Short Term Health Effects of Outsourcing of Health Care in Finnish Municipalities

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Abstract for Master's thesis

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While most of Finnish public health care is produced publicly by either municipalities or joint municipal authorities, a tenth of the municipalities have outsourced their health care services to private providers. Previous empirical literature suggests that outsourcing of health care has led to cost savings in Finnish municipalities. However, the effects on health and quality of health care remain unresearched. Assuming that changes in quality of health care are reflected in population health, this thesis studies the effects that outsourcing of health care in Finnish municipalities has had on the population health in the treated municipalities by measuring mortality and morbidity of those municipalities' populations.

The effects of outsourcing to mortality and morbidity in the municipalities are studied using a difference-in-differences model with year and municipality-fixed effects. Nearest neighbor matching based on propensity score is used for each treated municipality to limit the municipalities in control group, using only the demographically comparable municipalities in estimating the treatment effect on mortality and morbidity in municipalities that have outsourced their health care services. The difference-in-differences model is also applied separately to each treated municipality and their nearest neighbor to capture the treated municipalities' individual treatment effects. The results suggest a negative treatment effect on mortality the first year after the initiation of outsourcing and a delayed treatment effect on mortality the second year after the initiation of outsourcing. Furthermore, the results suggest a slight negative treatment effect on morbidity the first year after the initiation of outsourcing. The results imply that outsourcing has led to an improved quality of health care in relatively small Finnish municipalities. The increase in quality may either result from the private providers' deliberate quality-increasing efforts due to quality incentives, or from other improvements in efficiency as a result of the responsibility of organizing health care transferring to the private providers.

Keywords: Health care, health, outsourcing, municipality, mortality, morbidity, difference-in-differences, nearest neighbor, matching

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1. Introduction

In most countries health care is organized jointly by both public and private health care providers. The exact setting varies across countries due to their respective differences in legislation, culture, and history. Some countries such as the United States rely mostly on private providers with minimal federal regulation (Rice et al., 2020) while others such as France are more reliant on public sector providers (Chevreul et al., 2015). Finland falls in the latter category with a publicly provided universal healthcare system for all inhabitants (Keskimäki et al., 2019). While publicly provided, most forms of health care in Finland are highly decentralized. Every municipality is responsible for organizing functions such as primary care and social care and may do it as they best see fit.

The organization of municipal health care in Finland varies greatly. Most municipalities organize health care publicly, running their own health centers and organizing most of their functions with public providers, sometimes contracting out singular services. Approximately 10 percent of the municipalities have however opted to outsource all the healthcare functions they are responsible for to private providers (Jokinen, 2018). The aim of this thesis is to study the effects these outsourcings have on the residents' health in the municipalities that have outsourced their health care. Health in this thesis is assumed to reflect quality of health care and is measured as mortality and morbidity on a municipal level.

Both costs and efficiency of private and public health care and the differences between the two forms of organization are widely researched both empirically and theoretically. While private providers are often seen to provide the same services for a lower price and with a higher efficiency, the research on differences in quality of care has yielded mixed results.

Quality of care can be defined in numerous ways and can roughly be categorized in two main groups. The first include objective measures of health outcomes such as

mortality, number of clinical errors and morbidity. The second category is subjective and often researched with surveys including different measures of patient experience or satisfaction regarding the provided service. Furthermore, effectivity of care is often measured using statistics on lengths of stay or volume of services provided.

The research on quality of care in outsourced health care is scarce and in a Finnish setting nonexistent. Many articles have studied differences in quality of care between private and public providers, but the research on how outsourcing public health care to private providers affects quality is limited to a few studies in Norway and Sweden with implications of an improved level of quality of health care as a result of outsourcing. In the Finnish context both the efficiency and costs of health care providers have been under inspection and are well studied, while research on quality of care is severely lacking. Research on the quality of public care outsourced to a private provider in Finland does not exist.

This thesis examines the objective health outcomes in municipalities that have outsourced their health care by comparing their mortality and morbidity levels with municipalities whose health care is publicly organized, thus filling the existing gap in research in terms of health effects of completely outsourcing of health care in Finnish municipalities. Naturally, not all Finnish municipalities are comparable with each other due to a significant variance in demographics and health care cost structure, which is why a matching strategy is employed as a method of identifying a suitable municipality to compare with each outsourced one after which the outcomes are compared with the help of a fixed-effect difference-in-differences model. The findings indicate a lower level of both mortality and morbidity in the outsourced municipalities.

This thesis consists of eight chapters, the first being the introduction. The second chapter provides context of health care in Finland, outsourcing in general and how it is done in Finland. In the third chapter, dedicated to theory, two models that both describe government outsourcing of public services and health care are presented. In the fourth chapter previous academic literature in the area is discussed, focusing especially on previous results on how private health care providers perform in terms of health outcomes compared with public providers. The fifth chapter formulates the hypothesis of the thesis based on theory and previous academic literature. The sixth chapter is dedicated to data and methodology, while in the following seventh chapter

the results of the analysis are presented. The final, eighth, chapter contains discussion and conclusions.

2. Context

This chapter presents context to the topic of this thesis. Firstly, section 2.1 presents the health care system in Finland, the actors in the health care market and the responsibilities of the public organizations in the Finnish health care system. Secondly, section 2.2 discusses the ongoing changes in public health care in Finland and the upcoming health and social care reform. Thirdly, section 2.3 presents outsourcing as a concept, reasoning behind outsourcing of health care and the extent to which health care in Finland is outsourced.

2.1   Health care in Finland

The health care system in Finland is highly decentralized. The Finnish health care system is based on government-subsidized municipal health care services (Välimäki et al., 2011) The core health system is thus organized by the municipalities. Health care for each municipality can be organized by the municipalities themselves, the responsibility can be transferred to another municipality or health care can be organized jointly with other municipalities. Municipalities are responsible for defining and monitoring service volume and quality, assessing the needs of the population, ensuring equal distribution of services, acting as public authority in decision-making and most importantly, deciding on the method of provision. Provision of services is most often delivered by the municipalities themselves, but it can be outsourced to other local authorities, a private provider, or another organization.

Groups of municipalities form federations, which form hospital districts. Hospital districts are financed and managed by municipalities, and they are responsible for both providing and organizing specialized health care for the member municipalities' citizens. There are a total of 20 hospital districts, each comprising 6 to 35 member municipalities. In some areas, the hospital districts have started to organize primary care on behalf of the member municipalities, either partly or entirely. Some hospital districts have absorbed all the social- and healthcare duties of the member

municipalities and thus transformed into joint regional health and social care authorities (Keskimäki et al., 2018). To provide tertiary care, hospital districts are further grouped into five areas which hold a university hospital. University hospitals are located in Helsinki, Tampere, Turku, Oulu and Kuopio.
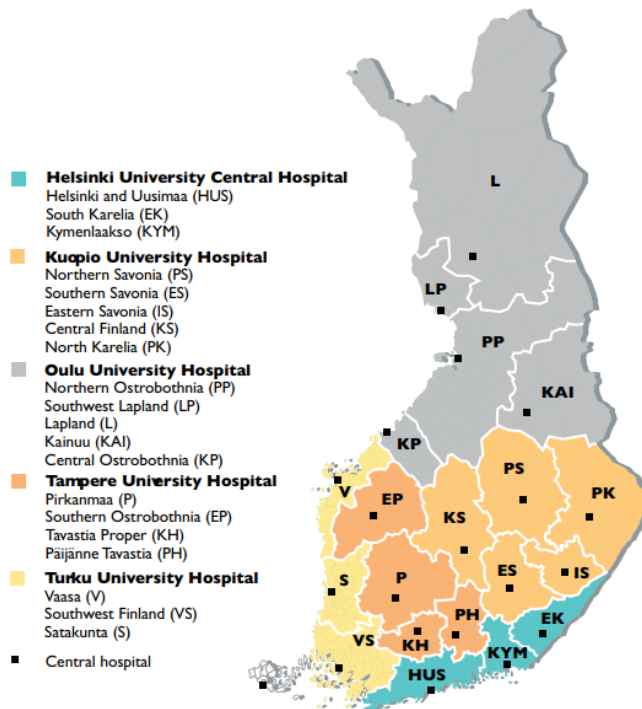
Note: University hospital districts, hospital districts and university hospitals in Finland. Adapted from Terveydenhuolto Suomessa. (2013). Sosiaali- ja terveysministeriön esitteitä 2 (2013). Sosiaali-ja terveysministeriö, Helsinki.

In addition to the public sector, health care is provided by private firms or other non-governmental organizations. Private health care providers operate parallel to the public sector and thus complement it. Private health care is mainly financed through out-of-pocket payments and voluntary health insurance (Keskimäki et al., 2019). Employers have an obligation to organize preventive occupational health services for their employees, which is why employers are responsible for a part of the health care system and for financing a substantial part of private health care. The private sector accounts for approximately five percent of hospital care activity (Keskimäki at al., 2019).

Differences between regions are present in terms of health, health care use and access to health care. While the aggregate volume of care has decreased in all regions between the years 1997 and 2013, the decline was the most moderate in some eastern and

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northern regions. The overall decline is mostly attributed to structural changes made between the years 2006 and 2012. The structural changes contributed to the merging of several municipalities and municipalities forming joint municipal authorities to organize primary care in a more efficient manner, and thus the responsibilities and resources allocated to primary care have increased while the importance of specialized health care has decreased in many areas. However, the differences between regions are mostly explained by demographic differences such as the population in Northeastern Finland being older than average (Mikkola et al., 2015). Despite this, the use of health care services was substantially higher in Eastern Finland than in other regions between the years 1997 and 2013. Regional differences are also present when looking at the availability of health care practices and workforce, such as doctors, nurses and psychiatrists (Hetemaa et al., 2021). The differences in availability of workforce can be attributed to the fact that the Finnish population is concentrated to the largest cities along the Finnish coast while the population in more secluded areas in Northeastern Finland is aging and decreasing.

2.2 Health and social services reform

Although the main responsibility of organizing health care falls to the municipalities at the time of writing this thesis in 2022, the Finnish healthcare system is currently undergoing major structural changes. Instead of the municipalities, larger autonomous regions called counties will be responsible for organizing health and social care from the beginning of the year 2023. The responsibility of organizing health and social care services will be divided to 21 separate counties and the capital City of Helsinki, i.e., to a total of 22 organizations instead of the current over 300 municipalities. The aim of the reform is to ensure an equal access to health and social care, shorter waiting times and decreased health and social care costs, although according to the government proposal for the health and social services reform (HE 241/2020 vp), the total costs will likely increase as a result of the reform in the short term.

The reasoning behind the health and social services reform is related to criticism presented towards the service structure, primary care performance, cost containment,

responsibility in care management processes and compatibility of the Finnish health care system, that has been ongoing since the 1990's (Välimäki et al., 2011). In fact, previous governments of Finland have been reforming and trying to reform the health and social care system since 2005. The system has thus far been reformed through a framework law and a municipal reform, which resulted in a number of municipal mergers and minor restructuring of the organization of health and social care between 2006 and 2012. In addition to these, previous governments have presented government proposals for health and social care reforms on three occasions: in 2013, 2017 and 2018 (Mikkola et al., 2015; Valli-Lintu, 2019). Although the minor reforms made between the years 2006 and 2012 resulted in organizational changes, according to the government proposal for health and social services reform, the Finnish public sector faces a fiscal sustainability gap[1] of 3 to 4 percent of the Finnish GDP. As the Finnish population will keep aging during the 2020's, the sustainability gap will continue to grow due to rising social and health care costs, which is why the structure of the public healthcare system will be reformed in order to strengthen the financial position of the Finnish government.

The municipalities that have completely outsourced their health care, and thus are in the scope of the analysis of this thesis, are relatively small, while the future counties are much larger. However, the counties will be autonomous and may therefore choose to either partly or entirely outsource their health and social care functions. While the results obtained from the analysis in this thesis may not be directly applicable to the larger counties, they may be indicative and act as a basis for future research.

2.3   Outsourcing

Outsourcing in general is defined as procuring products or services from actors that are external to the organization. When outsourcing services, this often means that the operational control is transferred from the buyer to the seller (Lankford & Parsa, 1999). Outsourcing of government or public services, or contracting out, is described by

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[1] A sustainability gap measures the long-term difference between government revenue and expenditure. In calculations made by the Finnish Ministry of Finance (2021), the sustainability gap describes how much general government finances should be strengthened over the next four years.

opening previously publicly organized economic activities up to competition (Domberger & Jensen, 1997). In outsourcing of public services, various organizations are able to bid for contracts to provide the services in the government's or other public organization's stead. According to Domberger & Jensen (1997), this way competition is present when organizations are competing for entry *to* the market instead of competing *at* the market as usual.

The private sector may be more effective in providing some services than a public organization. For a public organization, outsourcing is often an alternative to privatizing a particular service. Outsourcing a service instead of privatizing it retains some control over it for the public organization, and the public organization is able to monitor the performance of the outsourced service, impose sanctions or incentives and ultimately replace the contractor if needed. A study by Levin & Tadelis (2010) conducted in the US suggests that services with a low difficulty of measurement are outsourced more often than those with a high difficulty of measurement. However, other determinants of outsourcing a service are suggested to include low difficulty of outsourcing, high levels of spending in a local government and ultimately, low resident sensitivity to quality, i.e., the more important services are to the residents, the more unlikely it is they are outsourced. In theory, outsourcing decisions can be made by estimating the damage to quality by inferior services provided by the contractor. Hart et al. (1997) name waste management as an extreme example of a service that should be outsourced due to its ease of contracting and low importance to residents. The quality of garbage collection would not be affected significantly by inferior employees or equipment, even though garbage collection is essentially a natural monopoly (Donahue, 1989). Hart et al. (1997) name foreign policy as extreme example of a service that should *not* be outsourced due to its importance to residents and contracting difficulty.

In health care, as in most public services, the outsourcing decision is not straightforward. Health care is relatively easy to contract but its importance to residents is high. Furthermore, quality of health care suffers greatly from inferior services resulting from cost cutting, e.g., the health care employees not being properly educated or the equipment being of inferior quality. Furthermore, it is in the public organization's interest that the services provided are allocated appropriately. As discussed in more detail in the next chapter, since the public organization seeks to

improve social welfare of the residents, who receives the health care services and whether the services received are appropriate to their condition is of utmost interest (Chalkley & Malcomson, 2000).

In Finland, approximately 10 percent of the health centers are outsourced while only 2 percent of the population are subject to outsourced health services (Jokinen, 2020). According to the Association of Finnish Municipalities (2021), 29 municipalities have outsourced all their health care services by 2021. A qualitative series of interviews on the reasons for outsourcing was conducted by Jokinen in 2018. The participants were municipal representatives from municipalities that have outsourced all their health care services. The representatives name the declining state of the economy and increased social- and health care costs as the main reasons for the outsourcings, as well as the increased predictability of health and social care costs. Especially in small municipalities even a small number of serious cases of illness or injury can have a substantial impact on the municipalities' finances. Outsourcing the health care services with a fixed payment scheme enables the municipal representatives to accurately estimate the budgets for their respective municipalities. Most of the municipalities that have outsourced all their health care services had investigated the possibility of forming a joint health and social care authority with other municipalities, and many had indeed formed one prior to deciding on outsourcing the services. However, the municipalities often want to retain the ability to monitor the performance of health care services and control their behavior and performance by preserving the ability to impose sanctions or incentives and ultimately replace the private provider if needed.

Most municipal representatives interviewed by Jokinen (2018) are satisfied with the results of the outsourcings. The changes that occurred in organizational structures and service dynamics, i.e., efficiency, as a result of the outsourcings have made organizing, monitoring, and commissioning the services clearer and more straightforward than under a joint municipal authority, while the fixed payment schemes have succeeded in making budgeting and political decision making clearer. However, comparing the costs of health care to what they were prior to the outsourcings has proven difficult to many municipalities due to vagueness in the distinction of cost centers in accounting. Thus, comparing costs prior to the outsourcings to costs after the outsourcings in, for example, specialized health care or oral health care is nearly impossible, often resulting in increased administrative costs.

The market is divided between three large private firms that organize health care for most of the municipalities that have outsourced all their health care services, and a fourth firm which organizes health care for a single municipality. This means that the market is concentrated, as a small number of firms provide health care for a multitude of municipalities The three large firms are Pihlajalinna, Terveystalo and Mehiläinen. Both Pihjalanlinna and Terveystalo organized health care for ten municipalities in 2021, while Mehiläinen organized health care for eight municipalities. Coronaria, the fourth firm, organized health care for one municipality.

3. Theory

The most fundamental difference between a public organization, such as a municipality or a joint municipal authority, and a private firm is their objective. The objective of any public organization is to maximize welfare for its members, such as the residents of a municipality. Meanwhile, the objective of a private firm is to maximize its profits, i.e. its financial surplus. Outsourcing of health care is a contract where a public organization transfers the responsibility of organizing public services to a private, profit-seeking firm. Thus, the buyer (public organization) and seller (private firm) have different objectives in producing health care services.

Unregulated market economy is often justified with competition. Ideally, the buyer can compare both the prices and the quality of competing firms' products or services. Given a wide range of assumptions including perfect information about the quality and prices of products or services and a large number of both buyers and sellers, the prices would be set according to the laws of supply and demand. However, asymmetric information is present in the market for both health and social care services. Hence, the consumer is often unaware of the quality and appropriateness of the services provided to them (Bergman & Jordahl, 2014). The provider of health care services is often more aware of whether the correct form of care has been provided than the buyer. This leads to an incentive for the provider to boost its own financial profits and therefore to lower the factual, often unobserved, quality of the care provided (Hart et. al. 1997). Measuring the quality and appropriateness of the provided care while negotiating the outsourcing contract is challenging even for a public organization purchasing health care services from a private firm (Chalkley & Malcomson, 2000). Furthermore, when municipalities completely outsource all their health care services, the choice of the customer is often limited when choosing a health care provider and thus any quality arguments supporting the private market-approach can be dismissed. This is due to the municipalities opting to outsource their health care services often being small and secluded with very limited supply of health care providers other than the publicly organized ones. Therefore, to ensure a maintained quality of care, the municipalities need to continuously measure the quality of the services provided.

Later in this chapter, a fundamental model describing a public organization's decision to outsource public services by Hart et al. (1997) is presented in order to describe the

payoffs of both the public organization and the private firm. The model also describes the effort given by the private firm to either increase the quality of the public service or to decrease the costs of producing it. Therefore, the reasons behind a potential increase or decrease of quality as a result of the actions of the private firm can be explained. After this, a model by Chalkley & Malcomson (2000) is presented to describe the importance of any non-monetary costs may have on the private firm's decision on how to allocate the effort in producing public services. Chapter 3.1 focuses on describing what "quality" means in the context of health care and its importance to the theory applied in this thesis.

3.1   Quality of health care

The quality of health care can be described and measured in many ways. This thesis focuses on health outcomes, while the theory and the models presented do not differentiate between various aspects of quality but instead treat all dimensions of quality as a single variable.

Generally, the quality of a service refers to how well the service fulfills its objectives. The Finnish Ministry of Social Affairs and Health (2022) states that the objective of health care in Finland is to either improve or maintain the population health. Thus, the quality of Finnish healthcare can ultimately be measured against this objective. Improvement in population health as a result of health care-related actions implies good quality, while a worse population health resulting from health care-related actions implies the opposite. Health outcomes such as mortality or hospital readmission rate are widely used measures of quality of health care. In fact, Berta et al. (2013) argue that no other characteristic of care is more closely linked to the quality and the mission of health care providers than their activities to either prevent or delay death. Chalkley and Malcolmson (2000) describe quality of health care as being a measure of appropriateness of care. This appropriateness includes the patients receiving right type of medical care and the way the patients are treated.

Many other factors besides health outcomes are often regarded as quality of care. Donabedian (1990) states that efficiency, e.g., cost effectiveness, fairly distributed

health care, and acceptability, that is, how comfortable and accessible the care is, are parts of quality of care as well. In fact, many studies such as Holum (2018) and Owusu-Frimpong et al. (2010) measure patient satisfaction as an indicator of quality of care. Although the patient experience or satisfaction in itself is a controversial measure of the quality of care and might not reflect the health outcomes (Rao et al., 2006), it indeed comprises a part of it.

3.2   The Proper Scope of Government

The proper scope of government model developed by Hart et al. (1997) illustrates the outsourcing decision of public organizations such as governments of municipalities, and it is based on the assumption that the outsourcing contracts are incomplete in their nature. In incomplete contracts, the exact nature of the goods or services purchased is uncertain or depends on future events (Hart & Moore, 1999). Ideally, the buyer and the seller would write a contract that would describe the exact good or service and their quality in each situation. However, in services such as health care, the number of situations would be unbearably large and thus, the contract will be written as partly incomplete. Hart et al. (1997) argue that while the assumption of contractual incompleteness holds, the private firm will seek to cut the quality of the service or reject expensive-to-treat patients in order to save costs.

In the model, the assets needed to provide a service are called *the facility* (denoted as *F)*. In terms of health care outsourcings, the facility would refer to the network of assets such as health centers, real estate and the equipment needed to organize health care. The facility is run by a *manager* (denoted as M). The manager may be either a public servant or a private provider. The outsourcing decision is made by a municipal representative or representatives (denoted by G). A further assumption of the model is that the municipal representative represents the interest of the municipality perfectly. Thus, a potential agency problem between the municipal representative and the municipality can be ignored.

G and M write a long-term contract specifying the service provided to some extent and the *price of the service* (denoted by P_0). If the service is provided by the public sector,

the price P_0 stands for the wages of the manager, while if the service is instead provided by a private firm, P_0 stands for the price paid to the private form for providing the service. The manager is assumed to have full operative control of the provision of the service and thus be able to modify the service in a way not specified in the contract. This modification may be either an improvement to increase quality or a reduction in quality in order to save costs.

The services yield a benefit B to the society, which is realized as the residents being treated and thus improving their health. Meanwhile, the provision of the services costs C to the manager. The manager can change the amount of both B and C through effort choices. The manager is assumed to be able to dedicate effort to either advancing cost innovation or quality innovation. A cost innovation leads to reduced costs, while a quality innovation leads to an increase in quality but is often accompanied by a cost increase. Therefore:

$$B = B_0 - b(e) + \beta(i),$$

$$C = C_0 - c(e),$$

where e and i stand for effort dedicated to cost innovation and quality innovation, respectively. $c(e) \geq 0$ is the reduction in cost achieved by cost innovation, $b(e) \geq 0$ is the quality reduction caused by cost innovation, and $\beta(i) \geq 0$ is the quality increase caused by the quality innovation. Function b is therefore a measure of quality reduction due to the cost reductions implemented by the manager. In practice this could be caused by the manager neglecting to train health care staff, hiring incompetent workers or implementing other similar cost-cutting measures that negatively affect the quality of care and thus the overall health of the treated residents. With total effort costs being $e + i$, the manager's total costs can be written as:

$$C + e + i = C_0 - c(e) + e + i.$$

Further assumptions made in the model are that i, e, b and c are observable to both G and M. However, they are not verifiable, that is, completely measurable to both actors. Also, the benefits for G and the costs for M are observable while not being verifiable. Therefore, the cost reductions or quality improvements caused by the actions of M are known to both the buyer and the seller. Further, any improvement of quality or cutting costs requires permission from the owner of the facility. If the facility is public, G needs to agree to any innovation proposed by M but in case the facility is private, M

can implement any innovations without consent from G. In case of a private facility, it is not beneficial for M to dedicate effort to improving quality of the service without the approval of G since the costs induced by it would be borne by M alone unless G agrees to make an additional payment to cover it.

Human capital of the manager (denoted by λ) is an important aspect of the model. It is assumed that if M decides to either improve the quality of the service or cut the costs, a part of the "innovation" requires the participation of M due to the knowledge possessed only by them. However, a part of the innovation may be or become public knowledge thus making that part possible to implement without the manager's participation. If $\lambda = 1$, none of the innovations can be implemented without M, while if $\lambda = 0$, the innovations can be wholly implemented without M. In case F is public, G can realize $0 \leq (1 - \lambda) \leq 1$ of the net gains $-b(e) + c(e) + \beta(i)$ without M's participation by hiring a different manager. If F is private, G can obtain no benefits since M has control of F and can prevent any innovations and thus avoid being replaced.

Without renegotiating the contract, the model presents two options:

1) In case F is privately owned, the cost innovation is implemented, and the quality innovation is not implemented. G's payoff is $B_0 - P - b(e)$ while M's payoff is $P_0 - C_0 + c(e) - e - i$.

2) In case F is publicly owned, both the cost innovation and the quality innovation are implemented. Assuming $\lambda < 1$, G must replace M and G gets a $(1 - \lambda)$ share of the innovations. G's payoff in this scenario is $B_0 - P_0 + (1 - \lambda)[-b(e) + c(e) + \beta(i)]$ while M's payoff is $P_0 - C_0 - e - i$.

Hart et al. (1997) do not consider any monetary incentives or sanctions written in the contract. Therefore, the model assumes the contract must be renegotiated. However, most health care outsourcing contracts made by Finnish municipalities include either monetary incentives for providing a specific quality of care or sanctions for failing to provide a satisfactory quality of care (Jokinen, 2018). If incentives are added to the model, and denoted by π, the above options 1) and 2) can be modified as follows:

1) In case F is privately owned, and π is sufficient to incentivize M to implement both cost and quality innovations, both cost and quality innovations are

implemented. G's payoff is $B_0 - P_0 - b(e) + \beta(i) - \pi$. Meanwhile M's payoff is $P_0 - C_0 + c(e) - e - i + \pi$. However, if π is not sufficient to incentivize M to implement both the innovations, only cost innovation will be implemented. Then, G's payoff is $B_0 - P - b(e)$ while M's payoff is $P_0 - C_0 + c(e) - e - i$.

2) In case F is publicly owned, both the cost innovation and the quality innovation are implemented. Assuming $\lambda < 1$, G must replace M and G gets a $(1 - \lambda)$ share of the innovations. G's payoff in this scenario is $B_0 - P_0 + (1 - \lambda)[-b(e) + c(e) + \beta(i)]$ while M's payoff is $P_0 - C_0 - e - i$.

That is, option 2) remains the same as in the model presented by Hart et al. (1997). Assuming no renegotiations of the contract are made, the changes in quality are determined by the difference between quality reduction as an effect of cost innovation $b(e)$ and quality increase as an effect of quality innovation $\beta(i)$, e.g., $\beta(i) - b(e)$, while the net effect of outsourcing to the municipality is determined by $\beta(i) - b(e) - \pi$.

3.3   Government Purchasing of Health Services

The model developed by Chalkley & Malcomson (2000) describes government purchasing of health services in a similar manner as Hart et al. (1997), but takes into account any non-monetary costs for the seller. Additionally, Chalkley & Malcomson (2000) describe the objectives of both the buyer and the seller in depth. While the objective of the buyer is to maximize social welfare $b(x, q)$ where x denotes the number of patients treated and q the quality of care, the objective of the seller is to maximize its financial surplus $P - F - c(x, q, e)$, where P denotes the payment from the municipality and F denotes fixed costs. Variable costs $c(x, q, e)$ increase with the number of patients treated and the quality of treatment, while cost-reducing effort e decreases the variable costs. If non-monetary costs such as the supplier's reputation, patients' trust and altruistic ends, described later in more detail, are accounted for by $v(x, q, e)$, the supplier's objective can be written as:

$$u - P - F - c(x, q, e) - v(x, q, e)$$

Chalkley and Malcolmson assume the municipalities paying a premium of $\alpha > 0$ to the supplier in addition to P. Additionally, the payoff u to the supplier is considered in calculating the total social welfare. Social welfare can therefore be written as:

$$b(x,q) + u - 1(1+\alpha)P.$$

Purchaser's social welfare-maximizing objective can therefore be written as:

$$b(x,q) - (1+\alpha)[F + c(x,q,e) + v(x,q,e)] - \alpha u.$$

Assuming strictly positive quantity, quality and effort x^*, q^* and e^* and a feasibility constraint on $u \geq \underline{u}$, where $u = \underline{u}$, the first order conditions are satisfied:

$$b_x(x^*,q^*) - (1+\alpha)[c_x(x^*,q^*,e^*) + v_x(x^*,q^*,e^*)] = 0,$$

$$b_q(x^*,q^*) - (1+\alpha)[c_q(x^*,q^*,e^*) + v_q(x^*,q^*,e^*)] = 0,$$

$$c_e(x^*,q^*,e^*) + v_e(x^*,q^*,e^*) = 0.$$

Further, the concern about quality is captured with the following assumption, ensuring a positive marginal cost to quality at an efficient outcome:

$$c_q(x^*,q^*,e^*) + v_q(x^*,q^*e^*) > 0.$$

In case the supplier receives no financial compensation for higher quality, there is no corresponding marginal revenue. Therefore, the quality is in this case below the efficient level in case both efficient quantity and efficient effort are present.

If the payments are designed to incentivize the supplier to treat x^* patients at an effort e^*, quality of the treatment is always less than q^*. In this model the quality is mostly affected by $v(x,q,e)$. In case $v_q(.) = 0$, that is, the supplier is indifferent about the number of patients treated, quality of treatment and effort, the supplier will not deviate from the efficient levels and the outcome is decided solely by the incentives from payments. If the payments would be decided by $P = F + c(x,q,e)$, the levels of x, q and e provided by the supplier would all be efficient. In the case of $v_q(.) < 0$, the suppliers provide too high a quality under the same payment regime. The efficient level would in this case be to reimburse the supplier for less than 100 % of the costs in addition to a fixed payment per patient to ensure the number of patients treated. In a theoretical case of $v_q(.) > 0$, the supplier will always set the quality at the lowest possible level which is seldom the case in reality. For a profit-maximizing firm either $v_q(.) = 0$ or $v_q(.) < 0$ can be assumed. A situation where $v_q(.) < 0$ is feasible for a

profit-maximizing firm in a situation where the firm is concerned about the quality of the services it provides to influence future profits, e.g., if a positive reputation the firm accumulates from higher quality allows it to make outsourcing contracts with other municipalities in the future.

3.4   Discussion of theory

The purpose of the two models presented is to best describe the outsourcing decision made by a public organization and to describe the quality and the efficiency of the services both when outsourced and when produced by the public organization. This way, comparing the quality of the service produced when outsourced or produced publicly, respectively, is possible. The first model by Hart et al. (1997) illustrates the outsourcing decision of a public organization and monetary and non-monetary payoffs of both the buyer and the seller of the service under different circumstances. The latter model by Chalkley & Malcomson (2000) contributes to the theory by addressing the effect any non-monetary costs of the seller have on the quality of the service and the size of the payments the buyer needs to make to the seller. Non-monetary costs entail anything from supplier reputation to altruistic ends. In the case of supplier reputation, the private provider will increase the quality of care to increase the likelihood of getting more similar outsourcing contracts or private health care customers due to increased reputation. Other examples of non-monetary costs include an altruistic desire to provide the society with good-quality health care or a desire to show professional excellence, especially if the doctors and the nurses make managerial decisions (Newhouse, 1970).

From both models can be concluded that the nature of the contract, the dedication of effort of the private firm and how the private firm perceives non-monetary costs, are the main factors that affect the quality of the service. Unless specifically incentivized to, the private for-profit health care provider will not increase the quality, but will strive to maximize its financial surplus, thus minimizing the costs while maintaining an appropriate level of number of patients treated and effort level. While the supplier will not increase the quality provided, it is unclear whether a decrease in quality will

occur under the circumstances. While a profit-maximizing firm will seek to minimize costs, the possible non-monetary costs may contribute to either increase or decrease the quality provided. Both models assume that the managerial duties are transferred to the private firm in case the service is outsourced, which means that they explain the quality effects of outsourcing health care only if the public organization decides to outsource their health care services completely. In some cases, a part of the staff or some singular functions may be outsourced, but only when the private firm or its manager is able to dedicate effort to either saving costs, increasing quality or implementing innovations, can the outsourcing's effect on quality be explained by the two models presented.

Since the nature of the contracts and the incentives and sanctions included is the most important factor explaining the actions of the health care provider, the behavior of the providers may vary significantly between those whose contracts include both incentives and sanctions, those whose contracts include either of them, and those whose contracts include neither. Having both incentives and sanctions results in a stronger drive for the providers to meet the goals defined to gain the incentives and to avoid getting sanctions, and these providers are more likely to supply a higher quality service to more patients. Similarly, a contract including either incentives or sanctions entail an incentive for the provider to either try to avoid the sanctions or gain the incentives thus making it more likely for providers with such contracts to supply a higher quality service to more patients. Assuming a neutral level of non-monetary costs, in case of a contract lacking both the incentive and sanctions clausula, the provider will not actively act to improve the quality of care or number of patients treated and if it entails savings, the provider will seek to treat as few patients as possible and decrease the quality. Furthermore, contracts including only fixed price payments not accounting for volume of patients are linked to smaller supplier capacity and thus fewer patients treated (Csaba & Fenn, 1997). Considering the volume of the services provided, depending on the contractual terms the providers may either seek to over-provide services to easy-to-treat low-cost patients, under-provide services to hard-to-treat high-cost patients or completely avoid the high-cost patients (Ellis, 1998).

4. Previous empirical literature

This chapter is going to focus on previous empirical literature on healthcare efficiency, costs, and quality. The ongoing discussion and comparison of these metrics is comprehensive when it comes to debates between private and public providers. Previous studies on outsourced healthcare are however very limited, although empirical results of a more commonplace comparison between private and public healthcare can be applied to this study to some extent. Evidence of how completely outsourcing all health care services affects costs in Finnish municipalities can be found from existing literature, all the while a gap in research can be identified when it comes to health or quality effects of health care outsourcing in Finnish municipalities.

Few empirical studies research the effects of total outsourcing of health care in Finland. Most notably, two extensive reports by Jokinen (2018, 2020) study the effects of total outsourcing of social and health care to costs in Finnish municipalities by matching municipalities that have totally outsourced their social and health care with non-outsourced municipalities with similar demographics and cost structure. In most of the municipalities where total outsourcing of social and health care has taken place, the initial trend before the outsourcing was a growth in social and health care costs. The initiation of outsourcing is clearly visible in costs, as a cutoff point in time in most of the outsourced municipalities and the results indicate a negative relationship between social and health care costs and outsourcing. In other words, total outsourcing of social and health care seems to have caused lower aggregate costs in the outsourced municipalities. However, the results vary between municipalities. According to the earlier report by Jokinen, in 13 of the 18 municipalities included in the analysis costs are comparatively lower than in the control municipalities in terms of primary care. However, in terms of specialized health care costs, only six of the 18 municipalities show comparatively lower results than their non-outsourced counterparts. In total, the costs are comparatively higher in only two outsourced municipalities. The later report includes 26 municipalities that have totally outsourced their social and health care with 21 of them achieving comparatively lower total costs. While most of these savings are attributed to outsourced social care, even health care costs are comparatively lower. Interestingly, primary care costs account for all the cost decline while specialized health care costs are higher in the outsourced municipalities than in their counterparts.

Linna & Seppälä (2017) study the effects of a complete outsourcing of social and health care in a Finnish municipality of Mänttä-Vilppula in a similar manner. Although the study is limited to a single municipality, the results are studied in terms of both costs and usage (volume) of social and health care services. According to the study, in absolute numbers the costs of social and health care have declined by 8.2 percent. Meanwhile in the control municipalities the costs have risen by four to 5.1 percent, which means that social and health care costs in Mänttä-Vilppula have declined by between 12.2 to 13.3 percent, comparatively. The decline in costs is attributed quite evenly between social care and health care, and the usage of social and health care services has declined in most areas. While usage of specialized care has risen by six percent, primary care usage has declined by 13 percent. The results in control municipalities are subject to significant variation which means no definitive comparative conclusions can be drawn. They do however indicate a decline in both costs and usage of social and health care services following a total outsourcing, and are in line with Jokinen (2018, 2020).

Internationally, effects of similar complete outsourcing of health care as in Finnish municipalities have not been researched. However, some research on health effects of outsourced health care has emerged from Norway and Sweden. Holum (2018) used survey data from 429 Norwegian municipalities and over 35 000 individuals to measure consumer satisfaction with outsourced and publicly organized social and health care services, respectively. The findings show a significantly higher level of satisfaction with the outsourced services, which increases over time after the initiation of outsourcing. Interestingly, in smaller municipalities the consumers are more satisfied with outsourcing. This result is in line with earlier studies' findings stating that publicly organizing health care in municipalities with a population of less than 20 000 may prove ineffective and problematic (Aaltonen, 2006; Vohlonen, 2011).

Similar results as in Norway can be found in Sweden. Stolt et al. (2011), however, study outsourcing of elderly care, only a part of social and health care, and use a number of specific quality indicators, such as competence of employees, employee turnover and accommodation types in the elderly care facilities as outcome variables. Although the objectivity of many outcome variables can be questioned to an extent, the results indicate a lower number of employees and a lower level of employee competence in the outsourced facilities. However, the variables describing user-

friendliness of the service indicate a better quality of care in the outsourced facilities. The findings concerning the number of employees are in line with later research, such as Harrington et al. (2012), and earlier results from the United States (Amirkhanyan, 2008; Comondore et al., 2009), albeit the studies conducted in the United States indicate a lower level of quality of care as well as staffing. These differences between Sweden and the United States may be due to significantly different social care systems and a low level of regulation of social care in the United States (Rice et al., 2020).

Comparing private hospitals to public ones outside of an outsourcing setting often yields results favoring public hospitals in terms of quality of care, especially if measured in absolute and objective terms such as mortality. Berta et al. (2013) compare mortality of heart attack patients in public and private hospitals, respectively, 30 days after hospital discharge in Lombardy, Italy. While the ownership of the hospital has no statistically significant effect on mortality, teaching hospitals such as university hospitals are associated with a significantly lower mortality than non-teaching hospitals. Gobillon & Milcent (2016) conducted a similar study in France, comparing mortality after hospital discharge for heart attack patients in university hospitals, non-teaching public hospitals and private hospitals. The findings indicate the lowest level of mortality in university hospitals while the mortality level is highest in public non-teaching hospitals. The authors however account the difference between private and non-teaching hospitals to stricter budget constraints in public non-teaching hospitals and the higher number of innovative procedures used in private hospitals. French private hospitals are reimbursed for use of any innovative procedures while the public non-teaching hospitals only receive a fee-for-service payment. When controlling for the use of innovative procedures, mortality level is lower in all public hospitals than in their private counterparts.

Although no clear evidence in favor of either private or public hospitals can be presented in terms of quality, private healthcare providers may behave differently than public ones by practicing selection of patients, in other words a case can be made that private health care providers systematically select easier-to-treat patients in order to generate profits or boost effectivity of their services. An English study by Siciliani et al. (2013) researches differences in lengths of stay between English public hospitals, specialized public treatment centers and private treatment centers for patients admitted for hip replacement. The lengths of stay vary significantly with them being 40 percent

shorter in private treatment centers and 18 percent shorter in public treatment centers, compared with public hospitals. These differences may in part be explained by higher effectivity of the treatment centers. However, the differences in lengths of stay between private treatment centers and their public counterparts may be caused by profit-seeking behavior of private providers. Another study conducted in England by Street et al. (2010) researches whether treatment centers are systematically choosing to treat lower-cost patients. The treatment centers are all treated the same in the study, but it is important to note that at the time of writing the article approximately half of them were operated by the private sector. The results of the study indicate that patients treated by English treatment centers are in fact less complex and therefore entail lower costs than patients in English hospitals. However, whether the differences in complexity of patients, and therefore differences in profits of the provider are intentional, remains unclear.

5.   Hypothesis

The theory presented in chapter 3 indicates that in case the health care services are outsourced to a profit-maximizing private firm that has completely neutral objectives in terms of non-monetary costs and the outsourcing contract includes neither incentives nor sanctions, the private firm will dedicate its effort to minimizing costs at the expense of the quality of the service. However, if the firm is concerned about its reputation, has altruistic objectives, wants to express professional excellence in health care or in any other way has non-monetary costs that contribute to the firm dedicating additional effort into increasing quality, the quality of the service may increase. Also, in case the contracts include quality-related incentives or sanctions that either contribute positively or negatively, respectively, to the firm's income, the private firm has an incentive to increase quality of the service.

Previous empirical literature shows that the costs of health care have decreased in most Finnish municipalities that have undergone a total outsourcing of their health care. However, previous results concerning changes in quality of care between outsourced and public, or between private and public health care providers remain tentative at best. Quality of care may be better in some areas for private providers while their profit-seeking behavior affects the organization of resources such as staffing and selection of lower-cost patients. Previous research, in line with theory presented in the previous chapter, shows that unless incentivized to, private actors may strive to maximize their financial surplus by minimizing the costs. While unclear whether the cost minimization will lead to decreased quality, private actors will not actively engage in quality-increasing behavior unless incentivized to. According to the model presented in chapter 3.2, the decreased costs of health care should take place at the expense of quality. However, if the private firm implements both the quality and the cost innovations, the cost of the service may be decreased, and the quality of the service increased at the same time.

The decreased costs in most municipalities with completely outsourced health care should indicate a similar or decreased level of quality of care as before the outsourcing. However, as previous research states that quality of care has in fact increased as a result of outsourcing of health care services in Norway especially in small municipalities, with research on Swedish outsourcing of social care presenting similar

findings, it can safely be assumed that the private providers do indeed consider the non-monetary costs of organizing the service when dedicating effort to increasing quality. Additionally, most of the outsourcing contracts include some form of either incentives or sanctions (Jokinen, 2018). Thus, the quality of care in Finnish municipalities that have completely outsourced their health care, can be expected to increase as a result of outsourcing.

6. Data and Methodology

This chapter presents the data and the two methods used in the analysis. Section 6.1 presents the data and discusses its relevance to the analysis. Furthermore, descriptive statistics of the data is presented. Section 6.2 presents and discusses the methods used to estimate the treatment effect in terms of mortality and morbidity in the municipalities that have outsourced their health care services. Section 6.2.1 discusses difference-in-differences method, while section 6.2.2. discusses matching, which is used to determine the control group in the analysis.

6.1 Data

As the objective of this thesis is to determine how objective quality is affected by outsourcing of health care services in Finnish municipalities, the outcome variables measured are mortality and morbidity in the municipalities. Assuming all else remains equal, any change in levels of mortality and morbidity in a municipality can be accounted to a change in provision of health care in the same municipality. Evidently, both mortality and morbidity are affected by a number of other factors such as the age of the population, health care costs, and any health care provided by private firms or hospitals. Therefore, matching, discussed in more detail in section 5.2.2, is used to eliminate other known factors affecting the outcome variables.

The analysis relies on public data from the Sotkanet Indicator Bank, a National Institute for Health and Welfare information service which collects population welfare and health data from Finland. Relevant population welfare and health data alongside with demographical data and data describing health care expenditures are used on a municipal level. Most data are originally collected by Statistics Finland with the exception of the share of population receiving disability payment having been collected by the social insurance institution of Finland (Kela). The data ranges between the years 2010 and 2019, and is organized as panel data. Furthermore, the Association of Finnish Municipalities has gathered information on every municipality that has completely outsourced their social- and health care (Association of Finnish

Municipalities, n.d.). The information is dated to February 2021 and based on it a dummy variable has been added to the dataset for every municipality indicating the outsourced municipalities. The dummy takes a value of 1 for the municipalities that have outsourced their health care completely while for non-outsourced municipalities the value is 0. Additionally, information of the year outsourcing contracts have been initiated is added as data. For a municipality that has outsourced its health care, the year-dummy takes a value of 1 for the year after the initiation of the outsourcing and all the years after, while it remains 0 for the years preceding the outsourcing. Combining these data, the sample contains health data, demographical data, healthcare expenditure data and data on outsourcing in all Finnish municipalities.

The outcome is measured as the natural logarithm of mortality per 100 000 inhabitants along with the natural logarithm of morbidity index measured by the Finnish Institute for Health and Welfare. The morbidity index combines morbidity in cancer, coronary artery disease, cerebrovascular diseases, musculoskeletal disorders, mental health disorders, accidents and dementia. The different disease or disorder groups' effect on mortality, disability, health care costs and quality of life are estimated, and the groups are then weighed based on the results. The morbidity index for a municipality is therefore an average of weighted prevalences of the disease groups. A higher index in a municipality indicates a higher morbidity.

Natural logarithm is used to account for proportional changes in mortality and morbidity instead of absolute numbers which makes interpretation of the results of the analysis clearer. An important notion and limitation of mortality as the outcome variable is related to its measurement; a small number of deaths in a given year are accounted for in the following year in the data. However, by accounting the changes beginning from the year following the initiation year of outsourcing, the treatment effect of outsourcing in a given municipality is determined.

While the variables of interest are mortality, morbidity and initiation of outsourcing, a number of covariates are used in the matching of treated municipalities and their respective control municipalities. The probability of outsourcing decision is correlated with these covariates used in the matching (Jokinen, 2018; 2020; Linna & Seppälä, 2017; Luoma et al., 2007):

- Population

- Population density

- Share of population 75 years old or older

- Share of population receiving disability payment

- Unemployment rate

- Specialized health care costs per capita

- Primary health care costs per capita

- Home care costs per capita

- Private health care visits per capita

The first complete outsourcing of health care services by a municipality is dated to 2011, which is why data from the previous year, 2010, is used in the matching. Natural logarithms of all the listed covariates, besides the share of population 75 years old or older, are used in the matching in order to reduce skewness of their distribution. Descriptive statistics about the covariates are listed in table 1.

Covariate	Mean	Std. Dev.	Min	Max
Population	18486,2	46124,1	831	588549
Population density (Population/sq.km)	59,01	222,51	0,20	114,75
75 years old or older (%)	10,33	3,05	3,50	19,90
Unemployment rate (%)	10,29	3,11	3,60	21,00
Share of population receiving disability payment (%)	9,78	3,08	3,40	21,50
Specialized health care costs per capita (€)	1009,50	127,29	705,50	1453,30
Home care costs per capita (€)	146,15	65,24	-200,30	442,90
Primary health care costs per capita (€)	700,36	197,06	241,30	1522,70
Private health care visits per capita	0,50	0,21	0,20	1,30

Table 1: Descriptive statistics on the covariates for all municipalities (2010)

6.2   Empirical approach

6.2.1 Difference-in-differences

Difference-in-differences (DD) is a quasi-experimental method commonly applied in situations where some specific group or groups are exposed to a treatment while others are not. The aim – as in all quasi-experimental methods – is to identify the causal effects from specific events or situations when an experimental setting is not achievable (Angrist & Krueger, 1999).

Angrist and Krueger (1999) explain the DD method in the following way (applied to outsourcing of health care in municipalities): If the outsourcing status is denoted as Y_{0i} if the municipality *has not* outsourced its health care, and as Y_{1i} if the municipality *has* outsourced its health care, the outcome in municipality m in year t is $E[m, t]$ if health care has not been outsourced and $E[m, t]$ with outsourced health care. The specific years of outsourcing are known so the only values for $E[m, t]$ are when $m =$ *Outsourced municipality* and $t > Year\ of\ outsourcing$. The counterfactual average (outcome in the absence of the outsourcing) would respectively be: $E[m = Outsourced\ municipality, t > Year\ of\ outsourcing]$. Causal effects are identified by restricting $E[m, t]$. Suppose that:

$$E[m, t] = \beta_t \gamma_m$$

In the absence of the outsourcing, the outcome is written as the sum of the year effect γ with a municipality-fixed-effect m and a municipality effect β with a yearly-fixed effect t. If the effect of outsourcing is further assumed to be denoted by a constant δ so that:

$$E[m, t] = E[m, t] + \delta,$$

the outcome in both the outsourced and non-outsourced municipalities can be written as:

$$Y_i = \beta_t + \gamma_m + \delta O_i + \varepsilon_i,$$

where $E[m, t] = 0$ and O_i is a binary variable that is set to 1 for an outsourced municipality after the outsourcing has happened and 0 otherwise.

In this analysis data with multiple years and multiple different dates of treatment is used. Due to the analysis relying on a long time series of 10 separate years, it may be susceptible to serial correlation where observations for a given municipality are correlated with each other for a period of years. Thus, clustering the standard errors in model (1) to separate municipalities results in more accurate estimate of the treatment effect as suggested by Bertrand et al. (2004).

For DD to be a reliable method, interaction terms have to be assumed to be zero in the absence of the intervention, i.e., outsourcing (Meyer, 1995). In practice the outsourced municipalities' outcomes would have to develop in the same way as the control-

municipalities in the case outsourcing would not have happened. This counterfactual is difficult to prove, but to account for that propensity score-based matching is used in this thesis to find the best control municipality for each treated municipality as described in the following section.

6.2.2 Matching

To reliably estimate the treatment effect with a Difference-in-differences-model, the untreated municipalities must be assumed to have a similar development in terms of the variables of interest, i.e., the interaction terms must be assumed as zero. Simply comparing the treated municipalities that have completely outsourced their health care to the untreated would result in a biased estimate of the treatment effect of outsourcing, due to other factors besides outsourcing potentially affecting both mortality and morbidity in the measured municipalities. Thus, the treated municipalities need to be compared with municipalities with similar characteristics. Furthermore, in case a selection effect is present, the decision to undergo outsourcing of health care services in a municipality can be assumed to be affected by factors directly influencing both mortality and morbidity in the municipality. Matching is used in this analysis to account for any selection bias and to compare municipalities that have outsourced their health care to suitable control-municipalities.

Following previous research on the cost effects of health care outsourcing in Finnish municipalities (Jokinen, 2018; 2020; Linna & Seppälä, 2017; Luoma et al., 2007), a propensity score indicating the propensity for each municipality to outsource their health care services is estimated. Propensity score (p) indicates the conditional probability of assignment to a treatment, in this case outsourcing of health services, given a vector of observed covariates (Rosenbaum & Rubin, 1983):

$$p(X) = Pr\, Pr\, (X) = E(X),$$

where $D = \{0,1\}$ is the indicator of exposure to treatment and X is the multidimensional vector of pretreatment characteristics. X is composed of the covariates presented in tables 1 and 3. Given a population of municipalities i, the propensity score for each municipality is $p(X)_i$.

To estimate the propensity score, a package developed by Becker & Ichino (2002) for a statistical program Stata, is used. The individual values of propensity score range between 0.0018 and 0.4563, and are mostly higher for the municipalities that have outsourced their health care services compared with municipalities providing their health care publicly as shown in the following graph.
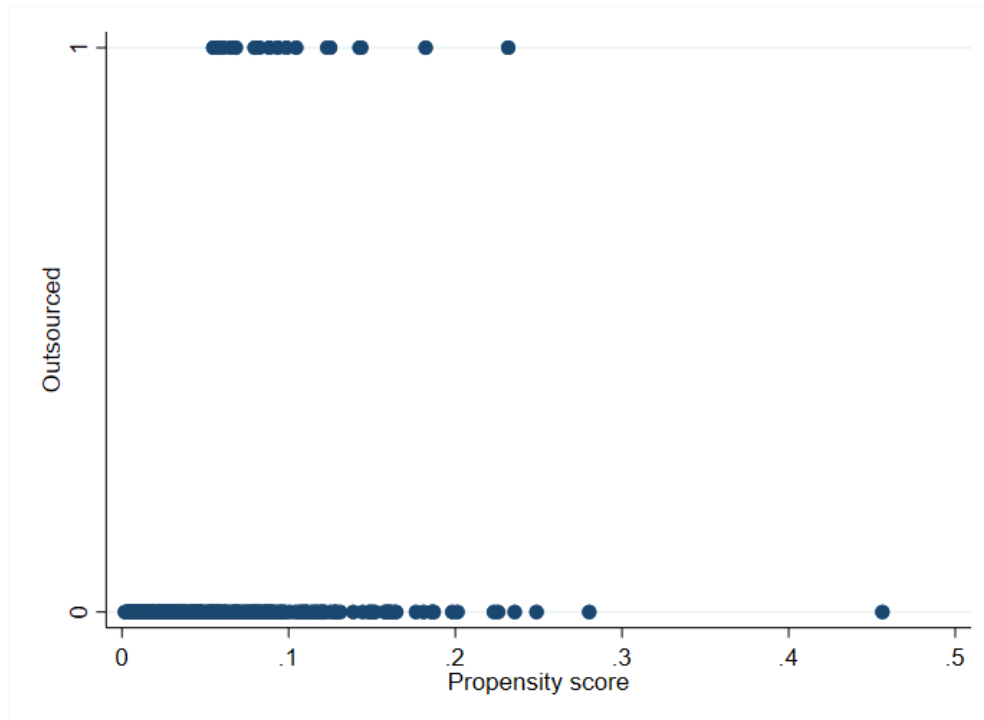
Graph 1: Distribution of propensity scores. Values for municipalities that have outsourced their health care are denoted as 1 while non-outsourced municipalities are 0.

The mean of the propensity score for the municipalities that have outsourced their health care is 0,1 while for the non-outsourced municipalities it is 0,06. If weighed by population, the respective values are 0,1 and 0,056.

The municipalities that have outsourced their health care are matched to the nearest non-outsourced municipalities to choose a suitable control-municipality. The pairs are listed in table 2.

Outsourced municipality	Control municipality	Year outsourced
Rääkkylä	Veteli	2011
Juupajoki	Jämijärvi	2014
Kihniö	Hankasalmi	2015
Jämsä	Ylivieska	2015
Pyhtää	Vehmaa	2015
Parkano	Ylitornio	2015
Kärsämäki	Lemi	2015
Rantasalmi	Veteli	2015
Ähtäri	Laihia	2016
Alavus	Hankasalmi	2016
Mänttä-Vilppula	Lapinlahti	2016
Kuortane	Taivalkoski	2016
Posio	Ruokolahti	2016
Sysmä	Leppävirta	2017
Soini	Sievi	2017
Siikalatva	Tuusniemi	2017
Sulkava	Luumäki	2017
Kinnula	Enonkoski	2017
Lumijoki	Pudasjärvi	2018

Table 2: Treated municipalities and their matched pairs.

Table 3 describes the covariates for municipalities that have outsourced their health care and their controls. The matched municipalities are smaller and less densely populated compared with the averages of all Finnish municipalities presented in Table 1. Meanwhile, the share of population over 75 years old, unemployment, share of population and all the measures of health care costs are higher in the matched municipalities. Number of private health care visits per capita is significantly lower in

the municipalities that have outsourced their health care and their matched pairs, possibly due to a limited access to private clinics or a smaller portion of the population being entitled to occupational health care due to unemployment and number of pensioners.

Covariate	Mean	Std. Dev.	Min	Max
Population	5607,63 (5765,71)	5114,11 (3484,43)	1821,00 (1615,00)	22691,00 (14067,00)
Population density	8,07 (8,69)	4,96 (5,76)	1,30 (1,60)	21,40 (24,70)
75 years old or older	11,95 (11,16)	2,02 (2,27)	7,50 (7,00)	15,50 (14,60)
Unemploymen t rate	11,18 (11,34)	2,34 (3,31)	6,60 (6,70)	16,10 (18,90)
Share of population receiving disability payment	11,56 (11,29)	2,28 (2,83)	8,90 (7,90)	16,80 (19,00)
Specialized health care costs per capita	1070,03 (1058,99)	164,02 (139,01)	791,40 (820,50)	1322,70 (1453,30)
Home care costs per capita	152,69 (140,39)	62,22 (64,05)	60,10 (56,10)	300,50 (257,00)
Primary health care costs per capita	797,25 (807,65)	170,71 (133,30)	499,50 (596,90)	1172,70 (1000,60)
Private health care visits per capita	0,38 (0,38)	0,11 (0,11)	0,20 (0,20)	0,60 (0,70)

Table 3: Covariates for outsourced municipalities for the year 2010. Values for control municipalities in parentheses.

7. Results

A basic difference-in-differences framework, with fixed effects applied in terms of time and municipality, is used to compare the mortality rates of outsourced municipalities after the initiation of outsourcing, to matched non-outsourced municipalities' mortality rates:

$$Y_{it} = \alpha_i + \alpha_t + \gamma(O * After)_{it} + \varepsilon_{it}, \tag{1}$$

where Y is the outcome variable for municipality i in year t, α_i denotes municipality-fixed effects, α_t denotes time-fixed effects, O is a dummy variable denoted as one for the outsourced municipalities and zero for the control municipalities, $After$ is a binary variable set to one for the year after the outsourcing has been initiated and to zero for years before the outsourcing or the year outsourcing has commenced.

Variables	(1) ln(mortality)	(2) ln(mortality)	(3) ln(morbidity)
$O * After$	-0.0732**		-0.0448**
	(0.0315)		(0.0174)
$O * After + 1\ year$		-0.0780*	
		(0.0321)	
Constant	7.170***	7.170***	4.884***
	(0.0213)	(0.0213)	(0.0115)
Observations	380	380	266

Table 4: Fixed-effects difference-in-differences results.

Estimations of (2) and (3) in table 4 contain data of municipality-pairs that have no treatment periods included. Since one municipality outsourced their health care in 2018 and can thus not be considered in the estimation of (2) where a lag of one year is applied, that municipality and its matched pair must be eliminated from the estimation.

Since data of morbidity is only available until 2016, all municipalities that outsourced their health care before 2016 must be eliminated from the estimation of (3). Table 5 presents the results from estimating model (1) with these municipalities removed.

Variables	(3) ln(mortality)	(4) ln(mortality)	(5) ln(morbidity)
$O*After$	-0.0732**		-0.0125
	(0.0315)		(0.0190)
$O*After+1\,year$		-0.0670*	
		(0.0335)	
Constant	7.170***	7.170***	4.851***
	(0.0207)	(0.0213)	(0.0154)
Observations	380	360	126

Table 5: Fixed-effects difference-in-differences results including only the treated municipalities and their respective nearest neighbor-pairs.

Table 5 shows the aggregate results comparing the outcomes in outsourced municipalities to those municipalities selected by matching strategy. The effect of outsourcing to the natural logarithm of mortality per 100 000 inhabitants is statistically significant on a 5-percent level and suggests a negative effect of 7.3 percent in mortality. This means outsourcing of health care would result in 7.3 percent less mortality in the outsourced municipalities. The other outcome variable measured is morbidity index, measured by the Finnish Institute for Health and Welfare. Observations range up to year 2016 only, which makes the sample significantly smaller, and only results for municipalities who outsourced their health care between 2011 and 2015 are therefore accounted for. The result is however marginal and statistically very insignificant. To further examine the delayed treatment effect,

column (4) shows results in mortality where treatment $O * After$ is coded as 1 two years after the outsourcing instead of one. These effects are slightly less negative, indicating a 6.7 percent lower mortality in outsourced municipalities, and are significant on a 10-percent level. Due to the limited availability of data, the later effect on morbidity cannot be measured.

In a traditional DD model as described by Angrist & Krueger (1999), only a single treated group that receives treatment in a single period in time, is present. Furthermore, in the estimates provided in tables 4 and 5 the treated municipalities are compared both with their matched pairs and the matched pairs of other treated municipalities, thus damaging the assumption of the interaction terms being zero. Furthermore, the treated municipalities that have outsourced their health care early are compared to other treated municipalities that receive treatment at a later date. In order to eliminate the issues in controls, a stacked regression method introduced by Cengiz et al. (2019) is applied. In order to compare each of the treated municipalities only to their matched nearest neighbor-pair pair, model (1) is applied a total of 19 times. Once for each treated municipality and its matched pair. To capture the treatment effect for each outsourcing, only years before, during and after the outsourcing are included in each of the regressions. Naturally, when estimating the delayed treatment effect, years during, after and one year after are included and $After$ is coded as 1 two years after the outsourcing instead of one.

Municipality	ln(mortality)	ln(mortality) + 1 year	ln(morbidity)
Ähtäri	-0.193***	0.47***	-
Kihniö	-0.0108***	-0.669	-0.0773***
Alavus	-0.214***	0.186	-
Mänttä-Vilppula	0.150***	0.112	-
Jämsä	0.126***	-0.266***	-0.0659***
Sysmä	0.152***	0.283	-
Lumijoki	-0.195***	-	-
Pyhtää	0.0121***	0.4	-0.0197***
Juupajoki	0.220***	-0.434	0.000112***
Soini	0.387***	-0.043	-
Kuortane	-0.0438***	-0.045	-
Parkano	-0.124***	-0.319	0.0247***
Siikalatva	-0.0379***	-0.159	-
Posio	0.186***	-0.171***	-
Kärsämäki	-0.641***	0.195	-0.0157***
Rantasalmi	-0.320***	0.463	0.0452***
Rääkkylä	-0.243***	-0.03***	-0.0702***
Sulkava	-0.639***	0.234	-
Kinnula	0.0577***	-1.061***	-

Table 6: Fixed-effects difference-in-differences results separately for each outsourced municipality.

Majority of the municipalities with outsourced health care show signs of both lower levels of mortality and morbidity. Of the 19 outsourced municipalities analyzed, 11 show lower levels of mortality, and of the eight outsourced municipalities with available data, five show signs of lower levels of morbidity. The mean treatment effect on mortality is -0.072, which indicates a 7.2 percent lower mortality in the treated municipalities. The mean treatment effect on morbidity is -0.022, which indicates a 2.2 percent lower morbidity in the treated municipalities. Both results are similar to the aggregate results presented in Table 4. However, when $O * After$ is coded as 1 two years after the outsourcing instead of one year after, the mean treatment effect on mortality is -0.099, which indicates a 9.9 percent lower mortality in the treated

municipalities. This indicates that some effects that outsourcing has on mortality may manifest later. However, results from many of the municipalities are not statistically significant which means that they may have been affected by other factors besides outsourcing of health care.

8. Discussion and Conclusions

This chapter is dedicated to discussing the results of the analysis. Firstly, section 8.1 discusses the limitations of the analysis and this study. Secondly, section 8.2 discusses the results in connection to previous research, theory and the context provided in earlier chapters of this thesis. Thirdly, section 8.3 provides conclusions and final statements of this thesis.

8.1   Limitations

The model used to estimate changes in mortality and morbidity relies much on the propensity score-based matching strategy. Even though the matched municipality pairs are similar and thus observably well matched in terms of the covariates used in estimating the probability of outsourcing, matching only controls for the observed variables as stated by Crown (2014) and Morgan & Harding (2006). The outsourcing decision is assumed to be influenced by the covariates on which the propensity score is based on, and therefore any overt bias is controlled for, but the analysis remains open to the possibility of hidden bias. Hidden bias is caused by any unobserved differences between the outsourced and non-outsourced municipalities (Rosenbaum, 2002a, 2002b). In other words, a covariate or covariates not accounted for may affect the outsourcing decision in a municipality thus making the estimated propensity score inaccurate. The treatment effect may also be caused by an unknown factor included in the error term.

All the municipalities that have completely outsourced their health care are relatively small, secluded and have a low population density. While treatment effect on treated is estimated to entail a decrease in both mortality and morbidity in most outsourced municipalities, the results can not necessarily be generalized for any third municipalities, counties or states. Especially larger cities with health care cost structures and demographics dissimilar to the municipalities of interest in this thesis are outside of scope of the results. Furthermore, the treatment effect is estimated for the years directly after the initiation of the outsourcing. Any long-term effects of

outsourcing of healthcare to mortality and morbidity are left outside of the scope of the analysis in this thesis.

8.2 Discussion

The results indicate that Finnish municipalities' complete outsourcing of their health care services leads to a short-term decrease in both mortality and morbidity in many cases, even though the results vary much between the municipalities. Interestingly, the results are in contradiction to economic theory, especially since the cost of health care has declined in most of the municipalities in question. According to theory, the private firm will engage in either minimizing the costs or maximizing the quality of care, or it will pursue both a decrease in costs and an increase in quality. Thus, the profit-seeking firm will not actively seek to better the quality of care at the expense of cost minimization unless explicitly incentivized to. The cost of health care has declined in most outsourced municipalities which indicates that the private providers of health care have taken cost-minimizing measures. Assuming a profit-maximizing firm that has a neutral vision of its non-monetary costs, the decline of both mortality and morbidity (i.e., increase of quality) at the same time contradicts the theory, because an increase in quality of care usually entails higher costs, while a decrease in costs similarly often is connected to decreased quality of the health care services provided. However, a private provider may pursue both an increase in quality and decrease in costs if they are properly incentivized. This incentive may be either a monetary one set by the buyer of the service, that is, the municipality that has outsourced the service, or non-monetary costs that the private firm imposes upon itself. As the private firms organizing the outsourced health care are few, they may have reason to establish competitive advantage in future outsourcings in the form of good quality service.

The increase in quality of care does not necessarily mean that the private providers have actively sought to increase it. A further explanation for the discrepancy between the results and theory, which is however in line with previous empirical literature, is that the private providers are significantly more efficient at providing health care services than the outsourced municipalities and their propensity score -matched pairs.

While the outsourced municipalities are small, the private providers are large companies with the required human capital to organize the care more effectively. Although this explanation cannot be proven, it would also hold true when comparing larger cities and municipalities to any smaller ones. As the tables below show, both mortality and morbidity are negatively correlated with population in Finnish municipalities and cities. Cities and municipalities with higher population therefore have lower levels of both mortality and morbidity.

	ln(population)	ln(mortality)
ln(population)	1.0000	
ln(mortality)	-0.5125	1.0000

Table 6: Correlation matrix for natural logarithms of population and mortality in Finnish municipalities and cities. Negative correlation of 0,5125 implies that one percent higher population in a municipality entails a 0,51 percent lower mortality.

	ln(population)	ln(morbidity)
ln(population)	1.0000	
ln(morbidity)	-0.2864	1.0000

Table 7: Correlation matrix for natural logarithms of population and morbidity in Finnish municipalities and cities. Negative correlation of 0,2864 implies that one percent higher population in a municipality entails a 0,2864 percent lower morbidity.

Previous research shows that the residents of smaller municipalities are generally more satisfied with the results of outsourcing of health care services (Holum, 2018). This result is also in line with previous research stating that larger municipalities are able to organize their public health care services more efficiently than the smaller municipalities (Aaltonen, 2006; Vohlonen, 2011). The initial high levels of both mortality and morbidity in the municipalities that have opted to outsourcing their

health care services might have resulted from an unfavorable economy of scale-setting where the smaller-sized municipalities and thus smaller-sized health care organizations performed worse than their larger counterparts. All the private providers are large firms with more refined and efficient processes, thus creating a more favorable economy of scale-setting for those municipalities using their services. If this is indeed the case, the upcoming health- and social services reform in Finland should yield positive results in terms of mortality and morbidity. As the Finnish public health care will from the year 2023 onward be organized by health care districts instead of municipalities, the sizes of the organizations will be significantly larger than they are now, before the reform. Vohlonen (2011) estimates that the optimal minimum size of a health care organization for efficiency ranges between 20 000 and 200 000 residents. Although some of the districts will have a population of less than 200 000, they all will be larger than 20 000 residents and thus it is reasonable to expect a rise in efficiency, resulting in a decrease in the high mortality and morbidity levels caused by inefficient health care.

Another explanation for the results is that the health care in treated municipalities and their respective matched pairs before the initiation of outsourcing differed in some unaccounted-for way from the rest of the Finnish municipalities and cities, thus creating a "gap" in quality of care favoring the rest of the municipalities and cities. After the initiation of outsourcing this gap has been diminished and the quality of care in the outsourced municipalities has started to converge with the rest of the municipalities and cities. This line of reasoning implies that complete outsourcing of health care would generate decreased levels of mortality and morbidity and decrease health care costs only in municipalities or cities with poorer initial quality and higher costs of care than most. The decreased levels of mortality and morbidity in the treated municipalities may be explained if the propensity to outsource is linked with poorer initial quality of health care. In other words, municipalities with initially poorer quality of health care are more likely to outsource their health care services. In this case, all the municipalities used as the sample in the analysis would have had an initially poorer quality of care. Thus, even the other variables used in estimating the propensity score in section 6.2.2 beside population levels in the municipalities, such as high health care costs, high unemployment rate, aged population and few private health care visits may be correlated with poor quality of care.

Regardless of the reason behind the results, many municipalities that have conducted a complete outsourcing of their health care services have succeeded in both decreasing health care costs and increasing the quality of health care. Ideally, future research would measure long-term effects of how outsourcing of health care affects health outcomes. Also, considering the findings of this thesis, future research on the topic should focus on how health and social care reform in Finland affects the quality of the service measured in health outcomes such as mortality and morbidity in the counties. To best capture the treatment effect, hospital readmission rate and 30-day mortality rate after the treatment should be measured as well as mortality and morbidity in the counties. Furthermore, the effects of the public organization's size to the quality of care should be explored. Optimally, a similar study including larger municipalities, cities or counties that have outsourced their health care services would be conducted. With suitable patient-level data, health effects of outsourcing of health care services could be studied on health center or hospital-level by comparing the outsourced health centers with non-outsourced in municipalities or counties that include both. This way more general conclusions could be drawn.

8.3   Conclusions

The purpose of this thesis is to study the health effects of outsourcing of health care in Finnish municipalities. The theoretical framework relies on the assumption that the health effects such as mortality and morbidity are measures of quality of the health care provided in each municipality. The treatment effect is measured with a difference-in-differences model and the control groups are defined with a propensity score-based nearest neighbor matching method. Every treated municipality is thus assigned a single control municipality with a similar propensity to outsource the health care services.

The results of the analysis show that levels of both mortality and morbidity have decreased following the outsourcing of health care in the treated municipalities when compared with the untreated control-municipalities. Furthermore, a delayed treatment

effect is found when examining the changes in mortality two years after the outsourcing. The decreased levels of mortality and morbidity may have resulted from the private providers' intentional increase of quality as a result of either monetary or non-monetary incentives to do so. As the analyzed sample contains only municipalities with relatively high health care costs and aged population, which are small in terms of population, the decreased levels of mortality and morbidity may be partly due to an initially poorer quality of health care in municipalities with highest propensity to outsource their health care services. To obtain results of outsourcing from a larger scale and from different-sized public organizations, the study should eventually be replicated in larger municipalities or cities that outsource their health care services. In future, health effects of outsourced health care should even be studied on health center or hospital-level with patient-level data

9. Sammanfattning på svenska – Swedish summary

Korsiktiga hälsoeffekter av utkontraktering av hälsovården i finländska kommuner

Den finländska hälsovården är väldigt decentraliserad. Varje finländsk kommun eller stad är ansvarig för att organisera hälsovård för sina invånare. Även om varje kommun och stad har samma skyldigheter, kan de välja att organisera hälsovården själv, tillsammans med andra kommuner eller städer, eller utkontraktera de hälsovårdstjänster som de har skyldighet att ordna till en annan organisation. Ungefär 10 procent av de finländska kommunerna har valt att utkontraktera alla sina hälsovårdstjänster till privata företag. Denna avhandling undersöker effekten som dessa utkontrakteringar har haft på invånarnas hälsa i kommunerna.

Den teoretiska referensramen i avhandlingen redogör för utkontrakteringsbesluten i kommuner, utkontrakteringens påverkan på kostnaderna av att organisera hälsovårdstjänster samt kvaliteten av dessa tjänster. Hälsovårdens kvalitet kan definieras på flera olika sätt. I denna avhandling mäts dödlighet samt sjuklighet i kommunerna, vilka kan tolkas bero på hälsovårdens kvalitet. De två modellerna som utgör den teoretiska referensramen i avhandlingen är skapade av Hart et al. (1997) samt Chalkley och Malcomson (2000). Modellen skapad av Hart et al. beskriver det allmänna beslutet att utkontraktera olika offentliga tjänster. Modellen beskriver även den insats som det privata företaget gör för att antingen minska på kostnader av tjänsten eller öka på kvaliteten av tjänsten. Därför möjliggör modellen jämförelse av både kostnaderna och kvaliteten av tjänsten när tjänsten är producerad offentligt samt när tjänsten är utkontrakterad till ett privat företag. Modellen av Chalkley och Malcomson beskriver däremot hur icke-monetära kostnader påverkar både tjänstens kostnad och kvalitet. Båda modellerna kommer till den slutsatsen att om det finns incitament för det privata företaget att öka på hälsovårdens kvalitet kommer kvaliteten att öka. Incitamentet innebär i detta fall både monetära incitament för förbättrad kvalitet eller sanktioner för försämrad kvalitet samt icke-monetära incitament som altruism eller företagets vilja att få ett bättre rykte.

Tidigare forskning påvisar att utkontraktering av hälsovården i de finländska kommunerna har i regel lett till kostnadsbesparingar. I övriga nordiska länder har

utkontraktering av social- och hälsovårdstjänster i regel lett till förbättrad kvalitet. Resultat från flera undersökningar påvisar dock att offentligt organiserad hälsovård är ofta av högre kvalitet än privat organiserad. Jokinen (2018, 2020) påvisar att hälsovårdskostnaderna har minskat mellan 72 och 80 procent i kommuner som utkontrakterat sina hälsovårdstjänster. Linna och Seppälä (2017) granskade hur utkontraktering av hälsovården har påverkat kostnader i Mänttä-Vilppula och kom fram till att hälsovårdskostnaderna i kommunen minskat med mellan 12,2 och 13,3 procent. I norska kommuner som utkontrakterat sin hälsovård upplever patienterna att hälsovården är av bättre kvalitet jämfört med kommuner med icke-utkontrakterad hälsovård (Holum, 2018). Resultaten indikerar även att kvaliteten har förbättrats mest i små kommuner medan i större kommuner är skillnaden mellan utkontrakterad och icke-utkontrakterad hälsovård mindre. I Sverige där flera ålderdomshem har utkontrakterats, visar sig kvaliteten vara med flera mått mätt bättre i de utkontrakterade ålderdomshemmen jämfört med i de icke-utkontrakterade (Stolt et al. 2011). Då man jämför vårdens kvalitet i privata och offentliga sjukhus, strider resultaten dock delvis mot resultaten från utkontrakterad hälsovård. Patienternas dödlighet är högre i de privata jämfört med de offentliga sjukhusen i både Lombardien, Italien (Berta et al. 2013) och Frankrike (Gobillon & Milcent, 2016). Skillnaden förklaras främst med lägre dödlighet av patienterna vid universitetssjukhus, och om man jämför mellan privata sjukhus och offentliga sjukhus där universitetssjukhus eliminerats, visar dödligheten sig vara lägre i de privata sjukhusen.

Baserat på den teoretiska referensramen samt tidigare forskning är hypotesen i avhandlingen att dödligheten samt sjukligheten har minskat vid utkontraktering, med andra ord har hälsovårdens kvalitet förbättrats i de kommuner där hälsovården har utkontrakterats.

För att undersöka effekterna som utkontrakteringar av hälsovården haft på dödligheten samt sjukligheten används paneldata på kommunnivå från varje år mellan 2010 och 2019. Data består av information om åren då utkontrakteringar inletts i kommunerna (Kommunförbundet, n.d.) samt data om dödlighet och sjuklighet i kommunerna under dessa år. Utöver dessa används en mängd demografiska data som beskriver befolkningsmängden, befolkningstätheten, andelen av befolkningen som är 75 år gamla eller äldre, arbetslöshetsnivån, antal besök hos privat hälsovård per invånare samt data om hälsovårdskostnader i kommunerna.

Den huvudsakliga analysen genomförs med difference-in-differences-metoden där utvecklingen i de kommuner som utkontrakterat sin hälsovård jämförs med utvecklingen i kontrollkommuner där hälsovården inte har utkontrakterats. För att skapa lämpliga kontrollkommuner för varje kommun som genomgått utkontraktering, estimeras *benägenhetspoäng* för varje kommun, vartefter varje kommun med utkontrakterad hälsovård paras ihop med en kommun som inte utkontrakterat hälsovården men har närmaste *benägenhetspoäng*. *Benägenhetspoäng* i det här fallet indikerar tendensen för kommunen att utkontraktera sina hälsovårdstjänster och baserar sig på demografiska data samt data om hälsovårdskostnader presenterade i tabell 1 och tabell 3. De kommuner som genomgått utkontraktering samt deras par är presenterade i tabell 2.

Difference-in-differences-modellen (1) med kommunfixa och årsfixa effekter används för att estimera effekten som utkontrakteringen haft på dödligheten och sjukligheten i de finländska kommunerna. Resultaten påvisar att då man jämför alla utkontrakterade kommuner med alla kommuner som valts till kontrollgruppen enligt benägenhetspoängen, har dödligheten minskat med 7,3 procent i de utkontrakterade kommuner medan sjukligheten har minskat med 1,3 procent. Effekten på dödligheten är dessutom statistiskt signifikant på 5-procentsnivån men effekten på sjukligheten är statisktiskt icke-signifikant. Då man mäter effekten på dödligheten med ett års fördröjning, visar sig dödligheten ha minskat med 6,7 procent. Denna effekt är statistiskt signifikant på 10-procentsnivån.

Då man tillämpar modellen (1) skilt på varje utkontrakterad kommun och deras parad kontrollkommun endast för åren innan utkontrakteringen inletts, åren utkontrakteringen inletts samt året efter, kan resultaten för varje utkontrakterad kommun granskas skilt. Resultaten varierar mycket mellan kommunerna. Genom att summera alla kommunernas resultat leder analysen till ett mer pålitligt estimat av effekten som utkontrakteringen haft på dödligheten och sjukligheten. Den genomsnittliga effekten på dödligheten är 7,2 procent, som ökar till 9,9 procent med ett års fördröjning. Den genomsnittliga effekten på sjukligheten indikerar däremot en minskning på 2,2 procent, som visar sig vara signifikant på 1-procentsnivå.

Resultaten överensstämmer med hypotesen i att hälsovårdens kvalitet förbättras, vilket påverkar dödligheten och sjukligheten då hälsovården utkontrakteras, speciellt i små

kommuner. De flesta utkontrakteringsavtal innebär antingen monetära incitament för förbättrad kvalitet av hälsovården eller sanktioner för försämrad kvalitet. Detta förklarar de privata företagens vilja att anstränga sig att förbättra hälsovårdens kvalitet. Man kan även anta att det finns icke-monetära skäl för att förbättra kvaliteten. Dessutom är de flesta av kommunerna som genomfört utkontraktering av sina hälsovårdstjänster relativt små. Den initiala ineffektiviteten hos hälsovården i små kommuner kan vidare förklara en del av kvalitetsförbättringen som har resulterat från utkontrakteringar till privata företag.

Resultaten i denna avhandling kan endast tillämpas på små finländska kommuner. Framtida forskning om ämnet bör ta i beaktande även större kommuner som eventuellt utkontrakterar sina hälsovårdstjänster. För att få mer robusta resultat, bör data på patientnivå om dödlighet och sjuklighet användas.

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