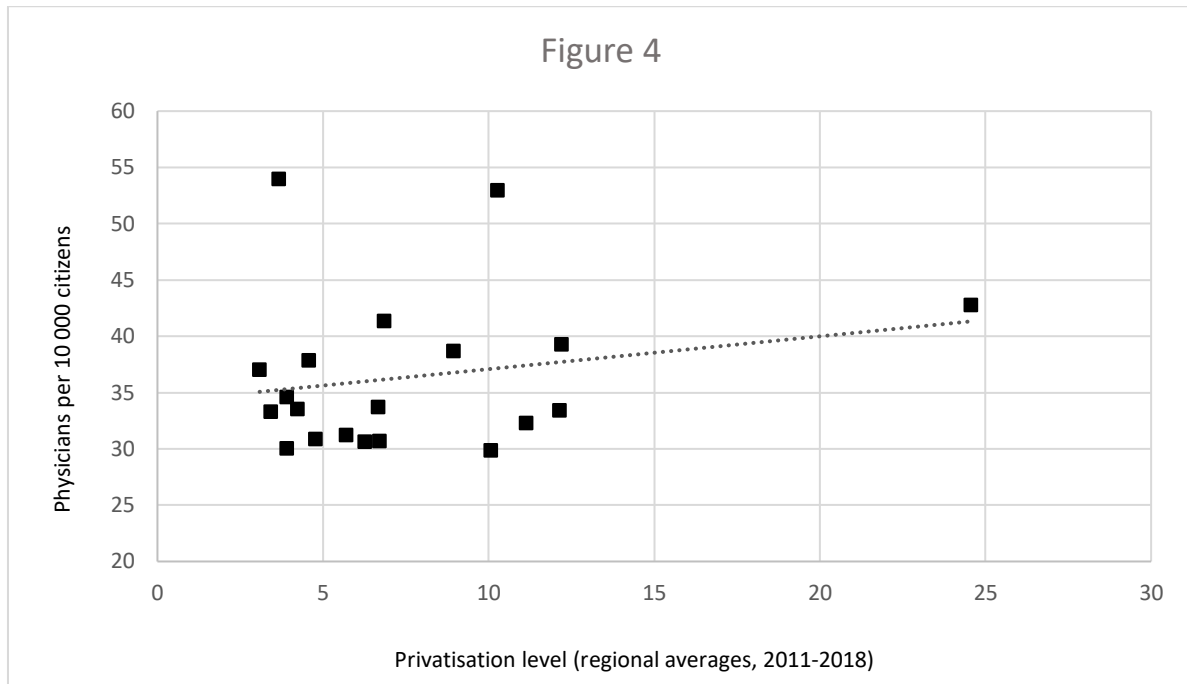| Coefficient	Standard Error	p-value
-3.62	1.72	0.0797

Figure 2
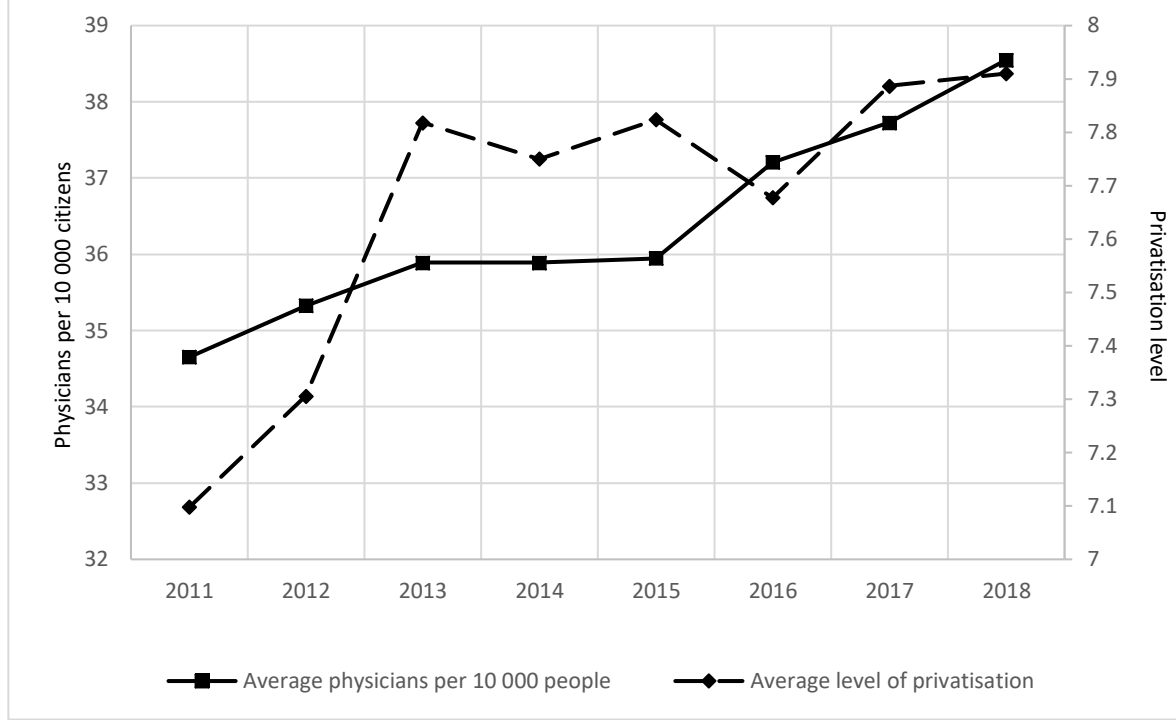
Coefficient	Standard Error	p-value
3.27	1.21	0.0349

Figure 3

Coefficient	Standard Error	p-value
-1.31	0.42	0.0059

Figure 4

Coefficient	Standard Error	p-value
0.29	0.32	0.378

Through a simple analysis there is some evidence of correlation between staffing levels and privatisation. In terms of nurses, the results are negative and significant both in terms of years and privatisation. In terms of physicians it is less clear, however there is a borderline significant result in terms of years.

These results warrant further analysis.

Noteworthy, these findings largely run counter to this paper's hypotheses. This paper has argued that according to economic theory, increased privatisation in the Swedish regions would lead to higher staffing levels. Going solely by the figures above, this is not the case. Nonetheless, according to this analysis, privatisation affects physicians more positively, or less negatively, than nurses.

This makes it more necessary to analyse the data with better models. Privatisation could still have a general positive effect on staffing levels, with other factors being responsible for the insignificant-to-negative effects.

Moving on to the other metrics which will be investigated in this paper. In order to provide a background to this paper's research questions, some key metrics are discussed.

Figure 5: Healthcare Expenditure per Capita
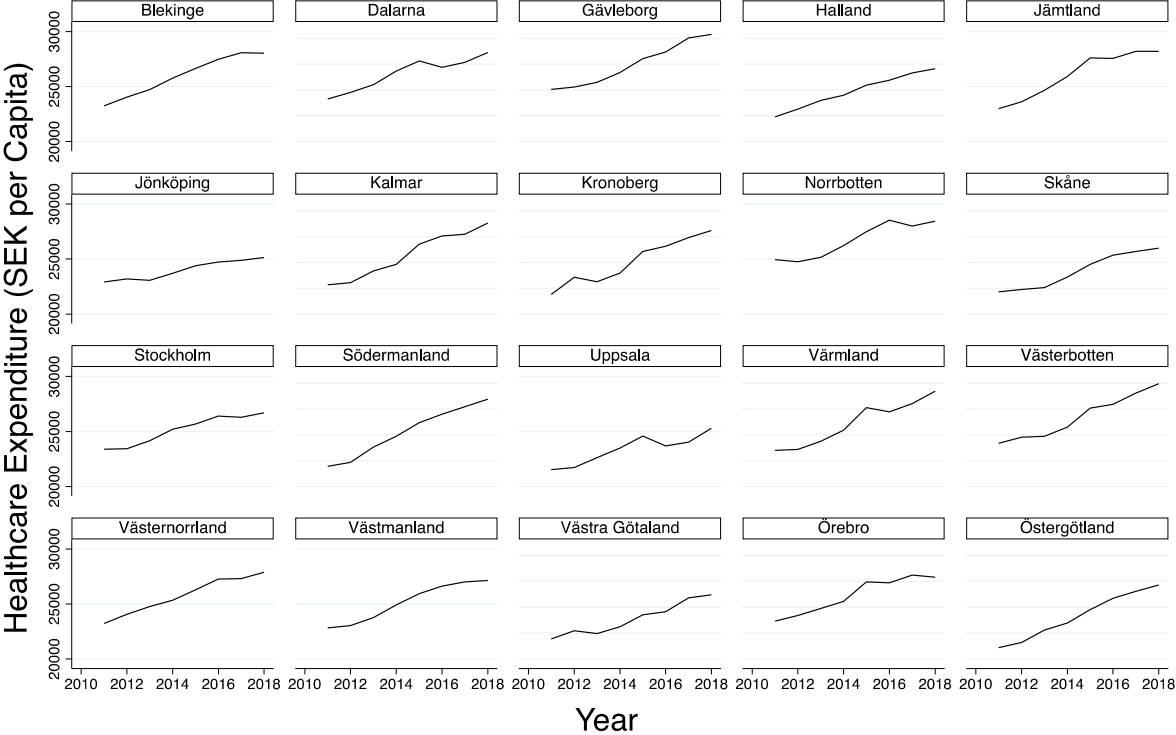
SEK weighted to 2018 prices

Firstly, it is evident from the data that all regions in Sweden have a general increase in their healthcare spending per capita over the years 2011-2018. Further, the levels of total privatisation vary considerably across regions as well as over time, as is evident by figures 6-25 (in the appendix).

In terms of salary (figure 26 in the appendix) there is also a clear time-component, with considerable increases over time and some variation across regions in terms of development and level.

Lastly, the graphs on the productivity measures used in this paper can also be found in the appendix. Here, there is interestingly what seems to be a general downward trend in terms of productivity. Therefore, it is even more interesting to see if the drop in productivity could be attributed to the increase in privatisation, or if privatisation can be seen as a way to curb productivity drops.

3.3 Method

As established previously in this chapter, there is some correlation between staffing levels and privatisation. However, a causal relationship has certainly not been established. In order to ascertain what effect privatisation has on staffing levels, more sophisticated econometric models are needed.

Whilst previous econometric-minded research has used D-I-D models (Dackehag & Ellegård, 2019; Dietrichson et.al., 2020), this paper will not follow suit. As all regions have seen some variations in their levels of privatisation, this paper will not use a treated v. not-treated method. Further, as mentioned, Swedish regions are quite diverse with fairly different geographical and demographical compositions. Thus, choosing one or a few regions to analyse might give answers as it pertains *to these regions*, however, there might be issues in regard to applying the results to other regions within Sweden. Therefore it is interesting to include more than just a handful of regions in the study.

As has been shown, there seems to be a time-dependent trend in the data, with costs, staffing and salaries etc. increasing over time. Thus it is necessary to control for time fixed-effects. Additionally, due to the regions' diversity regarding varying levels of population, sizes, as well as some differences in terms of healthcare organisation, it will be necessary to also control for regional fixed effects. Further, as has been discussed, previous literature has often used quite rudimentary analysis. In order to show whether it is of use to the research to use more 'sophisticated' models, it is important to ascertain whether the results change when we control for the above effects.

Therefore, this paper will present its results through five different models. Model 1 will be a simple pooled OLS with staffing levels as the dependent variable and total degree of privatisation as the independent variable (and in the case of nurses, the municipal privatisation level as a controlling variable). Model 2 will be the same as Model 1, with the exception that it includes a time-fixed effects variable.

This paper then proceeds to control for region fixed effects within-estimator, with Model 3 taking the following form:

$$y_{i,t} - \overline{y_i} = \beta_1(p_{i,t} - \overline{p_i}) + \beta_2(x_{i,t} - \overline{x_i}) + (\varepsilon_{i,t} - \overline{\varepsilon_i})$$

where y is the natural logarithm of the nurses or physicians per 10 000 people variables, i is the individual regions and t is the year. x represents possible additional controlling variables. Model 3 is Model 1, but with a control for region-fixed effects.

Model 4 adds a control for time-fixed effects onto Model 3 so as to control for time-fixed effects. Model 5 adds a region-specific linear time-trend onto Model 4. This last control is used to find if time-dependent, region-specific linear trends significantly alter the results.

Additionally, this paper will use clustered standard errors in all models, clustered around regions. Whilst the number of regions certainly can be considered too few to yield entirely unbiased results, the standard errors should still be deemed reliable due to the strongly balanced dataset. In cases of balanced datasets, 20 clusters can be considered sufficient to return reliable results (Cameron & Miller, 2015).

In terms of controlling variables, these will be applied in four steps (in the main analysis). First, this paper will display the results from regressions without any controlling variables – barring the municipal privatisation level variable for the nurses. Secondly, the same regressions will be run with three demographically related controlling variables. In a study from 2018, Stiernstedt pointed to age, socioeconomics and geography as three factors that contribute to health consumption (Stiernstedt, 2018), in extension affecting the need for staff independently of privatisation. It is therefore reasonable to attempt to control for these factors. Thus this paper controls for share of population over the age of 65, share of population over the age of fifteen with a tertiary education, and population density (as a proxy for urban/rural divide). Thirdly, this paper adds a control for overall per capita healthcare expenditure. It is reasonable to assume that overall per capita expenditure on healthcare also has some relation to overall staffing levels, not least because healthcare as an industry is labour-intensive (Lee et.al., 2020). Fourthly, the third set of regressions are run again, but excluding Stockholm Region. As mentioned, the Stockholm Region has a slightly different remuneration structure than the other regions as well as a significantly more privatised somatic care market. Whilst Stockholm is not different enough to warrant an exclusion from the analysis, it is important to ensure that this is not a determining factor in terms of the results and/or the significance.

Whilst the scope of analysis broadens beyond testing only for staffing levels as the analysis progresses, the models will remain the same, only replacing the dependent variable to the variable of interest. In terms of these metrics, similar controls are included but adapted for relevance to the dependent variable at hand.

The rationale for using a fixed effects model as opposed to a random effects model is due to the qualities of the dataset. As stated by Verbeek, the fixed effects model is most appropriate if "the individuals in the sample are 'one of a kind', and cannot be viewed as a random draw from some underlying population. This interpretation is probably most appropriate when i denotes countries, (large) companies or industries, and predictions we want to make are for a particular country, company or industry" (Verbeek, 2017: p. 394). As this definition clearly fits the case of regions within Sweden, the fixed effects model has been chosen in favour of the random effects model.

Chapter 4 – Results

This chapter will be divided into two separate sections. The first section will present the results relating to this paper's main analysis – i.e. the results relating directly to staffing issues in regional healthcare. The second section will continue by presenting the results from the extended analysis composed in this paper, namely those relating to cost and productivity.

First, a quick reminder of the models:

 (1) Pooled OLS.
 (2) Pooled OLS with time-fixed effects.
 (3) (Region-)Fixed effects (within).
 (4) (Region-)Fixed effects (within) with time-fixed effects.
 (5) (Region-)Fixed effects (within) with time-fixed effects and region-specific linear time-trend variable.

All models use clustered standard error, clustered around regions. The models regarding nurse employment *in* (as opposed to *by*) the regions control for municipal privatisation level.

4.1 Main analysis

Table 1. Privatisation Effects on Staffing Levels

		Models				
		(1)	(2)	(3)	(4)	(5)
Independent variable: Total Level of Privatisation						
Dep. Variable:						
Staffing level	*Nurses*	-.0120***	-.0119***	-.00839**	-.00365	.00056
(log)		(.0023)	(.0024)	(.0037)	(.0031)	(.0020)
	Physicians	.00803	.00776	.00800	-.00851	-.00160
		(.0052)	(.0054)	(.0088)	(.0075)	(.0043)
Controls:						
A	*Nurses*	-.0156**	-.0160*	-.000805	-.00102	.000508
		(.0074)	(.0077)	(.0022)	(.0023)	(.0017)
	Physicians	-.0123	-.0170	-.00400	-.00532	-.00136
		(.010)	(.0156)	(.0069)	(.0050)	(.0045)
B	*Nurses*	-.0160**	-.0144**	-.00144	-.000329	.000811
		(.0068)	(.0053)	(.0022)	(.0021)	(.0017)
	Physicians	.0138	.0158	.00031	-.0049	-.00137
		(.0089)	(.0099)	(.0059)	(.0051)	(.0047)

C	*Nurses*	-.0147*	-.0143**	-.00162	-.00172	.000611
		(.0071)	(0055)	(.0026)	(.0022)	(.0018)
	Physicians	-.0138	-.00975	.00104	-.00520	-.00115
		(.0086)	(.0098)	(.0053)	(.0052)	(.0046)

* significant at 10% level   ** significant at 5% level   *** significant at 1% level

A: Controlling for demographics (share with tertiary education, share over 65 years, population density);
B: Controlling for demographics + expenditure per capita;
C: Controlling for demographics + expenditure per capita, Stockholm Region excluded
Note: Nurses regressions control for municipal privatisation levels

In the first set of regressions, the results from the early models (models 1-3) suggest that whilst aggregate privatisation has no significant effect on physician staffing levels, it does have an adverse effect on nurse staffing levels. The yielded results are significant-to-highly-significant. As the control for both region-fixed effects and time-fixed effects is imposed in model 4 and model 5 the significance disappears, even beyond the borderline significance level. In the second and third set of regressions, where demographic controls and expenditure controls are added, the significance decreases yet remains acceptable through model 1-2 in terms of nurses. The suggestion is still that privatisation has an adverse effect on nurse staffing levels. However, the significance now disappears already when the control for region-fixed effects is added, not to return in model 4-5.

In the case of physicians, the results are continuously insignificant. In terms of the coefficients, they paint a more mixed picture than in terms of nurses, sometimes yielding negative and sometimes yielding positive returns. It might however be worth noting that as we move towards the more 'sophisticated' models, the results tend to turn more negative.

In terms of the first hypothesis, there is very little that suggests that privatisation has a positive effect on staffing levels. Rather, the suggestions thus far points in the opposite direction – with privatisation in some cases seemingly having a significant adverse relationship with staffing levels in terms of nurses. Regarding the second hypothesis, there is some suggestion that whilst the results are undeniably cloudy due to insignificance, there is something to the point that privatisation has a less negative effect on physicians than on nurses – since the results that are significant point to negative correlation for nurses and no significant effect for physicians.

In general, the overarching result in terms of the first table is that privatisation does not have a significant effect on staffing levels, for neither nurses nor physicians. It is somewhat notable that the 'unsophisticated' models do yield significant results, which only disappear once proper controls are added. A lengthier discussion on the implications of this will naturally be included in the next chapter (Chapter 5 – Discussion).

Due to these results, another key metric which could be interesting to look at would be how regional healthcare privatisation affects staffing levels among the people employed directly by the regions. There is data available for nurses employed by the regions directly[1]. The result from this regression is presented below.

Table 2. Privatisation Effects on Staffing Levels (Regionally Employed)

		Models				
		(1)	(2)	(3)	(4)	(5)
Independent variable: Total Level of Privatisation						
Dep. Variable:						
Regional staffing level	*Nurses*	-.0394***	-.0393***	-.0244***	-.0133*	-.00609
		(.0057)	(.0059)	(.0068)	(.0065)	(.0058)
Controls:						
A	*Nurses*	-.0155**	-.0257***	-.00874	-.0103	-.00674
		(.0074)	(.0085)	(.0059)	(.0063)	(.0054)
B	*Nurses*	-.0257***	-.0249***	-.0095	-.00898	-.00563
		(.0082)	(.0077)	(.0058)	(.0066)	(.0047)
C	*Nurses*	-.0265***	-.0257***	-.00962	-.00971	-.00556
		(.0086)	(.0069)	(.0059)	(.0067)	(.0048)
* significant at 10% level		** significant at 5% level		*** significant at 1% level		

A: Controlling for demographics (share with tertiary education, share over 65 years, population density);
B: Controlling for demographics + expenditure per capita;
C: Controlling for demographics + expenditure per capita, Stockholm Region excluded;

Here, a very similar result as before is emerging. In the first set of regressions, model 1-3 yield highly significant results, with privatisation having an adverse effect on regional staffing levels. The results are slightly more pervasive than in table 1, with model 4 yielding a borderline-significant negative effect. However, with the imposition of the region-specific linear time-trend variable, the significance disappears.

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[1] Unfortunately, there is no data available on privately employed, region-specific, employees.

However, as controls for regional demographical differences are added, and in subsequent controls, the significance disappears earlier. In controlling regression set A-C the pooled OLS-models all yield significant results in the case of nurses, yet fail to do so as soon as a control for region-fixed effects is added. It is somewhat notable that the coefficients, albeit the results being insignificant, are consistently negative – leading to a very cautious suggestion that privatisation has an adverse effect on regionally-employed staff. This is however entirely reasonable, as offloading operations onto other actors ought to have an adverse effect on one's own staffing levels.

Moving on, the final results in this section to be presented are those for nurses' salaries. Notable is that it is only results for nurses employed directly by the regions.

Table 3. Privatisation Effects on Salaries

		Models				
		(1)	(2)	(3)	(4)	(5)
Independent variable: Total Level of Privatisation						
Dep. Variable:						
Salary (log)	*Nurses,*	.00261***	.00205**	.0291**	-.000763	-.000138
	regional	(.0006)	(.0007)	(.0105)	(.0016)	(.0018)
Controls:						
A	*Nurses,*	.00188	-.00175*	-.00166	-.000514	-.000370
	regional	(.0029)	(.0085)	(.0051)	(.0017)	(.0020)
B	*Nurses,*	.000863	-.00177*	.00381	-.0000312	-.000122
	regional	(.0031)	(.0009)	(.0029)	(.0019)	(.0021)
C	*Nurses,*	-.000310	-.00173**	.00395	.000185	.0000253
	regional	(.0030)	(.0008)	(.0025)	(.0023)	(.0022)

* significant at 10% level ** significant at 5% level *** significant at 1% level

A: Controlling for demographics (share with tertiary education, share over 65 years, population density);
B: Controlling for demographics + expenditure per capita;
C: Controlling for demographics + expenditure per capita, Stockholm Region excluded;

Table 3, much like table 2, shows significant results both through the control for time-fixed effects as well as the control for region-fixed effects. The results suggest that privatisation has a positive effect on salaries for regionally employed nurses. However, when controlling for both time trends and fixed effects the results are insignificant and the coefficients inverse; persistent with the results from Model 5. Here, however, the significance disappears in "both directions", with insignificant results as demographics controls are added into model 1. Model 2 still yield some significant results.

4.2 Extended analysis

Now, moving on to other healthcare metrics. The first results are for total expenditure.

Table 4. Privatisation Effects on Total Healthcare Expenditure

	(1)	(2)	(3)	(4)	(5)
			Models		
Independent variable: Total Level of Privatisation					
Dep. Variable:					
Total regional healthcare expenditure per capita (log)	-.00160	-.00215	-.0225**	-.00722***	-.00334
	(.0021)	(.0023)	(.0102)	(.0025)	(.0025)
Controls:					
A	.00136	-.00143	-.00712	-.00644**	-.00304
	(.0032)	(.0032)	(.0051)	(.0025)	(.0024)
B	.00200	-.000460	-.00580	-.00698**	-.00295
	(.0024)	(.0025)	(.0045)	(.0024)	(.0025)
* significant at 10% level	** significant at 5% level		*** significant at 1% level		

A: Controlling for demographics (share with tertiary education, share over 65 years, population density);
B: Controlling for demographics, Stockholm Region excluded;

Here, the results are different. For the pooled OLS-models the results are insignificant. However, a significant relationship is found between privatisation level and total healthcare expenditure when controlling for region-fixed effects, and a strongly significant relationship is found when controlling for both region-fixed effects and time-fixed effects. The significance is lowered yet remains within an acceptable margin as controls for demographical differences is added. Only in the last model, when a control for a region-specific linear time-trend is added, the significance disappears. Still, the potential negative relationship between privatisation and costs is interesting and worth further investigation.

Table 5. Privatisation Effects on Expenditure per Healthcare Sector

	(1)	(2)	(3)	(4)	(5)
			Models		
Independent variable: Primary care privatisation level					
Dep. Variable:					
Primary care expenditure per capita (log)	-.00120	-.00171	.00360	-.00900***	-.00235
	(.0014)	(.0015)	(.0030)	(.0031)	(.0038)
Controls:					
A	-.000637	-.00169	-.00798*	-.00960***	-.00234

	(.0016)	(.0017)	(.0046)	(.0030)	(.0032)
B	-.00106	-.00103	-.00622	-.00890**	-.00264
	(.0016)	(.0017)	(.0038)	(.0036)	(.0037)
C	-.00123	-.00117	-.00623	-.00903**	-.00244
	(.0019)	(.0020)	(.0038)	(.0033)	(.0037)

Independent variable: Somatic care privatisation level

Dep. Variable:					
Somatic care expenditure per capita (log)	-.00403**	-.00423**	.00400	-.00175	-.000656
	(.0020)	(.0019)	(.0165)	(.0037)	(.0034)
Controls:					
A	-.00216	-.00238	-.00722	-.000703	-.000927
	(.0033)	(.0031)	(.0057)	(.0032)	(.0040)
B	-.00320**	-.00304*	-.0000581	-.000463	-.0000218
	(.0014)	(.0016)	(.0028)	(.0027)	(.0021)
C	-.00188	-.00241	.000368	.000370	-.0000441
	(.0011)	(.0014)	(.0027)	(.0027)	(.0021)

* significant at 10% level   ** significant at 5% level   *** significant at 1% level

A: Controlling for demographics (share with tertiary education, share over 65 years, population density);
B: Controlling for demographics + (total regional healthcare) expenditure per capita;
C: Controlling for demographics + (total regional healthcare) expenditure per capita, Stockholm Region excluded;

Next we see the models tried on per capita spending on primary care and somatic care, with privatisation level of primary care and privatisation level of somatic as independent variables. In terms of somatic care no significant results are observed beyond the initial pooled OLS models – which is not overly surprising as the privatisation levels in this sector is relatively low. In terms of primary care, a highly significant result from the fixed effects model controlling for both region- and time-fixed effects is observed. Here it also suggests that privatisation lowers costs. Once again, once the control for region-specific linear time trends is added, the significance vanishes. These results are pervasive as we control for demographic differences, total regional expenditure on healthcare per capita and through the exclusions of Stockholm Region.

Lastly, this paper is going to display how the model fares in the analysis of productivity variables. Recall how this is a contested issue, with very few studies using econometric techniques have been composed previously. The dependent variables will be the healthcare sector which the dependent productivity variable concerns, i.e. if the productivity concerns

primary care, primary care privatisation level is used as a dependent variable rather than the aggregate privatisation level.

Table 6. Privatisation Effects on Healthcare Productivity Metrics					
	Models				
	(1)	(2)	(3)	(4)	(5)
Independent variable: Primary care privatisation level					
Dep. Variables:					
Primary care visits, non-physician (log)	.00412	.00448	-.00637	.000344	.00423
	(.0029)	(.0030)	(.0057)	(.0057)	(.0035)
Controls:					
A	-.00120	-.000595	-.00270	-.00144	.00318
	(.0028)	(.0031)	(.0054)	(.0047)	(.0035)
B	-.000882	.000274	.00123	.00734*	.00481
	(.0028)	(.0032)	(.0051)	(.0041)	(.0031)
C	-.00131	-.000359	.00118	.00831**	.00493
	(.0031)	(.0035)	(.0049)	(.0037)	(.0032)
Primary care visits, physician (log)	.00567**	.00609**	-.00734**	.000814	-.00110
	(.0025)	(.0026)	(.0035)	(.0025)	(.0013)
Controls:					
A	.00255	.00384	.00124	.00104	-.00131
	(.0028)	(.0032)	(.0013)	(.0018)	(.0012)
B	.00274	.00474*	.00276	.000790	-.00146
	(.0027)	(.0027)	(.0014)	(.0015)	(.0010)
C	.00319	.00461	-.0000277	.00162	-.00125
	(.0029)	(.0028)	(.0014)	(.0016)	(.0011)
Independent variable: Somatic care privatisation level					
Dep. Variable:					
Somatic, care moments (log)	-.00659**	-.00657**	-.00347	-.00256	-.00504
	(.0066)	(.0036)	(.0081)	(.0038)	(.0038)
Controls:					
A	-.00549	-.00549	.00418	-.00360	-.00557
	(.0038)	(.0042)	(.0033)	(.0042)	(.0041)
B	-.00707	-.00534	.00288	-.00358	-.00557
	(.0045)	(.0041)	(.0031)	(.0038)	(.0040)
C	-.0104**	-.00803*	.000232	-.00413	-.00564
	(.0048)	(.0041)	(.0030)	(.0035)	(.0040)
* significant at 10% level	** significant at 5% level		*** significant at 1% level		

A: Controlling for demographics (share with tertiary education, share over 65 years, population density);
B: Controlling for demographics + expenditure in individual sector;
C: Controlling for demographics + expenditure in individual sector, Stockholm Region excluded;

In terms of productivity, a similar pattern as previous regressions emerges. Generally the first set of pooled OLS regressions generate significant results, however, as we increase the model's sophistication the results quickly become insignificant. In Model 4, there is a significant result however, suggesting that primary care privatisation has a positive effect on number of non-physician visits. The effect is however gone in Model 5. This concludes this chapter.

Chapter 5 – Discussion

This chapter is split into three parts: (1) what the results say about this paper's hypotheses and research questions, (2) how the results relate to existing literature and (3) shortcoming of the study and implications for policy. Lastly, there will be a short conclusion, summarising this paper's most important contributions.

5.1 Hypotheses and Research Questions

The results from this essay must be considered to be fairly decisive. As far as the scope of the research that this essay has expanded, there is little evidence that 'general' healthcare privatisation has any meaningful effect on healthcare staffing levels or results. Nonetheless, these general trends do come with certain caveats that ought to bear interest for future research.

This paper started by exploring what effects privatisation could have on staffing levels and hypothesised that the effect would be positive, due to firm profit maximisation and information asymmetry to the benefit of the healthcare professionals. The first general view of the data gave a mixed response, with a no effect for physicians and negative effect for nurses. Based on the results from this paper's analysis, H_1, hypothesising that staffing levels increase with privatisation, ought to be emphatically rejected. Very little evidence has emerged pointing to privatisation having a positive effect on staffing. However, also noteworthy, is that privatisation's negative effect on staffing levels is certainly not academically significant either. The evidence from the more sophisticated models point to there being a difference between regions, however that it cannot be explained by staffing levels.

In terms of H_2, that physicians staffing levels are more positively affected than nurses staffing levels, this hypothesis should also be rejected albeit with a caveat. From the rudimentary analysis there is some suggestion that privatisation has a negative effect on nurse staffing levels and a more mixed effect on physicians. Whilst these results are not significant in the later models the coefficients remain. Thus, H_2 should be rejected.

The results are also very persistent, maintaining roughly the same significance levels throughout the inclusion of the controlling variables.

Moving on to RQ_1, which asked what effects privatisation has on salaries. Whilst the results here remain significant through the fixed effects model, the answer to this question is still that privatisation has no effect on salaries in the region. Combining this with the results in terms of staffing is interesting. It could be argued that as we do not see any significant results in terms of staffing, increased marketisation could instead lead to higher wages as the bargaining power of the nurses increase through privatisation. This would be especially true for regionally employed nurses. However, little points to this being the case. When eye-balling the data there was a clear regional-specific and a clear time-component in the data, and when both are controlled for the results are insignificant.

In terms of the second research question, this is perhaps the one with the most compelling results in regards to significance. It asked how privatisation affects expenditure, and the results are significant when controlling for both time-trends and fixed effects, pointing to privatisation and competition leading to lower per capita healthcare costs. This is a result that prevails when analysing the primary care sector individually. Here, one could cautiously suggest that healthcare privatisation has a negative effect on per capita healthcare costs. Cautiously, because the results are insignificant when we control for regional-specific linear time trends.

This cautious suggestion is interesting. If healthcare privatisation does not lead to more or less staff, nor does it affect salaries (admittedly, only in terms of regionally employed nurses), how does competition then cut costs? This would actually suggest an intrinsic value in privatisation that leads to lower overall costs – a beneficiary outcomes for policy makers and other citizens unless quality of healthcare suffers.

This leads to the last research question – regarding privatisation effects on productivity. The results here are similar to those regarding staffing levels and salaries. There are effects in the early models that disappear once we add sufficient controls. The clear suggestion here is that privatisation has no discernible effect on healthcare productivity.

It should also be mentioned that in general, the exclusions of Stockholm Region had little-to-no effects in terms of significance and results.

5.2 Relation to existing literature and implication for future research

Prior to getting into the shortcomings of this study, this section is going to discuss what implications the above results have in terms of research.

The first and most obvious point to make is that this paper highlights the need to use sophisticated models when analysing the effects of privatisation on healthcare. Had this paper relied solely on rudimentary analysis, such as the pooled OLS models or even the first fixed effects model used in this paper, the results would have been significant in a lot of cases. Only when certain controls were added, the significance of privatisation vanished from the analysis. Thus, it can be concluded that there is a need for more 'sophisticated' modelling in the literature regarding privatisation effects on healthcare in Sweden.

The effect of region-fixed effects on significance in terms of staffing levels is especially interesting and worth special attention. Prior to imposing a control for region-fixed effects, the results fell well within the significance threshold used in this paper, regardless of controls on demographics, time and expenditure. However, as region-fixed effects were controlled for, the significance vanished. This suggests that there is significant variation across the regions in terms of staffing levels. On the one hand it is not overly surprising, as the Swedish regions are diverse in their composition as it relates to demographics, geographical size and population – however the consistent pattern of the significance disappearing when controlling for region-fixed effects highlights the importance of using this control when analysing cross-regional data.

It further opens up questions regarding generalisability. As has been mentioned in this paper, a considerable amount of previous research compare one or a few number of regions in their analysis to see what effects marketisation and privatisation has (e.g. Myndigheten för vårdanalys, 2013; Glenngård, 2015; Ellegård & Glenngård, 2018). Whilst they do provide answers relating to those regions, the findings of this paper calls for wariness as it relates to the applicability of the findings onto regions that are not included in these studies.

In terms of existing literature on productivity, this paper is largely in line with previous findings. Dietrichson et.al. (2020) did not find any significant effects in terms of productivity

in the form of hospitalisation and waiting times. Dackehag and Ellegård (2019) did observe some small effects on diagnosis registrations as it relates to competition, however, did not make any ground-breaking discoveries.

5.3 Issues and policy implications

There are certain inescapable issues with this analysis. The one that is most obvious is that it is a very rough estimate. Perhaps there are too many individual-specific effects in the regions as well as between various sectors of regional healthcare to allow for cross-regional and cross-sector analysis. Perhaps the timeframe is too short and this study should be followed up once more data has been gathered.

That being said, establishing causality would have been endlessly interesting, as it would have, in close to no uncertain terms, pointed to there being an intrinsic quality to privatisation that would be positive or negative to healthcare.

Thus, this study is not without merit. The study does establish that as far as can be observed at the moment, little suggests that there are any 'ground-breaking' effects of privatisation on healthcare. This is the first study of its kind, and this has therefore not been established before.

So, whilst this paper is comfortable in its findings, it does call for further research into the effects of privatisation on healthcare in the Swedish regions. Perhaps most notably in terms of the effects of costs, where this study did yield some fairly promising results. However, it also calls for the study regarding staffing levels to be followed up with more and better data. Notably, the nurse analysis did yield overwhelmingly negative, albeit often insignificant, results in terms of privatisation effect on nurses.

Perhaps the most important point of this chapter is one that mirrors most other research on the topic in Sweden: There is a need for more and better data. There are a number of ways in which this paper would have been significantly improved had it had access to more sophisticated data.

Rather than using 'day-population' it would have been preferable to use full-time equivalents as a metric for employment, both in public and in private healthcare providers. It would have been very interesting to see the employment split along the same lines as the costs, namely the fours healthcare sectors. It would also be academically productive to gather data on staffing in private healthcare funded by the regions. These examples are just a few in which research and in extension policy guidance would be significantly helped by more sophisticated variables. However, with an ideologically driven debate, there might not be an interest to gather more 'objective' data on the positive – or negative – effects of healthcare privatisation.

In regard to policy implications, the overall suggestion of this paper is that privatisation has no effect on healthcare – albeit with certain points that ought to be followed-up on and examined more deeply. This calls into question what drives privatisation. As stated in this paper, the Swedish debate is largely ideologically driven. These results weakly suggest that healthcare privatisation should be continued to be seen through an ideological lens. Free market-minded policy makers would likely see these results and ask that if there is no difference between who controls healthcare, why should the public sector govern it? Conversely, publicly-minded policy makers would likely see the results and ask why the regions should let go of their control of healthcare if it does not translate into any real positive effects.

Thus, this paper suggests that privatisation at its essence becomes a question regarding ideology. It ought to be mentioned that this is not a bad thing, as ideology still can play an important part in day-to-day civic life.

Conclusion

This paper set out to investigate what effects healthcare privatisation has had on staffing levels in Swedish regional healthcare, and expanding beyond this point onto other key healthcare metrics such as salaries, expenditure and productivity. By gathering public data on the regional net expenditure on healthcare and its share on private providers in the years 2011-2018, it sought to find if a higher proportion spent on private healthcare was associated with differences in staffing levels, as well as other metrics. Through theoretical reasoning, it hypothesised that privatisation ought to be associated with higher staffing levels and higher productivity – due to competitive nature in regard to attracting patient enlistment and information asymmetry where the consumers have a limited ability of assessing quality of care.

The analysis relied on econometric analysis, using five models of varying sophistication to get results. It started by using a simple pooled OLS model, and moved on to a pooled OLS with a time-fixed effects. Thereafter it used a region-fixed effects model, then a region-fixed effects model with a time-fixed effects and lastly a region-fixed effects models with time-fixed effects and a region-specific linear time trend. It used clustered standard errors, clustered on regions, throughout.

The general finding was that healthcare privatisation had no discernible effect on healthcare. The overall pattern was fairly clear. The pooled OLS models tended to yield significant – often highly significant – results, regardless of whether there was a control for time-trends. Once the model controlled for region-fixed effects, or during the addition of time-fixed effects the significance tended to disappear and was in all cases gone when controlling for region-specific linear time trends.

There were however some results that warrant further investigation. In terms of healthcare spending, there was a consistent negative relationship between expenditure and privatisation, both in terms of 'overall' expenditure and primary care expenditure. The results were significant when controlling for both region-fixed effects and time-fixed effects simultaneously, as well as through the addition of additional controls. Whilst the significance was beyond an acceptable level when controlling for region-specific linear time trends, these results are still worth following up on.

Additionally, once more and better data is available, it would be interesting to look further into the effects of privatisation on staffing levels again, not least in terms of nurses that show consistent negative, albeit often insignificant, results.

This paper has been open about its shortcomings. The regional healthcare market is a fairly complicated industry with components that do not lend themselves particularly well to this type of 'general' analysis. This paper therefore calls for better data to be made available, not least from private healthcare providers, in order to obtain better estimates for the effects of privatisation. The analysis herein should be seen as a fairly rough estimate and more provide a starting point for further research. It can be said that this paper investigates if there is something intrinsic in healthcare privatisation, regardless of where and how it is implemented, that affects healthcare quality or other metrics. A study of this kind is not without merit, as basic economic theory would suggest that marketisation and increased competition in of itself would increase productivity.

There are implications for future research. The most important is that this paper has highlighted the need for research to account for regional-fixed effects and large cross-regional analysis. When controlling for fixed effects, most significance disappeared, meaning that this is an important control to include when analysing healthcare effects. Further, it more generally calls for more econometrics studies to be made on the subject, as opposed to just fairly simplistic comparisons between a small number of regions or within regions. Further, due to the roughness of this study, there is still a need for further investigation in general once more data has been collected and a longer time frame can be analysed – the debate of the virtues and vices of privatisation is certainly not settled.

This paper also opens up to the implications for policy makers. If the findings herein are to be trusted, it divides the question of privatisation along ideological lines. If you believe that increased marketisation is inherently good, you will likely support it as it does not have any detrimental effects on healthcare. If you believe that healthcare marketisation should be treated with caution, you will likely not support it as it does not have any observable positive effects. Based on the findings of this paper, the issue will continue to be viewed through ideological lenses as is the case in Swedish political debate today.

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Appendices

APPENDIX A:

The dataset used in this paper is available upon request.

Appendix B

Figure 6
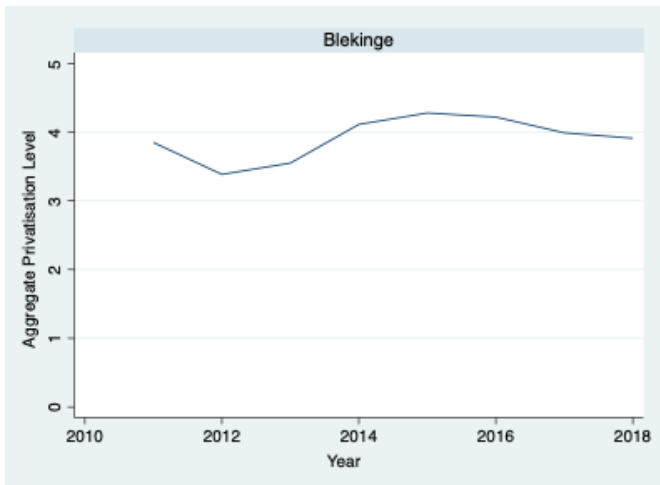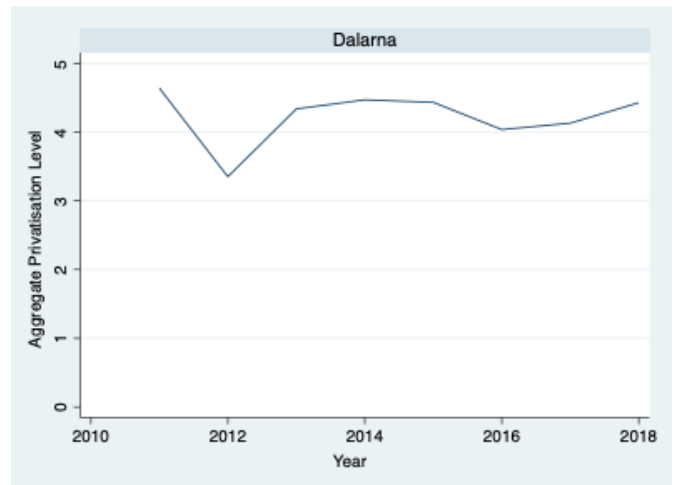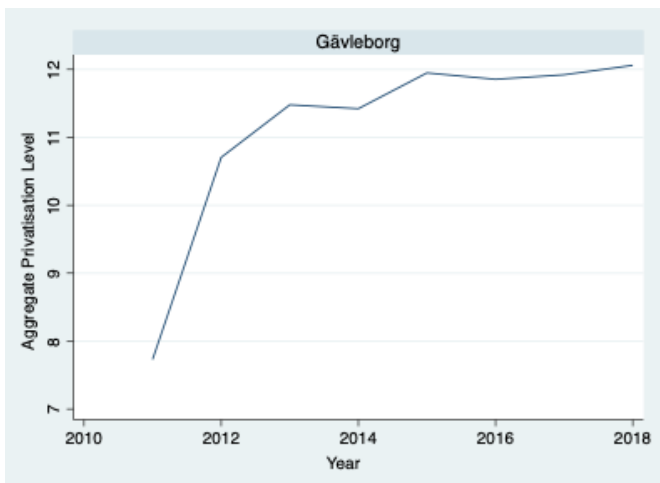
Blekinge

Figure 7

Dalarna

Figure 8

Gävleborg

Figure 9

Halland

Figure 10

Jämtland

Figure 11

Jönköping

Figure 12

Kalmar

Figure 13

Kronoberg

Figure 14

Norrbotten
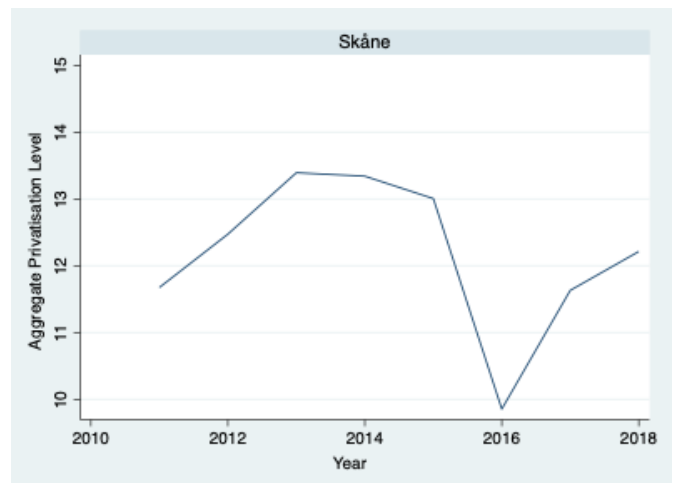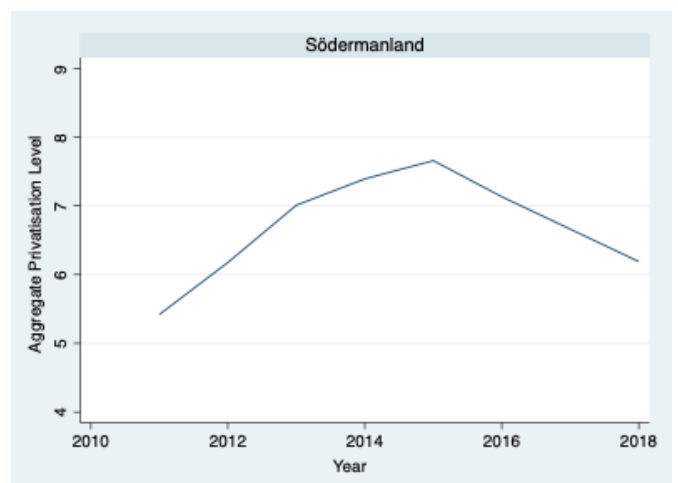
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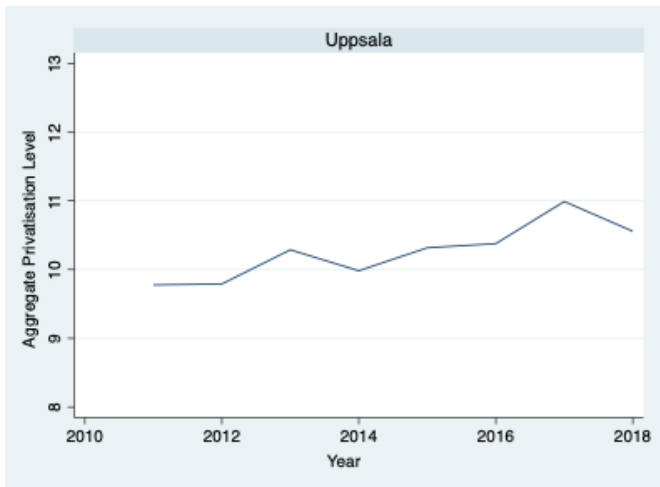

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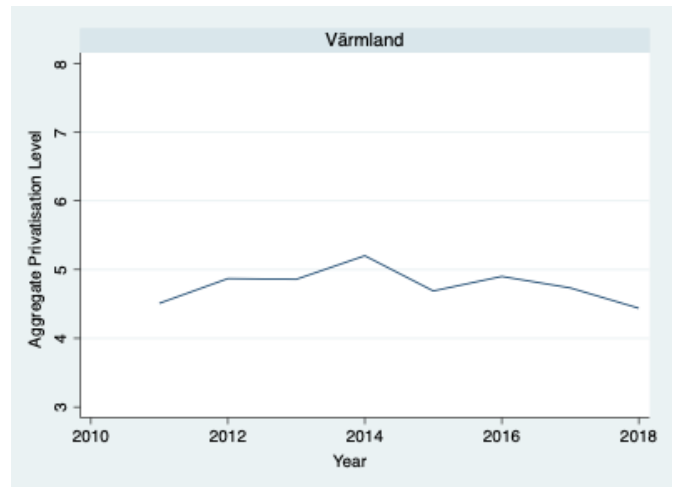Figure 16

Stockholm

Figure 17
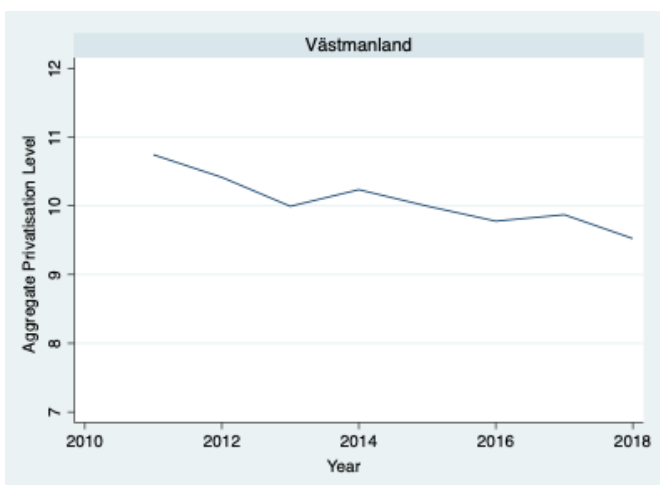

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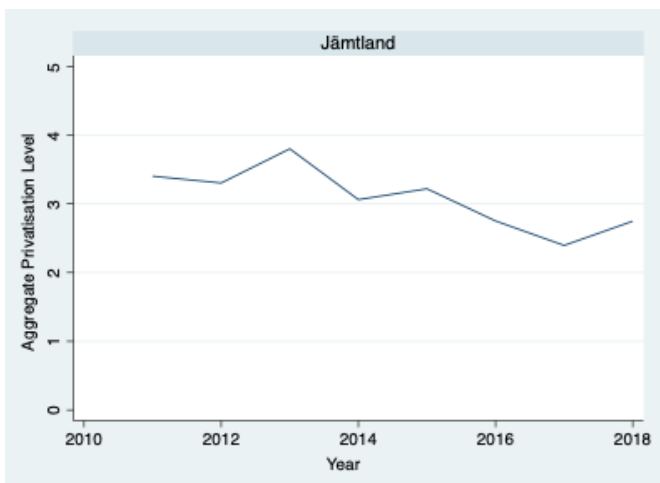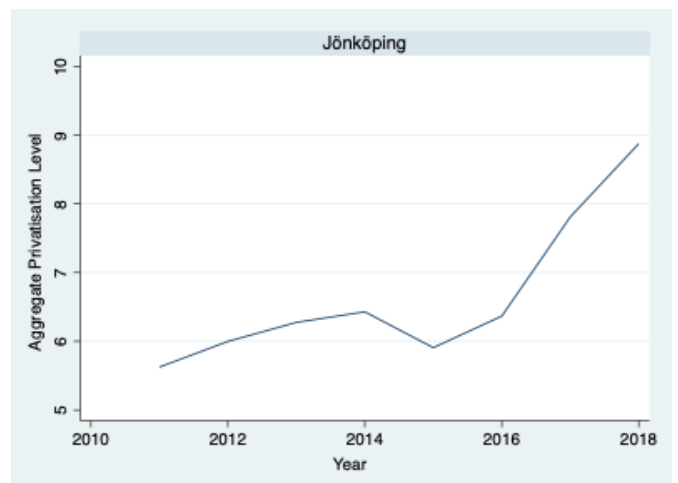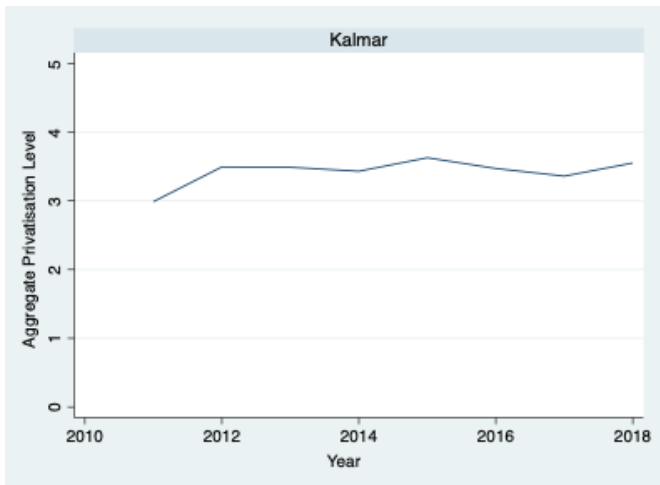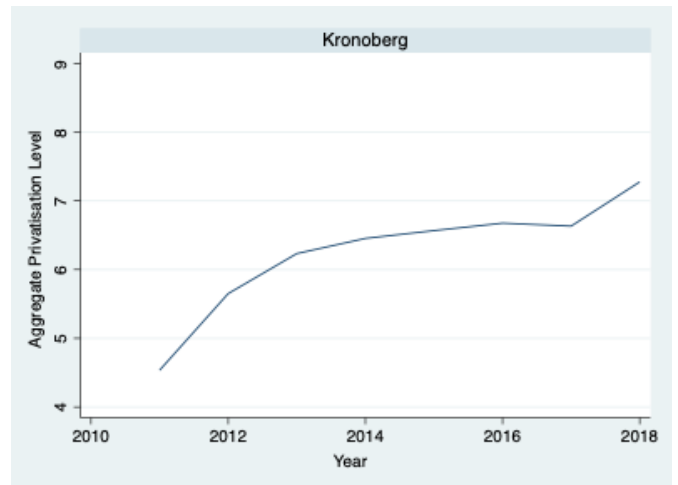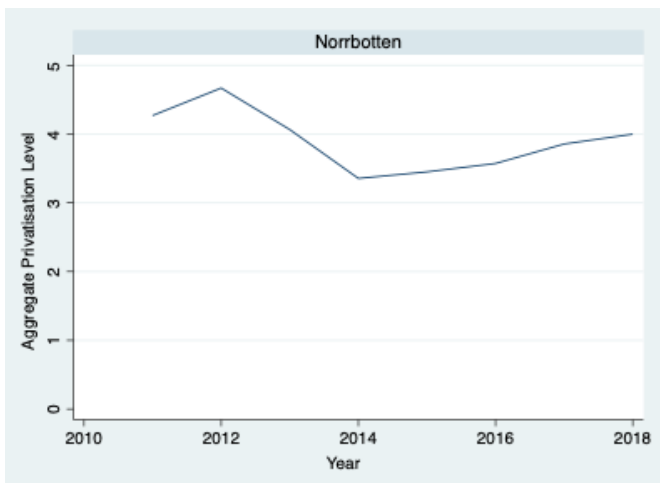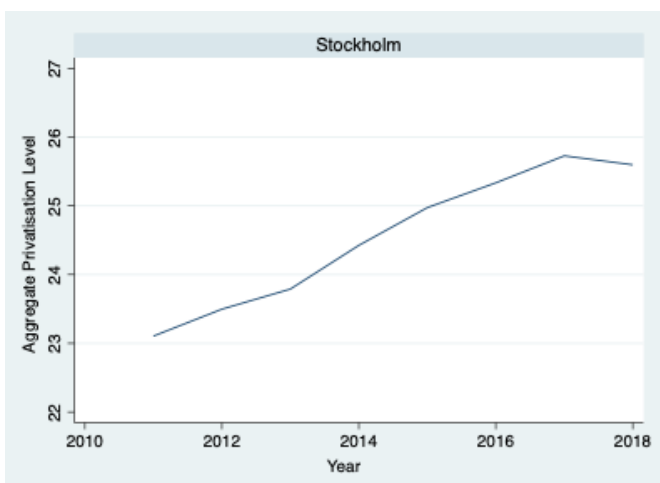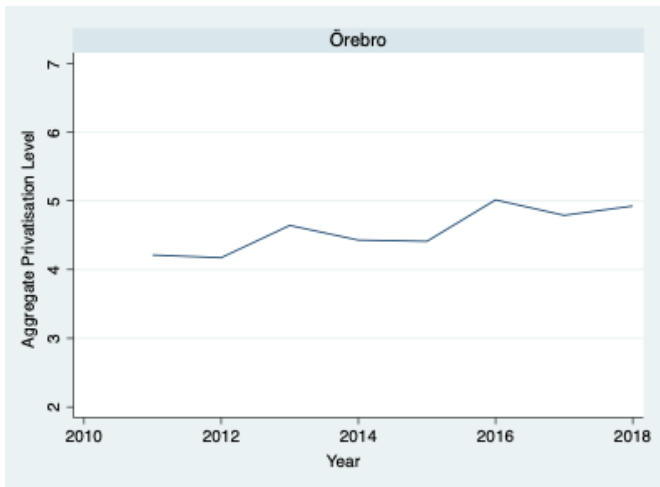
Figure 18

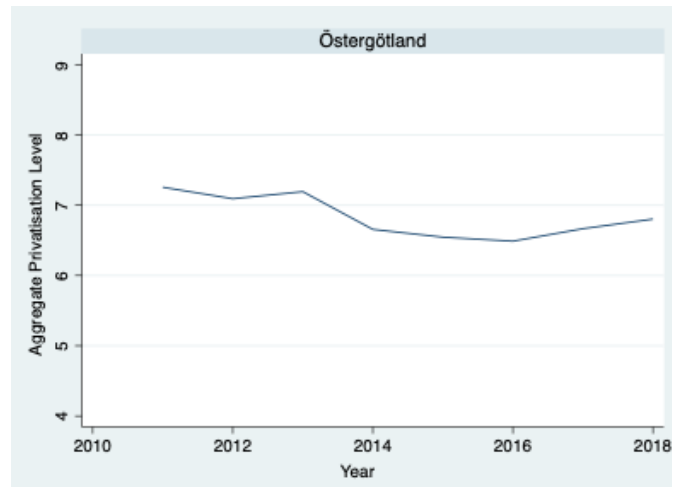Figure 19

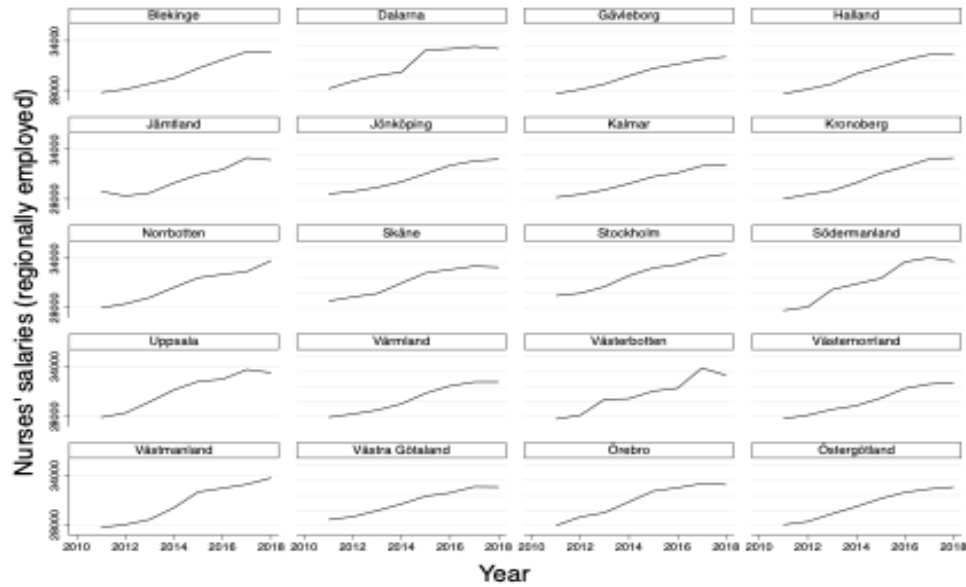

Figure 20
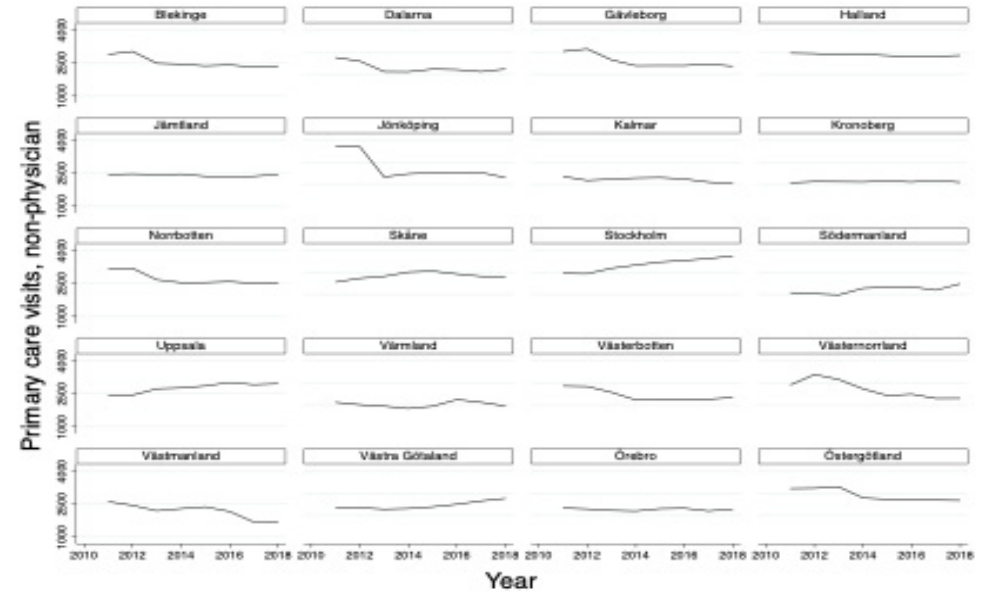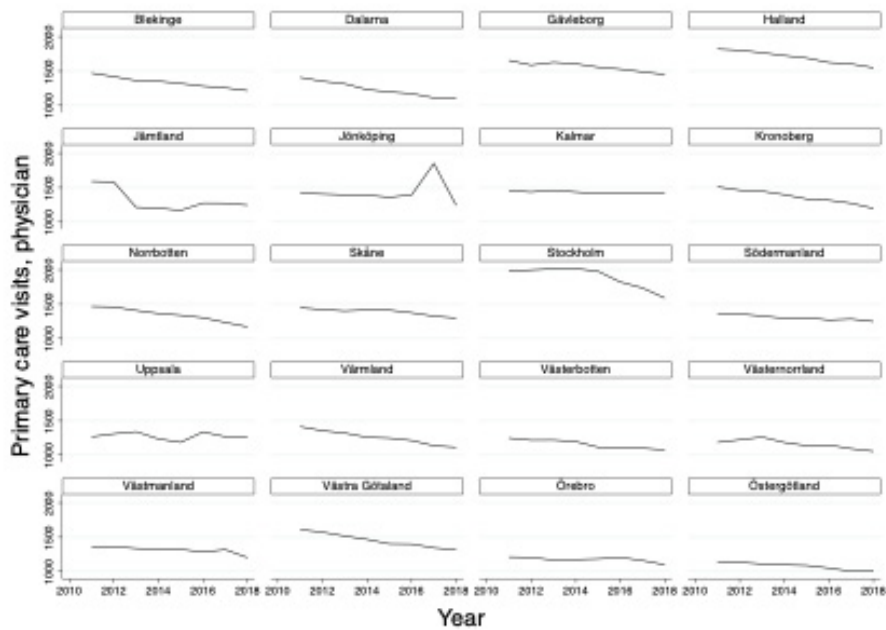
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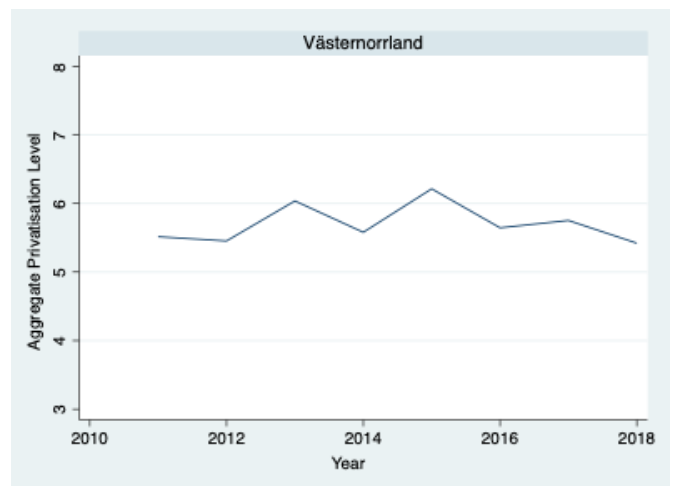
Figure 22

Figure 23

Figure 24

Figure 25

Figure 26

Nurses' salaries (regionally employed)

SEK weighted to 2018 prices

Figure 27

Primary care visits, non-physician

Figure 26

Primary care visits, physician

Figure 29

Somatic care moments

50