2018 Studies in social security and health | 148

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Studies in social security and health 148 | 2018

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Abstract

Pekola P. **The effects of competition and regulation on quality in physiotherapy.** Helsinki: The Social Insurance Institution of Finland, Studies in social security and health 148, 2018. 132 pp. ISBN 978-952-284-033-2 (print), 978-952-284-034-9 (pdf).

In health care, different market mechanisms have become more common in many countries. Competition is believed to increase quality, especially when prices are fixed and patients have a free choice of providers. Intuition dictates that when patients have more choice among providers, demand will be more responsive to quality and firms will only be able to increase revenue by raising quality. Previous literature on quality competition is mainly from the United Kingdom and the United States, and research has focused primarily on hospital markets. The aim of this study was to evaluate the effect competition and regulation have on quality in physiotherapy for disabled individuals organised and financed by the Social Insurance Institution of Finland (Kela). Thus, with this thesis it is possible to expand the literature into rehabilitation, such as physiotherapy, which has previously drawn only little attention. Kela generally uses competitive bidding in its effort to organise physiotherapy. When firms participate in tendering, they define both prices and quality in their tenders, and Kela scores these elements. In addition to organising competitive bidding, Kela has piloted fixed-price service vouchers during the contract period 2011–2014. In this system, where patients had a free choice of providers, only firms able to attract patients turned in revenue. Patient deductibles were not collected. A previous change in procurement altered the competitive environment of the firms. Thus, the change in the system most likely had an impact on the firms' incentives regarding quality investments. This thesis shows that when quality was measured as firms' quality investments, competition had a negative effect on quality despite the procurement mechanism and the pricing.

Keywords: competition, regulation, quality, prices, customers, freedom of choice, health services, rehabilitation, rehabilitation services, physiotherapy, disabled persons, service vouchers, incentives

Tiivistelmä

Pekola P. **Kilpailun ja sääntelyn vaikutus laatuun fysioterapiapalveluissa.** Helsinki: Kela, Sosiaali- ja terveysturvan tutkimuksia 148, 2018. 132 s. ISBN 978-952-284-033-2 (nid.), 978-952-284-034-9 (pdf).

Erilaisten markkinamekanismien käyttö on yleistynyt eri maiden terveyspalveluissa. Yleisesti ajatellaan, että kilpailu lisää laatua erityisesti silloin, kun hinnat ovat kiinteät ja asiakkaat voivat vapaasti valita palveluntuottajansa. Intuitiivisesti järjestelmä toimii seuraavasti: kilpailun kiristyessä valinnanvapauden myötä asiakkaat valitsevat tuottajikseen parempaa laatua tuottavat yksiköt, ja siten parempaa laatua tuottavien yritysten voitot kasvavat. Aikaisemmat kilpailua ja laatua käsittelevät tutkimukset analysoivat enimmäkseen sairaalamarkkinoita, ja tutkimuksia on tehty erityisesti Yhdysvalloissa ja Britanniassa. Tämän väitöskirjatutkimuksen tarkoituksena oli arvioida kilpailun ja sääntelyn vaikutuksia laatuun Kelan järjestämissä vaikeavammaisten fysioterapiapalveluissa. Näin ollen tämä väitöskirja laajentaa aikaisemman kirjallisuuden näkökulmaa kuntoutuspalveluihin, kuten fysioterapiaan, joita ei ole aikaisemmin tästä näkökulmasta tutkittu. Yleensä Kela järjestää fysioterapiapalvelut kilpailuttamalla tuottajat. Osallistuessaan kilpailutukseen yritykset määrittelevät tarjouksessaan sekä hinnan että laadun, ja Kela pisteyttää nämä tekijät. Sopimuskaudella 2011–2014 fysioterapiapalveluiden järjestämisessä kokeiltiin kiinteähintaista palveluseteliä kahdessa Kelan vakuutuspiirissä. Tässä järjestelmässä sopimuksen saaneet yritykset tuottivat voittoa vain, jos asiakkaat valitsivat heidät tuottajakseen. Fysioterapian asiakkaat eivät maksa palvelusta omavastuuta. Edellä mainittu toimintaympäristön muutos todennäköisesti vaikutti yritysten insentiiveihin tuottaa laatua. Tulokset osoittivat, että kilpailu laski laatua huolimatta siitä, miten palvelut järjestettiin tai miten hinta määräytyi.

Avainsanat: kilpailu, sääntely, laatu, hinnat, asiakkaat, valinnanvapaus, terveyspalvelut, kuntoutus, kuntoutuspalvelut, fysioterapia, vammaiset, vaikeavammaiset, palvelusetelit, kannustimet

Sammandrag

Pekola P. **Inverkan av konkurrens och reglering på fysioterapitjänster.** Helsingfors: FPA, Social trygghet och hälsa, undersökningar 148, 2018. 132 s. ISBN 978-952-284-033-2 (hft.), 978-952-284-034-9 (pdf).

Det har blivit vanligare med olika marknadsmekanismer i samband med hälso-och sjukvårdstjänster i många länder. I allmänhet anses det att konkurrens leder till bättre kvalitet, särskilt om priserna är fasta och kunderna fritt kan välja serviceproducent. Intuitivt tänkt fungerar systemet på följande vis: när konkurrensen ökar på grund av valfriheten, väljer kunderna sådan enheter som producerar bättre kvalitet. Härav följer att de företag som producerar bättre kvalitet ökar sina vinster. Tidigare undersökningar som behandlat konkurrens och kvalitet har i huvudsak analyserat sjukhusmarknader, och undersökningar har gjorts framför allt i USA och Storbritannien. Syftet med denna doktorsavhandling har varit att bedöma vilken inverkan konkurrens och reglering har på kvaliteten på fysioterapitjänster som ordnas av FPA för personer med svår funktionsnedsättning. Således utvidgar denna doktorsavhandling den tidigare forskningslitteraturens perspektiv till rehabiliteringstjänster, t.ex. fysioterapi, vilka tidigare inte undersökts ur denna synvinkel. I regel ordnar FPA fysioterapitjänster genom att konkurrensutsätta producenterna. När företagen deltar i konkurrensutsättningen fastställer de i sina erbjudanden både priset och kvaliteten, och FPA poängsätter dessa faktorer. Under avtalsperioden 2011–2014 testades för ordnandet av fysioterapitjänster servicesedlar med ett fast pris i två av FPA:s försäkringsdistrikt. I det här systemet genererade de företag med vilka avtal ingåtts vinst bara om kunderna valt dem till sin serviceproducent. Fysioterapikunder betalar ingen självriskandel för tjänsterna. Den ovan beskrivna ändringen av systemet påverkade sannolikt incitamenten för företagen att producera kvalitet. Resultaten i doktorsavhandlingen visar att konkurrensen försämrade kvaliteten oberoende av hur tjänsterna ordnades eller hur priset fastställdes.

Nyckelord: konkurrens, reglering, kvalitet, priser, kunder, valfrihet, hälsovårdstjänster, rehabilitering, rehabiliteringstjänster, fysioterapi, handikappade, servicesedlar, ekonomiska incitament

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In 2008, I started working at Kela and soon had the opportunity to join Kela's service voucher pilot as a member of the project group. Since then my professional career at Kela continued from the development and implementation of rehabilitation services to procurement and finally to research. With this development, issues such as pricing, quality, competition, incentives and freedom of choice became part of my everyday life. Looking back at this decade-long, incredibly interesting journey, it feels that time has flown by quickly. As in all long processes, there have been ups and downs, but never has the finishing line (as Professor Hannu Valtonen puts it) been lost. For this, I have my supervisors, colleagues, friends and family to thank.

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Helsinki, January 2018

Piia Pekola

Contents

List of original publications

This dissertation is based on the following original publications:

I **Pekola P, Linnosmaa I, Mikkola H.** Competition and quality in a physiotherapy market with fixed prices. European Journal of Health Economics 2016. DOI: 10.1007/s10198-016-0792-3.

II **Pekola P, Linnosmaa I, Mikkola H.** Does competition have an effect on price and quality in physiotherapy? Health Economics 2017; 26: 1278–1290. DOI: 10.1002/hec.3402.

III **Pekola P, Linnosmaa I, Mikkola H.** Assessing the effects of price regulation and freedom of choice on quality: evidence from the physiotherapy market. Health Economics Review 2017; 7: 25. DOI: 10.1186/s13561-017-0158-2.

The publications are referred to in the text by their Roman numerals and reprinted by permission of the copyright holders.

List of figures

List of tables

Abbreviations

AMI	= acute myocardial infarction
BPT	= best practice tariff
CHF	= congestive heart failure
DiD	= difference-in-differences estimation
DRG	= diagnosis-related group
EU	= European Union
EuHEA	= the European Health Economics Association
HHI	= Herfindahl-Hirschman index
HMO	= Health Maintenance Organization
GP	= general practitioner
GPA	= the Agreement on Government Procurement
IV estimation	= instrumental variables estimation
Kela	= the Social Insurance Institution of Finland
KM	= kernel matching
NHI	= National Health Insurance
OLS	= ordinary least squares estimation
PPS	= Prospective Payment System
qpr	= quality-price ratio
RCS	= randomised controlled study
t	= treatment group
UK	= United Kingdom
US	= United States of America
WTO	= World Trade Organization
2SLS	= two-stage least squares estimation

1 Introduction

In the past two decades, many countries have undergone health care reforms that introduce competition between service providers. These reforms have been analysed particularly in the United Kingdom and the United States. The literature, mainly focusing on hospital markets, shows that competition between suppliers tends to reduce prices and encourage efficiency but its effect on quality is ambiguous. Generally, competition has a tendency to improve quality if prices are regulated, but the overall effect of competition on quality depends on, for example, the institutional structures of health care (see e.g. Gaynor and Town 2011; Propper 2012; Santos et al. 2017).

One way to intensify competition among providers is to introduce patient choice to health care. Due to different insurance mechanisms, prices are often irrelevant to patients and, thus, freedom of choice forces firms to compete for patients on quality. (Gaynor and Town 2011; Gaynor et al. 2012; Propper 2012.) It is possible to empower patients by increasing choice: patients dissatisfied with the quality of service have the opportunity to seek another provider. As a result, low-quality providers lose and high-quality providers gain market shares. If low-quality providers want to stay active in the market, they need to improve the quality of their services (Le Grand 2007).

Finland is also planning a massive reform in its health and social care sector. The aim is that after 2020 patients will be able to choose among public, private or third sector primary care providers based on their individual preferences. In the intended system, counties (instead of the current municipalities) will be responsible for organising health services, money will follow patients, and providers will receive a fixed-rate compensation from the counties for their services. In addition to broadening the provider-mix, the system will most likely see widened use of different procurement mechanisms, such as competitive bidding, service vouchers and personal budgets. Previously described changes in the organisation of health services are about increasing competition between providers, which, on the other hand, is hoped to improve productivity and quality of care[1].

Despite the wide consensus upon the need to reform the Finnish healthcare sector, there is so far no evidence of how firms will react to these changes. Thus, there is a need for research, especially on the incentive structures linked to the previous system, because the ultimate goals of the reform, such as improved productivity and quality, cannot be reached unless firms have proper incentives.

The need for the reform and the lack of evidence bring the story to the Social Insurance Institution of Finland (Kela). Kela has a complementary role in the current Finnish healthcare system and it is one of the biggest organisers and financers of rehabilitation services in Finland. Kela arranges rehabilitation services through

1 See http://alueuudistus.fi/en/frontpage.

competitive bidding, but during the contract period 2011–2014 fixed-price service vouchers were piloted in two Kela insurance districts. Service vouchers were in use in physiotherapy targeted at disabled individuals. Most likely, the pilot did not have an influence on patients but, due to price regulation, had an influence on providers.

In addition to expanding the procurement mechanism to service vouchers, freedom of choice was also initiated in physiotherapy in 2011. This change affected both patients as well as providers despite patients having had the opportunity to influence choice even before 2011. Freedom of choice empowered patients because they now had the right to choose providers compared to the previous system, where they had the opportunity to influence choice but no official right to choose. In addition, freedom of choice also affects firms' behaviour because it is a means to intensify competition between providers.

Kela's service voucher system offered an opportunity to analyse the effects of competition and regulation on quality in physiotherapy and thereby to provide evidence of how changes in procurement and pricing affect firms' incentive structures in the Finnish context. Thus, Kela's reform could be considered important for not only developing the social insurance system but for developing the Finnish healthcare system in general. Knowledge of the incentives for firms is crucial because it defines the success of different reforms aimed to not only influence the market but also to improve the wellbeing of patients.

The research questions of this doctoral dissertation are all related to the functioning of the market and the incentives of firms to compete for patients on quality. Theoretical predictions show that competition and regulation (together with factors associated to these concepts) have an impact on firms' behaviour regarding price and quality decisions in health care (see e.g. Folland et al. 2007; Gaynor and Town 2011). In the empirical studies, different estimations of, for example, the expected toughness of competition and its impact on the outcome are used in estimating the relationship in different contexts.

As regards theory, I want to answer the following question: Under different pricing schemes, is market competitiveness associated with firms' incentives in respect to quality (and price) decisions?

To find a reply to this question, the following empirical questions need answers:

1) Does competition have an effect on quality in physiotherapy when prices are regulated?
2) Does competition have an effect on price and quality in physiotherapy (when prices are determined by firms)?
3) Do price regulation and freedom of choice have an effect on quality in physiotherapy?

The thesis is structured as follows: First, Chapter 2 describes the theoretical framework; how differences between administratively set prices and market-determined prices affect the incentives of firms to engage in quality competition. Also, the theoretical predictions of price regulation and especially cost containment are discussed in the chapter. Chapter 3 reviews the empirical literature on competition and quality as well as literature regarding price regulation. Institutional details of the Kela rehabilitation system are presented in Chapter 4. The aims of the studies as well as the research questions of each study are presented in Chapter 5. Chapter 6 presents the data, variables and methods, and Chapter 7 presents the results. Chapter 8 summarises the results and discusses their relevance in the development of rehabilitation services in particular and healthcare services in general. Finally, Chapter 9 concludes.

2 Competition, regulation and quality

Health care has a major impact on well-being, and its size and costs also make it a challenging sector. Historically health services have been produced with non-market means, but during the past decades, many countries have relied on different market mechanisms, such as freedom of choice, in their effort to organise health services (Propper et al. 2008). It is argued that competition could be a valid instrument for making decisions regarding the use of resources, and the main target of using competition in health care is to enhance efficiency (Barros et al. 2016). Also, arguments concerning equity have been made. Based on Le Grand (2009), for instance, free choice and the resulting competition are beneficial and improve the status of the poor and ill especially because with patient choice these patient groups are also able to change providers in case they are dissatisfied with the current supplier.

When firms compete in the market, some pre-requirements must be met for the competitive elements to be useful. For example, there must be several competitors in the market, patients have to have a free choice of providers, providers must compete to attract patients, and money must follow the patients. In addition to previous circumstances and practical requirements, different health policy initiatives are known to affect the incentives of service providers to enter and exit the market, invest, merge and innovate. The reaction to outcomes, such as prices, quantity or quality, depends on the firms' incentives. Sometimes changes in these factors occur even though the aim of the original policy is targeted at something else. (Gaynor and Town 2011.)

Theory and empirical literature differ substantially on different price-setting circumstances – prices can either be set administratively or they can be a strategic variable and be set by the firms (or be set in the market). Pricing naturally has a substantial influence on firms' incentives regarding, for example, quality investments. (Gaynor and Town 2011.) When prices are market determined, both theory and empirical evidence provide unclear effects, but with regulated prices, theory strongly suggests that quality increases as more competitors enter the market (Ma and Burgess 1993; Brekke et al. 2006; Gaynor 2006; Gaynor and Town 2011; Gravelle et al. 2012). Increased competition means a higher density of firms providing services in the market (Brekke et al. 2011). When the number of firms in the market increases, the demand for a firm becomes more elastic with respect to quality and, therefore, firms choose higher quality in order to attract more customers (Gaynor and Town 2011).

Previous empirical literature shows that competition has some effect on prices but the effect on quality is ambiguous. The effect seems to support pro-competition policies and theoretical predictions when prices are regulated. This evidence is found especially in the UK hospital market (Propper et al. 2004; Propper et al. 2008; Forder and Allan 2014). Still, there is evidence that incomplete and asymmetric information about quality may result in unfavourable results despite the pricing (Brekke et al. 2014).

The following section presents theoretical predictions of competition and price regulation on quality in health care. The literature reviewed is mainly from hospital markets, yet it also provides a framework for other health services, such as rehabilitation.

2.1 Price regulation and quality

Usually, in a regulated healthcare system, the main purpose of regulation is to encourage providers to keep costs down without skimping on quality. Also, when government agencies or insurers purchase health services they usually try to keep costs down without decreasing quality (Chalkley and Malcomson 1998). When prices are regulated, the pressure from cost containment is transferred to firms. Usually this change in pricing is hoped to force providers to intensify their production in order to bear costs. However, there may be incentives for providers to seek and implement cost reductions with other means. It might follow that firms will have an incentive to decrease quality in order to cut costs instead of improving productivity (Ma 1994). Due to price regulation, firms may also classify patients into profitable and unprofitable ones and aim to treat only the profitable individuals. The incentives to cream skimming may even become stronger with intensified competition (Ellis 1998).

Price regulation is always linked to the financial incentives of firms, and the effects of regulation are likely to depend on a variety of factors, such as the nature of regulatory instruments and the industry's economic characteristics (Joskow and Rose 1989). With price regulation, neither the cost structures of the providers nor the effort that high-quality production requires from the firms are perfectly visible to the regulator. For this reason, one of the main concerns in the formulation of regulatory policy is to determine how services should be paid (Mougeot and Neagelen 2005).

It is known that the quality supply function is increasing in the regulated price, i.e. a higher regulated price will increase the marginal net profit from higher quality and thus create an incentive to increase quality. In practice, regulated prices are often based on average costs in health care, which implies that the profit margin will be higher in procedures that have higher fixed costs and lower marginal costs. More precisely, this means that, due to price regulation, providers may increase quality for profitable patients (where the profit margin is positive) and dampen quality for non-profitable ones (where the profit margin is negative). Ultimately, the profit margin will be positive for providers that operate at volumes where marginal costs are constant or decreasing. (Brekke et al. 2014.)

As can be seen, price regulation may include a trade-off between intended and unintended outcomes. Thus, it is important to combine price regulation and competition in health care. Meltzer et al. (2002) have shown that competition with non-regulated prices tends to increase costs, and price regulation without competition includes no financial incentive for firms to increase quality. Naturally, the prerequisite of quality competition with regulated prices is the patients' freedom of choice (Brekke et al.

2014). It is hoped that after regulating prices, competition will overcome the unintended outcomes, i.e. firms' behaviour to seek cost reductions through reducing quality.

2.2 Competition and quality with fixed prices

In theory, providers compete for patients with quality if prices are regulated. When prices are regulated, competition between firms will be settled with non-price means. With more competition demand becomes more elastic, which enables firms to cover the costs from quality investments and earn profits. (Gaynor and Town 2011.) The intuition behind theoretical studies is that with regulated prices, health care providers can increase volume and revenues only by increasing quality. Theory predicts that patient choice increases quality if it ensures a positive marginal profit. The incentive to increase quality is stronger, the larger the profit margin (Brekke et al. 2011.) When patients have more providers to choose from, demand will be more responsive to quality and thus increase additional revenue from improved quality (Gaynor 2006).

Despite the rather straightforward relationship between competition and quality when prices are fixed described in the previous chapter, more recent literature shows the issue to be more complex. Competition indeed increases quality if patients are responsive to the quality differences of firms, if providers are profit maximisers instead of altruists, if the marginal cost of an additional patient is constant, if the profit margin is positive, and if providers meet whatever demand is generated by their choice of quality (Brekke et al. 2014).

Furthermore, other factors such as profit constraints, degree of specialisation, soft budgets, cream skimming and gate keeping also have an influence on the quality outcomes under pro-competition policies. For example, not distributing financial surplus to decision makers could affect quality incentives. Similarly, the specification of financial targets may affect the outcome. A public provider may, for example, have tight profit constraints, and quality and other decisions have financial repercussions even though the provider is not considered a profit maximiser. (Brekke et al. 2014.)

When considering healthcare services, at least three factors merit more thorough analysis: altruism, a positive profit margin and imperfect information. In health care, it is quite logical that providers care for the patients' wellbeing. Brekke et al. (2011) have analysed altruistic healthcare providers in their theoretical study and have shown that with semi-altruistic providers there is an unambiguous relationship between increased patient choice and service quality when prices are fixed. In this case, patient choice has two contradicting outcomes. A demand more responsive to quality increases the incentives to decrease quality so that unprofitable patients would choose other providers. On the other hand, an altruistic provider wants to increase quality and thus patient benefit. Depending on the size of the conflicting effects, competition will either decrease or increase quality.

When healthcare services are considered, the issues linked to a positive profit margin are also important due to possible capacity constraints. Health care is a very labour intensive industry, but also expensive equipment and instruments as well as room to take care of patients are required, and so capacity may well be an obstacle to quality competition. Naturally, the incentive of firms to increase quality is stronger, the larger the profit margin. Thus, an increase in the regulated prices will also increase the marginal net profit through higher quality. Increasing marginal costs, on the other hand, diminishes the firms' incentives to engage in quality competition, and the reason behind increasing costs may be capacity constraints. If patient capacity is limited, firms must either abstain from quality competition (i.e. from increasing volume) or invest in extra capacity, which will increase marginal costs. Therefore, the profit margin (and thus the incentive to compete for patients) will also be greater if the level of the fixed price includes investment costs (Brekke et al. 2014).

Finally, imperfect information is also known to have a crucial role on patients' decisions in selecting or changing providers and, consequently, on the competition environment of the firms. Information affects patients' responsiveness towards service quality. If patients start to react to increased quality information (i.e. quality differences) intuitively, providers' incentives towards pro-competitive direction would also be affected. (Brekke et al. 2014.) However, in health care, patients' knowledge about practitioner quality is usually observed ex-post. This means that some patients and health practitioners are a poor match and, due to switching difficulties, at least some patients continue using services from these imperfect providers. Yet, research has shown that with imperfect information, switching costs or patient errors do not prevent general practitioners (GPs) from competing with quality when, for example, regulated fees increase. In fact, as services are financed with taxes, the costs of switching and patient errors could have a real effect because they increase costs to the taxpayer. (Gravelle and Masiero 2000.)

However, opposite arguments also exist. In Finland (and elsewhere), there is evidence that only a small portion of patients actually switch providers (see e.g. Junnila et al. 2016). Based on this stability in patient behaviour, it is sometimes argued that despite free choice GPs, for example, do not have to compete for patients after all (see e.g. Thomas et al. 1995). Still, there have also been claims that a mere possibility of change affects firms' incentives towards the quality they and others produce and thus there is an incentive to compete (Le Grand 2009).

As is seen, quality competition is a complex issue. Therefore, it is recognized in the literature that despite quite strong theoretical predictions of quality competition under fixed prices, the effect needs to be settled within each empirical environment or market (Brekke et al. 2014.)

2.3 Competition and quality with market determined prices

When prices are market determined (or set by firms), both price and quality are strategic variables for firms. There is evidence from literature that price competition may lead to deteriorating quality. This is especially so if price competition is very intense (see e.g. Forder and Allan 2014). Gaynor (2006) has shown that during the 1970s and 1980s virtually no price competition existed in health care but in the 1990s the situation changed. In their recent study on nursing homes in the UK, Forder and Allan (2014) found that competition reduced both quality and price. Within this market, greater competition reduced revenue, which in turn led to decreases in quality. Thus, it seems that competition worked through prices. However, other studies regarding nursing home markets in the US show that price competition in this particular sector is not much of a factor (Nyman 1994; Mukamel and Spector 2002; Mehta 2006), meaning that providers most likely have market power over the regulator, which leads to the nil effect.

When firms determine prices, the incentives for providers to make quality investments will be affected by their return on quality. As increasing quality is costly, hospitals will have an incentive to adjust their overall quality in response to changes in their competitive environments (Gowrisankaran and Town 2003). Kranton's (2003) previous findings that institutional structure affects the incentives of firms seem to apply very well to the healthcare industry, when prices are determined by firms. The healthcare market is different from other markets of goods and services, which means that, for example, the incentives of firms must be considered carefully by the regulators.

When firms are able to set prices freely, economic theory of competition and quality is unable to clearly predict the outcome (Gaynor 2006). Still, with theory, researchers are able to provide factors to look for that could influence the estimations (Gaynor and Town 2011). One important factor is imperfect information. Dranove and Satterthwaite (1992) have studied the effect of imperfect information on price and quality when consumers have imperfect information of both elements. The results show that when price competition intensifies relative to quality competition, firms will end up producing quality at a suboptimal level. Forder and Allan (2014) present an example of such a result as they analyse competition in the nursing home market. They found that competition reduced both quality and price. However, the study concluded that intense price competition reduces firms' revenues, which then leads to quality reductions.

In health care, such as physiotherapy, the quality of a provider is observed ex-post, but patients usually have multiple visits to health specialists. Thus, the provider's reputation will influence patient decisions, especially when information regarding quality is imperfect. Allen's (1984) study focuses on reputation in a competitive market where the prices charged and sometimes even the quantity produced are visible to consumers when they enter the market but quality is not. Prices reflect the level of quality produced, and firms will not lower their prices as it would change the incentives and also signal to consumers that quality has decreased. Consumers are aware of the quality history of a firm, and this knowledge will eventually become generally known among consumers. Any firm providing a low quality product will see an impact on reputation, which may endanger future sales. Therefore, if a firm is interested in its reputation and future sales, it will always have an incentive to produce high quality because consumers are smart and doing otherwise would result in no sales.

Klein and Leffler (1981) were also able to show in their theoretical study regarding imperfect information, quality and reputation that a firm will have an incentive to produce high quality if it is interested in its reputation and future sales. Shapiro (1983) notes in his study regarding imperfect information and reputation that with perfect information and perfect competition there is no need to analyse reputation because all transactions are settled in the market. However, when observing quality is difficult, consumers may use the quality produced in the past as an indicator of present or future quality. Thus, the study shows that when consumers rely on reputation, there is an incentive for firms to initially invest in costly reputation building and thus earn smaller profits (or even sell at an unprofitable price). However, it is noted in the study that later on high quality must be sold at a price higher than cost.

Despite previous findings regarding reputation, great uncertainty lies behind firms' behaviour when competition and its effect on quality are considered. Kranton (2003) demonstrates in her study that industry associations may be important factors in sustaining high-quality production and that institutional structure within which a firm operates is critical for its incentives to produce high-quality products. Kranton illustrates that if a firm is able to attract new customers and thus gain permanent increases in its market share, it will have an incentive to produce higher quality despite having lower prices (and revenues) for a short period. The gain in future sales will overrun the short period losses that materialise after costly quality investments. From the customer point of view, the price reduction (and quality increase) will have to be credible or else a firm will lose customers.

3 Empirical evidence of competition and regulation in health care

Evidence of the effects of competition on quality is mainly from the UK and the US, and studies have mostly focused on hospital markets. This thesis aims to broaden the literature and analyse the causal effect of competition as well as price regulation on quality in physiotherapy in Finland. Despite the literature mainly analysing hospital markets, it provides a framework for the physiotherapy market as well.

Comprehensive descriptions of previous literature regarding the effects of competition on quality are presented by Gaynor (2006) and Gaynor and Town (2011). The authors divide the studies based on pricing, which is in line with the differences in theoretical predictions.

Previous summaries of past literature describe very well the differences in the definition and use of central variables in different studies. Examples also remark the difficulties in measuring that lie behind this study genre. In many cases quality has been measured indirectly as patient mortality (see e.g. Cooper et al. 2011; Gaynor et al. 2013; Bloom et al. 2015). Mortality reflects the quality of care but its use may have features that need to be considered during analyses. Patients are heterogeneous – they differ in their characteristics, such as the severity of their condition. Also, hospitals do not choose a certain level of mortality; hospitals rather make decisions of service quality which then affects mortality. (Gaynor and Town 2011.) Overall, measurement difficulties complicate the studies involved in quality issues as quality is multidimensional and, additionally, different patients may value it differently (Tay 2003). Nevertheless, studies are quite uniform in one respect – they consider providers to be vertically differentiated in respect to quality. This means that more quality is considered better (see e.g. Gaynor and Town 2011).

Previous literature defines competition in many ways. Many studies analyse the effect of market structure on quality and a commonly used measure is the Herfindahl-Hirschman index (HHI), which is the sum of the squares of the market shares of all firms (see e.g. Kessler and Geppert 2005; Colla et al. 2010; Grabowski and Town 2011; Gaynor et al. 2013). Within these studies, competition is a measure of a hospital's market share within a certain area. It is also possible to define competition as the number of competitors in the market as well as the number of mergers or demand elasticity (see e.g. Ho and Hamilton 2000; Tay 2003; Propper et al. 2004; Propper et al. 2008).

3.1 Empirical studies with regulated prices

As explained in Chapter 2, theory predicts that competition increases quality when prices are fixed and patients are free to choose providers. Intuitively, healthcare providers such as hospitals or physiotherapists can attract more patients only by raising quality. With patients having more choice among providers, demand will be more responsive to quality; thus, raising quality will increase additional revenue. Such a prediction is correct especially if patient choice increases patient responsiveness to quality. If providers are profit maximisers instead of altruists, the marginal cost of an additional patient is constant, the profit margin is positive and providers meet whatever demand is generated by their choice of quality. (Brekke et al. 2014.) Assuming that the price mark-up is positive and marginal costs are constant or decreasing, firms have an incentive to increase quality and volume when prices are regulated. However, if the price-cost margin of a firm deteriorates either due to very intense price competition or an unsuccessful level of regulated prices, they may have an incentive to decrease quality (lecture by Luigi Siciliani at the EuHEA meeting in Hamburg in July 2016).

Prior events explain the multitude of results from previous empirical studies and the need for the effect to be settled within each empirical environment or market (Brekke et al. 2014). US evidence on the effects of competition on quality with fixed prices is mainly from the Medicare market. The results from these studies have more varied findings compared to results from the UK healthcare sector. Also, results alter by, for instance, condition (hip fracture vs. stroke) or the market studied (e.g. hospital vs. nursing home). In short, Kessler and McClellan find a positive effect of competition on quality, Gowrisankaran and Town find a negative effect, Shen finds mixed effects, and Mukamel et al. find no effects (Kessler and McClellan 2000; Mukamel et al. 2001; Gowrisankaran and Town 2003; Shen 2003; Tay 2003).

As mentioned, the results from studies conducted in the UK are more positive and their findings lend more support to pro-competition policies. For example, Gaynor et al. (2013) analysed a healthcare reform conducted in 2006. During that time, hospital pricing was changed from being market determined to being regulated, and combined with patient choice this reform was aimed to increase quality competition between hospitals. Despite the reform, it was evident that the restructuring would affect different areas differently. More densely populated areas were likely to have more competitors and a high degree of choice. Rural areas that had highly concentrated market strucutres, on the other hand, were likely to have less exposure to competition. Still, the results show that competition saved lives (i.e. increased quality) without affecting costs. The results also apply to non-profit hospitals. (Gaynor et al. 2013.) A description of the previous studies with fixed prices is presented in Table 1 (p. 24).

Table 1. Examples of previous literature on competition and quality with fixed prices.

Study	Competition measure	Quality measure	Main findings and the effect of competition on quality	Country studied
Bloom et al. 2015	Number of hospitals	Mortality after AMI, Management quality	Management quality increased. Mortality decreased.	England
Gaynor et al. 2013	HHI	Mortality after AMI, hospital utilization, expenditure	Mortality decreased after AMI, all-cause mortality decreased, hospitals facing more competitive pressure were able to find ways to marshal resources more efficiently to produce better patient outcomes.	England
Grabowski and Town 2011	HHI	Urinary tract infection, loss of activities of daily living, physical restraints, pressure ulcers (both high and low risk)	Nursing homes facing higher competition improved quality more than facilities in less competitive areas.	US
Cooper et al. 2011	Number of hospitals, HHI	Mortality after AMI	Quality increased.	England
Colla et al. 2010	HHI	Costs, length of stay, institutionalisation or mortality of hip fracture and stroke patients	Outcomes vary by condition. Hip fractures: competition increased costs and length of stay, while increasing death rates or institutionalisation. Stroke: competition decreased costs and length of stay and produced inferior outcomes.	US
Kessler and Geppert 2005	HHI	Readmission and mortality after AMI of more severely ill and less severely ill patients	Less severely ill patients: Competitive market has lower expenditures for these patients but competition has no effect on quality. More severely ill patients: Competitive market has higher expenditures and higher quality for these patients.	US
Gownisankaran and Town 2003	HHI	Mortality after pneumonia and AMI	Mortality ofHMO patients decreased. Mortality of Medicare patients increased.	US
Shen 2003	Number of hospitals interacted with HMO penetration and financial pressure	Mortality after AMI and complication rates	Interacted with financial pressure: 1985–1990 = no effect 1990–1994 = increase Interacted with HMO penetration: 1985–1990 = decrease 1990–1994 = no effect	US
Tay 2003	Demand elasticity	Mortality	Quality decreased.	US
Mukamel et al. 2001	HHI	Mortality after AMI and complication rates	Competition has no effect on quality.	US
Kessler and McClellan 2000	HHI	Mortality after AMI	Quality decreased.	US

3.2 Empirical studies with market-determined prices

When prices are market determined, previous empirical quality competition studies have had varying results, and it seems that institutional structure affects the incentives of firms, as Kranton points out in her 2003 study. When market structure is defined as the number of competitors in the market (in line with the definition used in this thesis), Propper et al. (2004) as well as Propper et al. (2008), for example, found competition to increase mortality (i.e. decrease quality). When competition was defined by the HHI, Gowrisankaran and Town (2003) found competition to increase quality (decrease mortality) after heart attack and pneumonia. With the same competition variable, Mukamel et al. (2002) found competition to decrease quality. This means that mortality dropped when patients with, for example, acute myocardial infarction (AMI), pneumonia or stroke were studied. Some studies define competition as mergers. Ho and Hamilton (2000), for example, studied the effect mergers and acquisitions have on the mortality of heart attack and stroke patients, on the readmission of heart attack patients and the discharge of newborn babies. They found varying results based on patient status – mergers had no effect on mortality while readmission rates and early discharge increased.

Two previous studies analyse the effect of price changes (i.e. changes in the competitive environment) on quality. Propper et al. (2008) analyse the UK healthcare market especially during an earlier policy regime, where competition was introduced in 1991 and abolished in 1997. In this regime, prices were negotiated and measures of quality very limited and not publicly available. Due to changes in the payment system, hospitals no longer received their annual budgets from the central government. Thus, the change appeared as follows: in the pre-reform period, the annual revenues of hospitals were known and costs were reasonably certain. During the post-reform period, costs remained quite certain but the possibility to earn revenue became uncertain and dependent on contracts. The results show that death rates were higher in areas with more competition. The study also suggests that hospital income is associated with lower death rates, which means that with fewer resources hospitals had greater problems in maintaining quality.

Volpp et al. (2003) have studied the effect of price deregulation on mortality after heart attack. The aim of the paper was to determine whether mortality rates for patients with AMI changed after subsidies for hospital care were reduced due to a government-administered reform. During the reform, the hospitals' payments changed from having fixed prices to being subject to price competition in which the rate-setting system was based on costs. The study found that quality decreased. The introduction of hospital price competition and reductions in subsidies for hospital care of the uninsured were associated with an increased mortality rate among uninsured and AMI patients. A description of the previous studies with non-regulated prices are presented in Table 2 (p. 26).

Table 2. Examples of previous literature on competition and quality with non-fixed prices.

Study	Competition measure	Quality measure	Main findings and the effect of competition on quality	Country studied
Forder and Allan 2014	Distance weighted HHI	Quality rating of nursing homes	Quality (and price) decreased	UK
Propper et al. 2008	Number of hospitals, price deregulation	AMI mortality	Mortality increased (quality decrased)	UK
Propper et al. 2004	Number of hospitals	Mortality	Mortality increased (quality decreased)	UK
Volpp et al. 2003	Price deregulation	Mortality	Mortality increased (quality decreased)	US
Gowrisankaran and Town 2003	HHI	Pneumonia and AMI mortality	Mortality decreased (quality increased)	US
Sari 2002	HHI	In-hospital complications such as wound infections	Higher market concentration decreased quality. Higher managed care penetration increases quality.	US
Mukamel et al. 2002	HHI	Excess mortality after all causes and more specifically after AMI, CHF, pneumonia, stroke	Mortality increased (quality decreased)	US
Ho and Hamilton 2000	Mergers	Mortality, readmissions	No effect on inpatient mortality; readmission rates increased in some cases	US

3.3 Empirical studies of price regulation

The following examples from empirical literature regarding price regulation and quality are not meant to focus on different pricing schemes per se but rather to illustrate the financial incentives price regulation holds in health care. Recent literature is also mainly from the US and the UK. In the US, the Medicare Prospective Payment System (PPS) was introduced in 1983. Due to this reform, hospitals became price takers instead of price setters (Shen 2003). In the UK, a policy regime was introduced in 1991 with the aim to separate providers and purchasers and increase competition. In this regime, prices were negotiated and measures of quality very limited and not publicly available. However, later on due to a change in government, this reform was abolished in 1997. (Propper et al. 2008.)

Ellis and McGuire (1996) analyse hospitals' responses to prospective payment. They show that changes in reimbursement have financial incentives to providers, which may garner three kinds of responses. First, changes in regulated payments may induce hospitals to alter the intensity of services provided particularly to certain groups of patients. The authors named this a moral-hazard effect. Providers may also try to change the patients they treat based on the severity of their condition. This is called a selection effect. Finally, providers may try to change their market share, which is called a practice-style effect.

In another study by Ellis (1998), changes in reimbursement are shown to influence providers' incentives towards the intensity of the care provided (i.e. quality of care) or patient selection. For example, a cost-based reimbursement results in the cream skimming of all patients. The PPS, on the other hand, increases the incentive to cream (compete for) the low-severity patients and skim the high-severity patients. The study also suggests that if firms are dumping the high-severity patients, they are also practicing skimming (Ellis 1998.)

Shen (2003) has analysed the effect of financial pressure on hospital quality. The effect of financial pressure on quality might differ depending on which type of competition dominates the market. For example, in Medicare, where prices are regulated by the government, quality competition is more likely to be a dominant factor, whereas in the case of Health Maintenance Organizations (HMOs) price competition may predominate over quality competition especially in highly competitive markets. Shen's empirical analyses focused on hospital markets where quality was measured as health outcomes after treatment for AMI. Financial incentive was defined in two different ways: as pressure from the PPS for inpatient care and changes in HMO penetration. Due to price regulation, the PPS is likely to induce quality competition. However, HMOs negotiate prices with hospitals and this will increase the likelihood of price competition. The study shows that the two different elements of financial pressure create different results on patient outcomes – financial pressure has an adverse effect on hospital quality. The effect is strongest on short and medium term health outcomes while the effect diminishes within one year of hospital admissions. Both selective contracting with HMOs and price regulation with the PPS create similar incentives to cut costs and reduce the amount of care. The paper also compares the financial savings and quality reduction of the system and finds that the quality reduction is small relative to the costs saved by the PPS and HMOs.

Dafny (2005) analysed the responses of hospitals to changes in DRG (diagnosis-related group) pricing and found that hospitals responded to changed prices by up-coding more patients into groups with the largest price increases. However, the hospitals did not increase admissions for those diagnosis groups and foremost, the regulator could not positively influence the quality produced by the hospitals.

Sood et al. (2008) studied the implementation of the PPS in inpatient rehabilitation facilities. The main target was to analyse the effect of changes in marginal and average reimbursements on costs and thus on health outcomes. The switch to the PPS has two potential and alternative results: It is likely to decrease the marginal reimbursement for additional services and thereby induce providers to reduce costs. However, it also affects the average reimbursement that a facility receives. In case the average reimbursement increases due to the PPS, it could in principle increase costs, and thus the implementation of the PPS could lead to an unambiguous result regarding cost savings and health outcomes. The study found that the implementation reduces costs by 7–11%, but the PPS had little or no impact on mortality or return to community residence.

One of the more recent studies regarding health care analyses an activity-based pricing (and especially the Best Practise Tariff; BPT) system and its effect on hospital behaviour. The aim of the BPT was to set prices proactively to reflect the costs of delivering best practice. If hospitals respond to the regulator's pricing decisions effectively, payers could alter prices proactively to affect, for instance, the volume of particular treatments. In England, the price offered to hospitals for discharging a patient on the same day as the operation or procedure increased by 24% while the price for inpatient care remained intact. This change was meant to enhance productivity by chancing clinical practice. The aim of the study was to analyse the intended and unintended effects from the price changes. The study sought to find out whether the amount of patients treated as day cases had increased and whether the reforms had an effect on patient selection, quality or productivity. Similar to the present study, the authors used a difference-in-differences (DID) method in their analyses, as price reform only affected some of the hospitals or units. Results show that the proportion of patients treated as day cases increased by 11 percentage points. However, there was no evidence that readmission or death rates were affected. (Allen et al. 2016.)

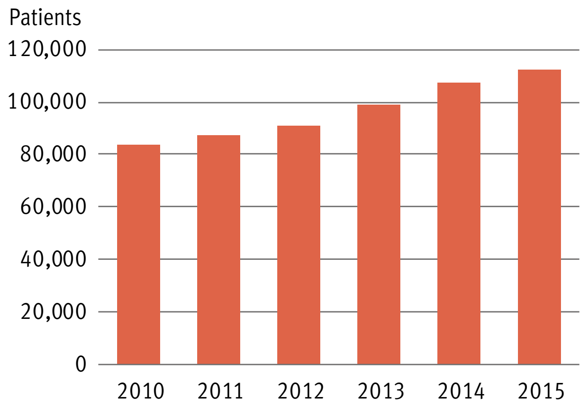
4 Rehabilitation services and procurement organised by Kela

Kela has a complementary role in the Finnish healthcare system, and rehabilitation is an integral part of healthcare services both in primary and specialised care. This means that previous literature from (mainly) hospital markets provides a framework for analysing rehabilitation services as well. They are especially useful in analysing rehabilitation services organised by Kela, because Kela uses different procurement mechanisms, which influence firms' behaviour regarding competition and quality.

The history of rehabilitation dates back to times when fellow citizens helped sick or disabled individuals to adjust to the community and to improve living conditions and life satisfaction. Rehabilitation began properly with the legislation of 1946 (907/1946), but the increased amount of veterans in need of rehabilitation after the war actually created the rehabilitative methods. During the 1950s, rehabilitation was seen as action aiming to help people to return to work after being sick or action aimed at supporting people to stay active in work. During the 1960s, there was a desire to link rehabilitation to other health and social services, and especially medical rehabilitation was seen as an integral part of good quality care. By the 1980s rehabilitation had stabilised its status as part of the Finnish healthcare system, and from the 1990s the role of the patient has been enhanced and the focus moved away from the expert towards empowering the patient. (Puumalainen 2008.)

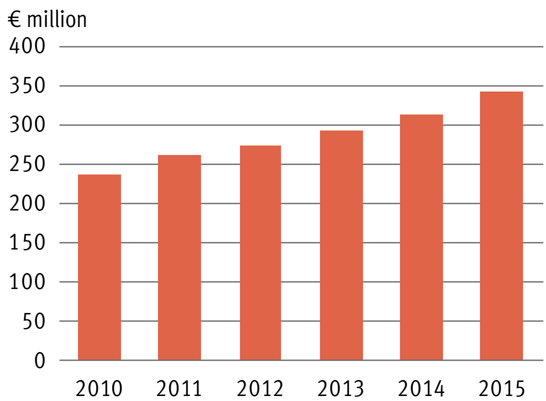
In the 1960s, the rehabilitation section was established as part of Kela, which is now the single largest organiser and purchaser of rehabilitation services in Finland. The structure of rehabilitation is defined in the law (566/2005). Services include vocational rehabilitation, rehabilitative psychotherapy, discretionary rehabilitation and medical rehabilitation. In 2015, approximately 112,000 persons received rehabilitation financed from the National Health Insurance (NHI). In 2015 Kela's budget for rehabilitation services was approximately 343 million euros. (Kela 2016a.) Figures 1 and 2 (p. 30) describe the number of patients receiving rehabilitation services organised by Kela as well as their costs.

Figure 1. Number of patients receiving rehabilitation organised by Kela.



Source: Kela 2016b.

Figure 2. Costs of rehabilitation organised by Kela (€ million).



Source: Kela 2016b.

4.1 Physiotherapy targeted for the disabled individuals

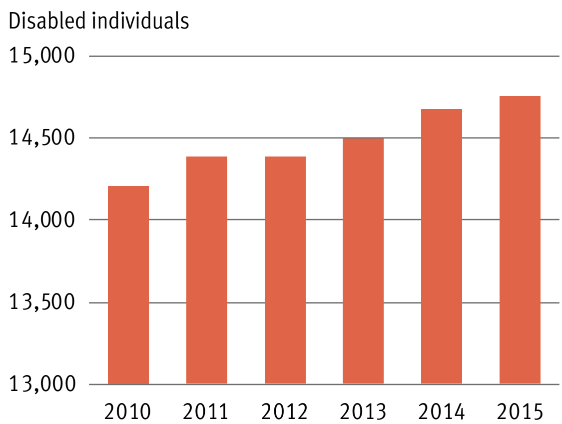
Kela is obligated by law to organise medical rehabilitation, such as physiotherapy, for disabled individuals (566/2005). Kela grants medical rehabilitation, such as physiotherapy, if the applicant fulfils the criteria defined by the law. For example, a person must receive disability allowance at its highest rate. Also, before 2016 medical rehabilitation was connected with other benefits (disability allowance or care allowance for pensioners at its middle or highest rate) but this mandatory relation has since been dismantled due to changes in acceptance criteria[2]. Medical rehabilitation services for persons with severe disabilities are provided in accordance with a written rehabilitation plan. This plan is drawn up with a doctor. Usually disabled individuals

2 See http://www.kela.fi/web/en/rehabilitation.

receive physiotherapy once a week, and Kela grants access to therapy for up to three years at a time.

The number of patients receiving physiotherapy (Figure 3) has been quite constant – approximately 14,000 persons receive these services annually. The purpose of medical rehabilitation is to support individuals with difficult illnesses and injuries (severe disabilities) to manage their ordinary activities and job-related duties. There are different rehabilitation activities (inpatient and outpatient) targeted at disabled individuals and they all aim at improving and maintaining work capacity and functioning. Inpatient rehabilitation periods last for a minimum of 18 days and, if necessary, a relative may join the rehabilitation. Outpatient rehabilitation, on the other hand, includes physiotherapy, occupational therapy, speech therapy, psychotherapy, music therapy and neuropsychological therapy[3].

Figure 3. Number of disabled individuals receiving physiotherapy organised by Kela.

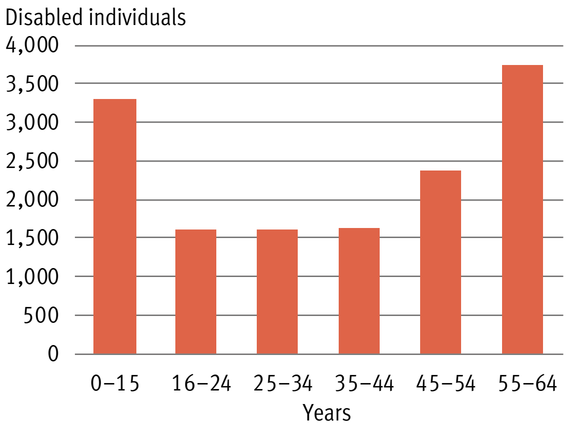


Source: Kela 2016b.

Medical rehabilitation is targeted at disabled individuals under the age of 65. The largest need for the service is in the younger and older age groups. For example, in 2015 the largest age groups receiving physiotherapy were children aged 0–15 and adults aged 55–64 years (Figure 4, p. 32).

3 See http://www.kela.fi/web/en/rehabilitation.

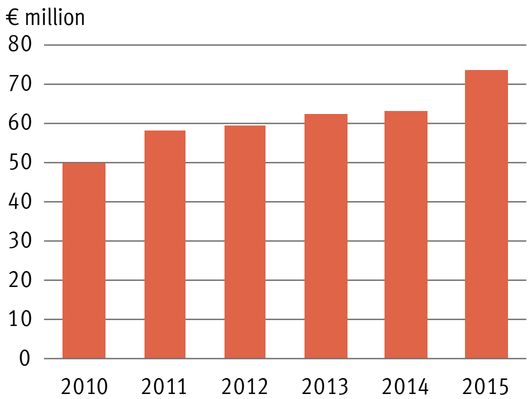
Figure 4. Distribution by age of disabled individuals receiving physiotherapy organised by Kela in 2015.



Source: Kela 2016b.

The costs of physiotherapy have increased steadily during recent years. In 2015, Kela's budget for physiotherapy was 73.5 million euros (Figure 5). Since the amount of patients has remained quite constant, the average revenue for firms per patient has increased from 3,535 euros in 2011 to 4,990 euros in 2015.

Figure 5. Cost of physiotherapy for disabled individuals organised by Kela (€ million).



Source: Kela 2016b.

Physiotherapy for disabled individuals is different from the general physiotherapy market because patients are entitled to these particular services by law, services are organised by Kela and they are financed from the NHI. There are no out-of-pocket payments for patients and firms have to take part in a procurement process before they can provide service. Also, physiotherapy for disabled individuals is quite intense because they typically receive therapy regularly (e.g. once a week) for many years compared to general physiotherapy which is usually provided for a shorter periods of time. Also, services are provided by private entrepreneurs only. The physiotherapy market for disabled individuals accounts for approximately 22% of the physiotherapy services produced in Finland, and approximately 40% of all physiotherapy firms are Kela's service providers (Pekola et al. 2017a; Pekola et al. 2017b).

4.2 Procurement of rehabilitation services

The law mandates that Kela is either to produce rehabilitation services itself or purchase them from the private sector (566/2005). At the moment, all rehabilitation services financed from the NHI are purchased from the private sector. The main method of acquiring a sufficient number of service providers to different Kela insurance districts is competitive bidding, in which Kela adheres to the legislation guiding public procurement procedures.

The national law on public procurement is based on the European Union (EU) public procurement directives, which date back to 1960s. In 2004, the European Council and the European Parliament accepted two directives that aimed at clarifying, simplifying and modernising existing European legislation on public procurement[4]. In addition to public procurement directives, other EU legislation governs procurement and the ways different countries implement procurement principles. In addition to national legislation and EU directives, Finnish contracting authorities adhere to the World Trade Organisation (WTO) Agreement on Government Procurement (GPA). (Ministry of Economic Affairs and Employment 2016.)

In Finland, the Act on Public Contracts (348/2007) and its revised regulations from 2010 define procurement in detail. The purpose of this Act is to increase the efficiency of the use of public funds, promote high-quality procurement and safeguard equal opportunities for companies and other communities in offering commodities or services. This means that when goods are acquired with public funds, procurement procedures must follow procurement legislation that covers, for instance, tendering procedures and contracting. (Ministry of Economic Affairs and Employment 2016.)

4.2.1 Competitive bidding

Kela organises competitive bidding to have enough providers to produce different rehabilitation services. For example, in physiotherapy targeted at disabled individuals, competitive bidding is the main method of organising the service, and tendering is usually carried out every four years. Bidding processes are conducted in different Kela insurance districts separately because physiotherapy services must be provided close to a patient's home, workplace, school or day care. The purpose of the procurement is to create a pool of eligible firms for each Kela insurance district.

4 See http://ec.europa.eu/environment/gpp/eu_public_directives_en.htm.

The process and procedures of competitive bidding as well as regulation regarding the organisation of rehabilitation services are strictly defined in the law (566/2005; 348/2007). According to the procedures defined in the Act on Public Contracts (348/2007), Kela must publish invitations to tender on the internet[5] because usually the value of the procurement exceeds the threshold defined in the law. The minimum quality of the service, as well as other requirements for the service providers are defined in the request for tender.

Firms, on the other hand, define their quality, price (for a 45-minute therapy session) and capacity in their tenders. During the procurement process, Kela assesses the tenders and scores those fulfilling the minimum requirements for quality and price. Scored quality could be defined as quality investments of firms because the actual outcome of care is not scored. For example, during the contract periods 2007–2010 and 2011–2014, quality scoring was targeted at therapists' education and work experience as well as the premises and their quality, the quality of the equipment and the extent to which a firm conformed to Kela's quality standard.

After scoring, tenders are compared and ranked based on their quality-price ratio (qpr). The final qpr defines the order of the tenders; tenders with the worst qpr do not receive a contract. Firms accepted as service providers based on accepted tenders sign a written contract with Kela that is valid for four years. The contract defines the terms of service production during the contract period. For example, the quality of the service may not decrease during the four-year period, and the price can only increase by predefined yearly indexes. During the contract period, the actions of the firms are also subject to auditing.

Each Kela insurance district makes contracts based on local need (e.g. the amount of demand in the area). The purpose of the procurement process is to create a pool of eligible firms for each Kela insurance district. After contracting, patients may choose proper service providers[6] from their local area based on their individual preferences. For example, in 2011 Kela had 1,320 physiotherapy service providers in 336 municipalities. In the same year, 1,202 firms provided services after participating in competitive bidding.

During the contract period, service providers are compensated from the NHI only if a patient has selected them to provide services and the physiotherapy has actually taken place. This means that money follows patients and thus patients' decisions have financial repercussions in the market. Due to patient choice, firms' access to the market has two stages. First, they need to succeed during competitive bidding and receive a contract with Kela. In the second stage, firms need to compete against each other on

5 Seehttp://www.hankintailmoitukset.fi (in Finnish and Swedish).

6 Patient choice was initiated in 2011. Before that Kela officials selected the proper service providers in co-operation with the patients.

quality to attract patients, because there are no out-of-pocket payments for patients using the service. Patients' decisions are also not likely affected by travel time or cost either, because all costs are covered for disabled individuals.

4.2.2 Service voucher

There has been a systematic increase in the possibility to use of service vouchers in Finland in the social and healthcare sector (1309/2003; 569/2009). Based on legislation, patients may receive a voucher from their home municipality and use this voucher when in need of certain healthcare services. In this case, the patient may choose a suitable service provider from the private sector and the municipality covers the costs through the voucher scheme. (Tuominen-Thuesen 2009.) At least three types of service vouchers are used in public health care in Finland. Some are earnings-related and require out-of-pocket payments, some have fixed prices with out-of-pocket payments and some are fixed-price vouchers per se (Sitra 2011).

During the contract period 2011–2014 Kela piloted service vouchers in two insurance districts (Päijät-Häme and South Ostrobothnia). The pilot was an administrative decision of Kela that aimed to develop different procurement methods for Kela and to enhance patients' possibilities to take part in the decision making of their rehabilitation. The price of the service was regulated, and the service was targeted at disabled individuals only.

A pre-requirement for the pilot to be successful was to have a sufficiently competitive environment (an adequate amount of supply and demand). The chosen pilot areas had some distinctive and some shared features: the two districts are geographically located in different parts of Finland but both of them could be described as medium sized districts. In the two insurance districts, there are 26 municipalities with a total of 118 firms providing physiotherapy for 1,200 disabled individuals in 2011. Each municipality had 1–22 providers.

Service vouchers were effective in physiotherapy for all firms within these insurance districts. Because competitive bidding was not an option, firms could only provide physiotherapy for disabled individuals if they decided to take part in the Kela service voucher pilot. Yet, the pilot differed from competitive bidding because the process was no longer regulated by the Act on Public Contracts (348/2007) and the price was regulated by Kela. Kela announced the information regarding, for example, prices before the pilot began in September 2010.

During the pilot, firms needed to register as service providers. Registration was not limited; rather, it was possible during the whole four-year contract period. Compared to competitive bidding the system was more flexible in this respect. As in competitive bidding, firms needed to fulfil minimum requirements (registration criteria) which included several issues. The firm must be entered into the prepayment register, and insurances for their business (patient insurance and liability insurance) are required. Premises and equipment must be safe for disabled individuals, and providers must accept the regulated prices and declare that they will not charge the patients any extra fees. Further, they need to inform Kela of any changes in their business, therapists must have professional practice rights and adequate first aid skills and they must be acquainted with Kela's quality standard. These minimum quality criteria are fairly close to the minimum criteria set by Kela for firms participating in competitive bidding.

After an assessment of the minimum criteria, firms received contracts with Kela to produce services for the disabled. Firms with contracts formed a pool of service providers from which patients were able to choose a provider from their local area based on their own preferences. Excess quality was not scored during registration. In this system, patient decisions have a financial impact on firms because they need to compete for patients to get reimbursements from Kela.

Providers were not able to charge any extra fees from patients, and during the contract period the regulated prices could only increase according to yearly indexes defined by Kela. The same fixed prices were used in both pilot districts, but the regulated prices had two categories, so different firms could have different prices depending on which price category they reached – the reference level price or the higher level price. Prices were also different for firms with and without premises.

Firms could reach the higher level price if they fullfilled the quality criteria linked to the higher price. Staff quality criteria linked to pricing were 30 study credits of further education after graduation (a combination of longer and shorter courses) and work experience of 8 years or more. If a firm fulfilled the criteria, the price was increased from 38 euros to 45 euros for firms with no premises (or premises under $20m^2$). For firms with premises the prices were 43 euros and 50 euros.

Because firms were no longer able to set prices, they needed to make decisions regarding quality and cost containment based on the changed regulation policy (minimum requirements and regulated price). Due to the changes in pricing, the system potentially had an impact on firms' incentives regarding cost containment and quality. On the other hand, in 2011 freedom of choice was also introduced in physiotherapy. Thus, the system now had elements of competition that could have opposite effects on the quality of the firms.

4.3 Patient choice in physiotherapy

Following the trend of other Northern European countries (Vrangbaek et al. 2012), it has become a growing trend to increase patient choice also in Finland. According to the current Health Care Act (1326/2010), Finnish patients using public and tax financed healthcare services may choose between all public healthcare units both in primary and specialised care. However, due to a vast reform in the Finnish social and health care sector, from 2020 patients will be able to choose from a mix of public, private or third sector primary care providers.

Since 2011[7], disabled individuals (also called patients) receiving physiotherapy organised by Kela have been able to choose their service providers from their local area based on individual preferences. Patients were granted the right despite the procurement in their area.

The law (566/2005) dictates that services are compensated only when they are materialised and therefore patients' decisions have financial repercussions. Thus, there is potentially a financial incentive for service providers to compete with each other for volume. When patients exercise free choice, price is irrelevant, since Kela is mandated by law to cover all costs. For this reason, from the patients' point of view, service providers differ from each other in two dimensions: location and quality.

To ease the decision-making process for patients, Kela established a website[8], which lists all service providers in different geographical areas. Information regarding language and communication skills is provided, but comparable quality information is not offered. Thus, it is evident that information on physiotherapy is incomplete and asymmetric.

7 Before 2011 the choice was made together with Kela officials.

8 See https://easiointi.kela.fi/palveluntuottajahaku/ (in Finnish and Swedish).

5 The empirical studies

In an example of hospital competition presented by Gaynor and Town (2011), hospitals first bargain with health plans to determine both the set of hospitals to be included in the plan network and the payment, and in the second phase patients choose their health plans. Similar events occur in the physiotherapy market targeted at disabled individuals – firms first participate in competitive bidding (or register as service providers in the service voucher scheme) in order to be contracted with Kela, and then patients choose providers from their local area. When fixed-price service vouchers were piloted, Kela changed the payment mechanisms for firms in the two insurance districts. Firms no longer determined the prices in the tenders, but firms were rather reimbursed based on the fixed amount regulated by Kela.

The previously explained change in the pricing and implementation of patient choice was likely to affect the incentives of firms operating in the market and ultimately the outcomes, such as quality and quantity. Thus, the following theoretical question arises: Under different pricing schemes, is market competitiveness associated with firms' incentives in respect to quality decisions?

The general aim of this thesis was to evaluate different procurement mechanisms and especially different pricing schemes associated with competitive bidding and service vouchers by using empirical data and to analyse the causal effects of competition and price regulation on quality in physiotherapy targeted at disabled individuals financed from the NHI.

In more detail, the main questions addressed were:

I) Does competition have an effect on quality in physiotherapy when prices are regulated?
II) Does competition have an effect on price and quality in physiotherapy?
III) Do price regulation and freedom of choice have an effect on quality in physiotherapy?

The objective of the case studies (articles I and II) was to estimate and clarify the effects of competition on quality when prices are either regulated (article I) or determined by firms (article II). Because pricing potentially has a large impact on firms' financial incentives, the empirical estimations are analysed in two separate studies. In both analyses, the effect of market structure (number of competitors) on quality in physiotherapy is estimated, while in article II the effects of market structure on the price of a 45-minute therapy session are also estimated. It is relevant to analyse quality effects in physiotherapy because the market is potentially very competitive, patient choice was officially implemented in 2011, and two different procurement mechanisms were used during the contract period 2011–2014. The main difference of the procurement process was the pricing, because patient choice was effective despite the mechanism of organising the service. Kela regulated all prices during the service voucher pilot, while with competitive bidding firms were able to set their prices in the tenders. After registration or tendering, patients are able to select a provider from the pool of accepted firms. Article III analyses the effect of price regulation and freedom of choice on quality. As is known, it is common to regulate prices in health care. However, price regulation affects firms' decisions and incentives regarding, for example, cost reductions. Price regulation transfers the responsibility of cost control to firms, but also the level of the fixed prices has an effect on firms' incentives. If prices are set too low, firms' price-cost margin may be compromised (turn to negative) and cause quality to deteriorate due to cost reductions possibly executed by decreasing quality. To be able to analyse these events, for article III, regulated and non-regulated firms were identified and the quality of both groups was analysed from two contract periods (2001–2010 and 2011–2014).

6 Data, methods and variables

6.1 Estimating the causal effects of competition and regulation on quality

In articles I–III, a causal relationship between the variables with theoretical importance is estimated. Economists study causality from the perspective of policy evaluation. Policy questions require different tools, and analyses must always be solved case-by-case, yet certain rules and expectations are known and used when causal effects are investigated. (Heckman 2008.) A randomised controlled study (RCS) is usually regarded as an optimal way to study a certain reform or event, because a controlled study requires only minimal assumptions of the units included in the studies and the reform itself. However, an RCS is usually not an option in economics when policy reforms are studied. A simple correlation is also typically not an adequate method, because causality claims require much more information of the event. (Imbens and Wooldridge 2009.)

The definition and use of market structure includes deficiencies due to an endogeneity problem. For example, the HHI approach comes with uncertainty even if patient migration data is used. Higher-quality hospitals may have patients coming from a larger geographic area than lower-quality alternatives, and this could lead to results that high-quality hospitals face more competition (and have less market power) than the substitutes even though the result could be quite the opposite. (Tay 2003.)

Due to the previously described bias caused by endogeneity, causality studies require the use of instrumental variables, and selection bias on the other hand requires a proper comparison group for the treatment group in order to distinguish treatment effect from the selection bias, for example. Overall, different groups may differ in both observed and unobserved characteristics and especially unobservable factors require more thorough investigation when causal effects are studied after a policy reform.

There are three concerns linked to causal inference: First, a *definition* of hypothesis must be solved with the help of scientific theory. Second, there is the *identification* issue of the model – causal parameters must be reliably and logically identified within a large sample free of any sampling variation. Thirdly, there is the *estimation* and identification of parameters with real data. However, when all of these phases are adequately addressed, it is possible to define explicitly the relationships between the unobservables in outcome and selection mechanisms to identify causal models from data. (Heckman 2008.)

Internal validity of the causal inference is the correct definition of the treatment. The external validity of a study is the knowledge of transferring a treatment parameter from one environment to another. The most ambiguous and fundamental problem is forecasting the effect of a new policy. (Heckman 2008.) In this study, I focus on estimating the effects of competition and regulation on quality. The units analysed are firms and the treatment is price regulation under fixed-price service vouchers. I also analyse competition under different pricing schemes – prices are either regulated by Kela or defined in the firms' tenders.

To be able to solve the previously explained causal effect of competition and price regulation on quality, statistical methods must be carefully used and implemented. The evidence of causality requires the use of, for example, the instrumental variables estimation and the difference-in-differences estimation (Brekke et al. 2014). The methods and their use in this thesis as well as data are explained in the following chapters.

6.2 Instrumental variables estimation (used in articles I and II)

If the regressor (X) is correlated with the error term (u), the ordinary least squares (OLS) estimator of the β is inconsistent. In the previous case X is no longer exogenous, and there will be an endogeneity bias and thus an instrumental variables estimation (IV estimation) must be conducted instead of using simple linear regression analyses. During the IV estimation, information about the movements in X that are uncorrelated with u is utilised through the use of instruments (Z), and therefore the estimations of the regression coefficient are consistent. (Stock and Watson 2007.)

Despite being seemingly straightforward techniques, there are certain predefined requirements for the instruments. First of all, the instrument Z must be unrelated with the error term. Secondly, the instrument Z must be correlated with X. This means that the selected instrument Z is relevant. Thirdly, the IV estimation is consistent and satisfying only if the instrument (Z) explains the outcome (Y) through X. This is called the validity assumption. Validity cannot be directly tested, because the unobserved factors are indeed unobserved. The validity tests will only reveal whether the instruments are bad, but they do not state anything about them being good. Finally, the weakness of the instruments must be considered; in case there is any correlation between the instrument Z and the error term u, a weak correlation between X and Z leads to inconsistent IV estimations. Thus, in addition to multiple statistical tests, the use of IV techniques requires a lot of knowledge of the phenomenon being studied, and different decisions must be theoretically well-reasoned. (Stock and Watson 2007; Wooldridge 2010.)

Gaynor and Town (2011) have noted that a market structure variable is endogenous in competition studies, and thus it is important to add variables that only explain quality through the market structure variable. The authors note that in the empirical setting of health care, the endogeneity bias means that due to the unobserved quality it is likely that certain providers have large market shares and thus it appears that these providers also have a high measure of market power. Therefore, in articles I and II, the endogeneity of the competition variable (i.e the number of firms) can cause significant bias in the results, and thus instrumental variables (Z) that only explain quality through the market structure variable were added to the analyses.

The estimation proceeds in two stages, and hence it is common to call the IV estimation a two stage least squares estimation (2SLS). Both stages use OLS estimation techniques. During the first stage, the X is decomposed to two components: one that may be correlated with the error term and another that is uncorrelated. The second stage regression then uses the latter which is a predicted version of X achieved by using the instrument Z. With this technique, a consistent β is estimated. (Stock and Watson 2007; Wooldridge 2010.)

6.3 Difference-in-differences estimation (used in article III)

Difference-in-differences (DID) estimation depends on the presence of data of both control and treated units from pre and post treatment periods. Within estimation, the population average difference over time in the control group (Treatment (t) = 0) is subtracted from the population average difference over time in the treatment group (t = 1) to remove biases associated with a common time trend unrelated to the intervention (Imbens and Wooldridge 2009). In DID estimation it is important to be able to control pre-period differences of units in the treated and control groups. It means that both groups should have followed similar parallel trends if treatment had not occurred.

Due to observational data, the DID regression was used in our effort to isolate the effect of the price regulation and freedom of choice on quality. Our aim was to estimate the treatment effect of the treated. For this task, in article III we have defined the regulated and non-regulated firms and their quality before (contract period 2007–2010) and after (2011–2014) the reform. In order for the DID estimation to work, the variable that separates the treatment and control groups must be a binary variable. The variable indicating the time before and after the reform must also be a binary variable. The treatment effect can then be estimated by using an OLS regression, but this requires the use of an interaction constructed from the two previously mentioned binary variables (Cameron and Trivedi 2009).

It is possible to use richer models, and an obvious extension is to include regressors other than the previously mentioned treatment indicator and time dummies (Cameron and Trivedi 2009). To control for the variation in the quality (Y) it is possible to add both time in-variant and time-varying variables to the model. We have added firm and market structure (municipality) level variables that are considered relevant for the analyses. The control variables used are, for example, firms' potential patient capacity and the amount of patients in a municipality.

Due to the lack of multiple pre and post time periods, we finalised the analyses in article III with kernel matching (KM) and by testing the balancing property. By using matching methods, we aim to control the possible selection bias.

6.4 Data

All three articles make use of various data sources and statistical estimation methods. In articles I and II the aim is to estimate the effect of competition on quality (and price in article II) by using cross-sectional data from the contract period 2011–2014. Article III analyses the effect of price regulation and freedom of choice on quality, but in this article data from the contract periods 2007–2010 and 2011–2014 are used.

Firm and municipality level data for studying competition and financial risk and their effect on quality were gathered by using different registers as well as procurement data from Kela. Data on the number of disabled individuals receiving physiotherapy, the number of firms providing services for Kela in different municipalities and the sickness index of the population in different municipalities were gathered from Kela registers. Average rental rates, population of the various municipalities and physiotherapists' monthly income in the private sector were provided by Statistics Finland. Data on the number of physiotherapists in Finland, the number of staff in the firms providing services for Kela, and the firms' risk rate, which defines their financial risk, was obtained from Suomen Asiakastieto Oy. Information on the number of years a firm has operated since establishing was obtained from the Finnish Patent and Registration Office's database. Municipality-level data was used in calculating variables for particular Kela insurance districts.

In articles I and II, data regarding the contract period 2011–2014 was analysed. In article III, also data from the contract period 2007–2010 was used. In all articles, procurement data and Kela register data were supplemented with data from Statistics Finland and Suomen Asiakastieto Oy. For articles I and III, previous register and procurement data were also supplemented with firm-specific quality data gathered with a questionnaire to firms that took part in the Kela service voucher pilot.

During the contract period of 2007–2010, there were about 1,460 firms providing physiotherapy for disabled individuals, but data from only 724 firms was usable in article III. Data regarding the contract period 2011–2014 included firm-specific variables from 854 firms participating in competitive bidding. Thus in article II, information was available on 71% (854 of 1,202) of all firms providing services after tendering. Procurement data included firm level data on quality, prices and capacity but only from firms accepted as service providers.

Regarding the service voucher pilot (2011–2014), we were able to include quality, price and capacity data on 95 (80.5%) firms providing services within the two pilot districts in articles I and III. Price and capacity information was retrieved from Kela.

However, quality was not scored during registration, and thus quality information was gathered with questionnaires from the firms that had a contract with Kela for providing physiotherapy for disabled individuals during the pilot. Multiple questionnaires (altogether five with six reminders) were sent to the firms in 2013 (in January, February, March, April and November). Three questionnaires were electronic and two were traditional postal questionnaires. Despite repeating the questionnaires many times, an insufficient amount of respondents was gathered, and for this reason 33 service providers were interviewed by phone in April 2014. The data and methods used in the articles are presented in Table 3 and Table 4.

Table 3. Data, methods and the data unit level used in articles I and II.

Articles	Years	Data source	Data unit level	Methods
I) Competition and quality in a physiotherapy market with fixed prices	2011–2014	Procurement data from Kela, Kela register data, Statistics Finland register data, Suomen Asiakastieto Oy register data, questionnaire targeted at firms atteding Kela's service voucher pilot	95 firms	OLS, IV
II) Does competition have an effect on price and quality in physiotherapy?	2011–2014	Procurement data from Kela, Kela register data, Statistics Finland register data, Suomen Asiakastieto Oy register data	854 firms	OLS, IV

Table 4. Data, methods and the data unit level used in article III.

Article	Years	Data source	Data unit level	Methods
III) Assessing the effects of price regulation and freedom of choice on quality: evidence from the physiotherapy market	2007–2010 and 2011–2014	Procurement data from Kela, Kela register data, Statistics Finland register data, Suomen Asiakastieto Oy register data, questionnaire targeted at firms atteding Kela's service voucher pilot	724 firms from both periods	OLS, DID, KM

Dependent variable: quality (in all articles)

The variables that had theoretical importance and were significant in the models estimated are quality and competition in articles I and II. In all articles the dependent variable was quality scored either during the tendering (article II) or during the research (article I) based on the scoring of the tendering. Quality was measured empirically as the sum of each firm's quality attributes. The quality factors included education (max 20 points), work experience (max 30 points), premises and their quality (max 6 points), quality of the equipment (max 6 points) and the extent to which firms complied with Kela's quality standards (max 41 points); hence, the maximum quality score was 103 points. In addition to these quality factors, Kela scored language skills (max 2 points), but that variable was excluded from the analyses due to missing data. Quality data from the contract period 2007–2010 were made commensurate with the quality from the contract period 2011–2014 by multiplying the 2007 premises and their quality score points by 0.4, the equipment score by 1.2 and firms' compliance with Kela's quality standards by 1.17.

The analysed quality factors can be described as medium or long-term quality investments of a firm rather than as the quality of care. Even though it is unfortunate that it was not possible to use the actual outcome of care, the construct of quality physiotherapy is known to be manifold: any measurement of quality can include how the service is organised, the way in which care is provided, the way in which information about care is recorded and used for evaluation purposes, and the outcome of such care. (Grimmer et al. 2000.) The quality assurance standards set by the Charted Society of Physiotherapy (2012) also define a variety of different quality factors in their quality standard for physiotherapy. For these reasons, quality analysed and used in the thesis is an operable measure despite its deficiencies.

Independent variable: competition (in articles I and II)

Our main independent variable in articles I and II is competition. As mentioned previously, there are multiple options in defining competition. Perhaps the most used measure is the Herfindahl-Hirschman Index (HHI), which is the sum of the squares of the market shares of all firms. However, based on previous literature regarding the English hospital market (see, e.g. Propper et al. 2004; Propper et al. 2008) it is also possible to define market structure as the number of competitors in a market.

Despite the procurement method being irrelevant to patients, distance to the provider is considered to be an important issue defining demand as patients are disabled individuals. For this reason, patients are presumed to make decisions among or between providers within their own municipalities. Thus defining competition at the municipality level is sensible. In article I, we measured the degree of competition by the number of firms providing physiotherapy services for disabled individuals in a given municipality. The reasoning behind this definition lies within the registration of the service voucher pilot. Because firms were able to register freely during the pilot, it was likely for firms to know their current competitors. In contrast, during competitive bidding firms participated in the tendering process simultaneously, and thus firms needed to consider all firms providing physiotherapy in a given region as possible competitors. Therefore, in article II competition was defined as all firms producing physiotherapy in a municipality and in article I competition was defined as the number of firms providing physiotherapy services for disabled individuals in a given municipality.

Approximately 40% of the service providers contracted with Kela to produce physiotherapy for disabled individuals are self-employed entrepreneurs. Due to Finnish tax legislation, these firms are not obligated to report their yearly net revenues, which prevented us from using the HHI as a competition measure. As a robustness check we calculated the HHI in article I by using the amount of disabled individuals in a municipality and the number of patients treated by each firm.

Instrumental variables used in articles I and II

In articles I and II instrumental variables were used. In article I, two instrumental variables were included in the analyses: market level total capacity and square of the total population in a municipality. These instruments are correlated with the number of physiotherapists in a market. A higher market level total capacity is clearly positively correlated with the number of physiotherapists in the market, and total population takes into account differences in population density in different areas, and it captures the possibility of accounting for differences in the supply of services in different areas. There is also more competition in more concentrated areas.

In article II we used three insurance district level instruments for both quality and price estimations. Our instrumental variables are the rental rate, the percentage of disabled individuals in the total population and the sickness index of a particular population. In line with Forder and Allan (2014), all of the instruments used in the analyses are variables aggregated at the insurance district level, while municipality-level versions of the variables were added to the analyses as exogenous variables. In this way, all impacts resulting from the need for quality will be felt at the lower level and any remaining effect will be felt at the higher aggregated level.

Demand and cost shifters in articles I and II

In article I the total number of disabled individuals treated by the physiotherapists in a municipality serves as a demand shifter, and a logarithm for the average rental rate in a municipality (€/m^2) serves as a cost shifter.

In article II, the percentage of disabled individuals receiving physiotherapy of the population of a particular municipality serves as a demand shifter, and the average wages of physiotherapists working regular hours serves as a cost shifter.

Independent variables: price regulation in article III

Price regulation (a fixed price service voucher) was implemented in 2011 for the four-year contract period (2011–2014) in two Kela insurance districts. In these insurance districts, services are organised with fixed-price service vouchers, while in other districts services are organised by competitive bidding and non-regulated prices. Price regulation changed the competitive environment of firms by intensifying it and forcing firms to compete solely on non-price means. However, it is important to analyse whether the change in pricing will have an effect on quality. We use difference-in-differences (DID) regression in the effort to isolate the effect of regulation, and for this task, we have defined the regulated and non-regulated firms and their quality before and after the reform.

Other control variables used in articles I–III

For all articles, both firm and municipality level control variables were included. In article I, the number of staff working in a firm, the sickness index of the population in a municipality, years of operation since the founding of the firm, price and a logarithm for the average wages of physiotherapists working regular hours in the private sector in Finland are used as control variables.

In article II, a firm's potential patient capacity, total population in a municipality, the sickness index of the population in a municipality and average rent levels in a municipality were used as independent variables in both price and quality estimations.

In article III, we added several firm and market structure level control variables into our analysis in order to control for other factors that could have an effect on the outcome. Our control variables included the potential annual capacity of a firm with respect to disabled individuals, the number of competitors (firms providing physiotherapy) operating in the municipality, the average rental rate in a municipality, the number of disabled individuals receiving physiotherapy in a municipality, the population of a municipality and the price for a 45-minute therapy session. Our price variable was made commensurate by multiplying 2007 prices by the index of wage and salary earnings. We also used six dummy variables based on firm type (limited company, limited partnership, joint-stock company, sole proprietor, foundation and association) in order to control for management differences, among other things.

6.5 Statistical estimations in articles I–III

With previously mentioned observational data, reduced-form approaches were used in estimating the effect of competition on quality in articles I and II. Within this approach, the measure of market concentration is regressed on the variable of interest (e.g. quality) but also other confounding variables are included in the model. This approach makes it possible for researchers to let the data declare the relationships between the variables of interest. (Gaynor and Town 2011.) Still the declared approach requires measures to take the endogeneity bias in account. Thus, previously presented IV estimation (2SLS estimation) methods were applied.

In articles I and II, our main analyses proceeded in two stages. We first provided OLS estimates assuming that (the potential endogenous variable) competition is an exogenous variable. In our second model, to correct for any bias caused by the endogenous variables in the model, the competition variable was treated as an endogenous variable and the model was estimated by using IV estimation techniques. In article II this was extended to both quality and price estimations. In article I, the price of the service was regulated by Kela but it was also affected by the quality of the provider. Hence, the inclusion of price would only allow us to analyse the partial effect of competition on quality within a price category. To get the full effect of competition on quality, the price variable needed to be dropped from the final OLS and IV estimations despite the theory expecting regulated prices to be added to the analyses as they affect supply side decisions (see e.g. Gaynor and Town 2011). Partly for this reason, three additional analyses were conducted in article I as well as a response bias analysis. First, we added insurance district dummies, and second, firm-type dummy variables to our IV estimation in order to take into account regional differences as well as differences in firm-specific business management styles in our analyses. In the final (additional) estimation, prices were included in the model as expected by theory. In article I standard errors were clustered at municipality level.

When IV estimation techniques are in use, the selected instruments must be theoretically justified but they also need statistical testing. In articles I and II, the IV models were over-identified. Thus, the instruments used were tested for under-identification, weakness and over-identification. Also, a Stock-Yogo test for testing the weakness of the instruments was used. After a thorough testing of the instruments, the endogeneity assumption was also tested with the Durbin-Wu-Hausman test. Based on previous testing, if a possible endogenous variable is shown to be exogenous, the main results may be drawn from the OLS estimation.

In article II, two additional analyses were conducted as robustness checks. First, we added municipality-size dummy variables, and second, we added firm-type dummy variables to our OLS model. Smaller municipalities had less than 20,000 inhabitants, larger ones had over 20,000 inhabitants.

In article III, the DID method was used in order to isolate the effect of service voucher reforms, i.e. price regulation and freedom of choice on quality. For this task, the regulated and non-regulated firms and their quality before and after the reform were defined. The coefficient of interest (the interaction term, i.e. price regulation multiplied by year stating the period of regulation) forms after the average gain in quality over time in the control group is subtracted from the average gain over time in the treatment group. Basically, the method removes either biases that could be caused by permanent differences between the two groups or biases resulting from time trends unrelated to the regulation (Imbens and Wooldridge 2009).

Because the data in article III only consists of two time periods, the parallel trend assumption could not have been tested properly. This means that during the DID analyses it was difficult to confirm that the two groups (control and treatment) did not differ before the reform was implemented and thus the selection bias was possible. To overcome these difficulties, kernel matching was conducted as a sensitivity analysis in this study.

Another robustness check in article III was executed with a slightly different quality measure. The original quality measure is the sum of different quality factors that were scored either during the procurement process (non-regulated prices) or after firms replied to questionnaires that were sent during the study (regulated prices). One of the quality factors (firms' compliance with Kela's quality standards) was difficult to score outside the procurement process, because scoring involves judgement and, therefore, we modified our quality variable by removing this particular quality indicator and ran the estimations again with the renewed dependent variable. Finally, we also added firm-type dummy variables to the model in order to control for firm type time invariant factors in our analyses.

7 Results

With this doctoral dissertation I wanted to answer the following theoretical question: Under different pricing schemes, is market competitiveness associated with firms' incentives in respect to quality (and price) decisions?

In order to reply to the previous theoretical question, I need to answer the following empirical questions:

- Does competition have an effect on quality in physiotherapy when prices are regulated?
- Does competition have an effect on price and quality in physiotherapy (when prices are determined by firms)?
- Do price regulation and freedom of choice have an effect on quality in physiotherapy?

The following sections present the findings from three empirical studies.

7.1 Article I: Competition and quality in a physiotherapy market with fixed prices

Results from article I show that competition has a statistically significant negative (yet weak) effect on quality. Results from both the OLS estimation and the 2SLS estimation find similar results. Results from the tests regarding the use of instruments indicate that the instruments chosen are valid and relevant. Also, weakness of the instruments does not bias the results. An important finding regards the endogeneity assumption associated with the study genre. In physiotherapy, endogeneity does not bias the results and therefore, the main results can be drawn from the OLS estimation. Thus, it seems that in physiotherapy, firms are less eager to make quality investments when competition is denser. However, the demand shifter (number of disabled individuals treated) has a positive and significant effect on quality while the cost shifter (logarithm for the average rental rate in a municipality) does not have an effect.

In addition to the analyses, three additional estimations were done as a robustness check. Insurance district dummy variables and firm-type dummy variables were included in the models. Based on the estimations, the results remained unaltered and it may be concluded that regional differences or differences in business management styles, for example, did not have an effect on the results. Finally, we added regulated prices to the models as suggested by Gaynor and Town (2011), but the main results remained intact. In fact, based on the response bias analyses, firms that did not respond to our questionnaire were slightly smaller firms based on their yearly patient capacity. They also had somewhat lower prices and thus perhaps lower quality than the firms included in the study. Therefore, our results from physiotherapy with fixed prices are robust.

When market structure is defined crudely as a certain geographical area such as a municipality, it is impossible to control patient flow. For this reason, we calculated the HHI for different municipalities by using the number of patients treated in firms located in each municipality and the number of patients living in each municipality. Based on the results, the market for physiotherapy is very concentrated. Only 2 out of the 26 municipalities in the insurance districts included in the service voucher pilot had an HHI below 1800 (a value that is commonly used as a threshold for a non-concentrated market). Also, when data was analysed separately for different markets based on the number of competitors in each, it was shown that quality was higher when only one or few firms produce services for disabled individuals. Quality then decreases as the number of firms increases, and with several competitors in the market, quality increases again.

The results found in this article are likely caused by imperfect information. Despite patient choice, Kela does not provide any information on quality for patients to ease the comparison and ultimately the choice. As quality information is not public, there is also no incentive for firms to invest in quality or compete against each other on quality. When firms determine prices, theory gives unambiguous results of how competition will affect quality. On the other hand, when prices are fixed, the general theory of competition and quality indicates that competition increases quality because providers need to compete on quality instead of price to attract patients. Yet it is shown that the causal connection is not necessarily this straightforward. Brekke et al. (2014), for example, show that other factors, such as imperfect information, influence the incentives for firms in the market despite prices being regulated.

7.2 Article II: Does competition have an effect on price and quality in physiotherapy?

In article II the effect of competition on both quality and price was analysed. In this article prices (as well as quality) were determined by firms in their tenders. As in article I, the analyses for both quality and price estimations proceeded in two stages. First, competition was treated as an exogenous variable and then as an endogenous one. This means that the first estimation was again an OLS model and the second was a 2SLS model. The selected instruments for the 2SLS model were aggregated at insurance district level and similar variables measured at municipality level were included to the model as exogenous variables. Similar spatially defined instruments have previously been used by Forder and Allan (2014), and the aim was to test whether a similar formulation would be effective in this as well.

Based on the results regarding the use and selection of the instruments, the under-identification, over-identification or weakness of the instruments do not bias the results in either quality or price estimations. However, in line with article I, the endogeneity of the competition variable does not bias the results and in fact, the results drawn from the OLS estimation are valid in both quality and price estimations.

Based on the results from the OLS model, competition has a negative effect on quality at a 5% level. Results with instrumental variables showed a negative but non-significant effect, but based on a previous endogeneity test, this result is not valid in physiotherapy. Despite previous findings, the strategy of using instrumental variables in a way that was previously used by Forder and Allan (2014) to tackle the possible endogeneity also seems to work in the context of physiotherapy. We were able to demonstrate that including aggregate-level instruments (insurance district) in the 2SLS regression model and adding local-level versions (municipality) of the same variables to the analyses as an exogenous variable is, in fact, an efficient way to analyse competition when endogeneity is suspected.

In addition to the two main models, we completed two additional estimations as a sensitivity analysis. First, we added municipality size dummy variables, and second, we added firm-type dummy variables to the OLS model. The results from these additional regressions suggest that quality was slightly lower in smaller municipalities compared to larger ones (population > 20,000) but there were no differences between firm types (e.g. business management styles). Thus, our results from quality estimations are robust.

In article II, the causal connection between competition and price was also analysed, and the results show that competition does not have an effect on prices. We found that service providers have market power over Kela because the selection criteria for competitive bidding are not very strict. Also, Kela does not support free choice as it does not provide patients enough information on quality. Based on the results regarding the elasticity of quality with respect to competition, it was found that quality is inelastic in physiotherapy. This means that a 10% increase in competition will only increase quality by 5%.

In line with article I, the imperfect information dilemma is quite apparent in article II and in physiotherapy in general, as Kela provides too little information for patients to act rationally in their decision making. As is known, sufficient and relevant information is crucial in order for choice and competition reform to work efficiently. If freedom of choice is to have an effect on quality, it is necessary to rely upon a patient's judgement and responsiveness to the quality of the service and for providers to react to the choices stemming from those judgements. It is known that only the presence of free choice has an effect on quality. Information about the quality of health care is quite often technical in nature and most patients have difficulties in dealing with this kind of knowledge, still the performance of service providers seemingly improves when information about quality is published. (Le Grand 2007; Santos et al. 2017.)

7.3 Article III: Assessing the effects of price regulation and freedom of choice on quality: evidence from the physiotherapy market

As explained in the previous sections, Kela's service voucher pilot altered the pricing of the firms because during the contract period 2011–2014 prices were regulated. Before regulation, all firms participated in competitive bidding organised by Kela, and at this point firms defined their prices in their tenders. In 2011, patient choice was also initiated throughout the country. This means that the system had two potential effects on the market. Price regulation forces firms to cut costs and it is possible that firms execute this reduction through quality. Freedom of choice, on the other hand, increases competition between providers, and in such a setting firms need to enhance volume by increasing quality if they are to increase profits.

Based on the results from the DID regression analyses, quality decreased after the reform. When control variables were included in the model, control and study groups did not have a statistically significant difference, which is crucial in this study setting. As a sensitivity analysis, we removed the competition variable from the model in order to control the possible bad control, but the result remained the same. As a robustness check, we also conducted similar analyses with a slightly modified quality variable because of concerns regarding the scoring of one of the quality factors (the extent to which firms complied with Kela's quality standards). The results remain unaltered; however, the effect is much more modest in this model. This could mean two things: either the difficulty in scoring indeed overestimated the negative effect, or firms decreased their quality most in this respect. The firms' compliance with Kela's quality standards is probably the easiest quality factor to decrease because other quality factors (such as equipment or premises) are likely to react more slowly to price regulation.

Finally, we also added firm-type dummy variables to our regression to control for firm-level time invariant factors but the main result was not altered. Thus, we conclude that quality was decreased after prices were regulated and freedom of choice was introduced. Based on theoretical literature regarding fixed prices, firms may carry out cost reductions by decreasing quality. It seems that in physiotherapy the results are in line with the theoretical predictions and so we conclude that firms were not incentivised to compete for patients with quality. Instead, they aimed to decrease costs by reducing quality. The imperfect information present in physiotherapy organised by Kela only strengthens the results.

The more a healthcare provider, such as a hospital, provides services under fixed prices, the lower the net revenue it receives. Thus, the success of pricing must be evaluated through the interests of both patients and providers (Ellis and McGuire 1996.) Due to imperfect information, the interest of patients is difficult to discern despite freedom of choice and, thus, the financial incentives of firms regarding price regulation are solved by quality reductions. The result is sensible as the evaluated quality assesses the quality investments of firms rather that the outcome of care.

Due to the lack of data from multiple pre- and post-regulation periods, we were unable to test the parallel trend assumption associated with DID analyses. This means that we are not able to test whether the control and study differed before and after the reform. Due to this deficit, we continued our analyses with kernel matching. The results from the matching confirm our findings that price regulation indeed had a negative and statistically significant effect on quality. The result of the average treatment effect of the treated is uniform (approximately −6 quality points) with the DID analyses with control variables and a modified quality variable. The matching was thoroughly tested, and the tests also assure that the result is robust and there is no concern that, for example, the selected matching algorithm would bias the results.

Based on the results, it is evident that price regulation has decreased quality in physiotherapy. Freedom of choice, on the other hand, did not incentivise firms to compete against each other on quality despite theoretical predictions linked to quality competition with fixed prices (Gaynor and Town 2011). Because price regulation transfers the responsibility of costs to firms, by theory, firms may use quality reductions as a means to achieve these goals (Folland et al. 2007). It has been shown in previous literature that imperfect information decreases quality (Akerlof 1970) and the incentive effects of providers are lower in any capitation fee when information is imperfect (Gravelle and Masiero 2000). Thus, the results achieved after concluding multiple estimations with empirical data are robust and in line with prevailing theory. A summary of the main results from articles I–III is presented in Table 5.

Table 5. Summary of the main results.

Articles	Main results
I) Competition and quality in a physiotherapy market with fixed prices	Competition had a negative (yet weak) effect on quality
II) Does competition have an effect on price and quality in physiotherapy?	Competition had a negative (yet weak) effect on quality; Competition had no effect on price
III) Assessing the effects of price regulation and freedom of choice on quality: evidence from the physiotherapy market	Price regulation had a negative effect on quality

8 Discussion

Health care is an important sector for a variety of reasons. For patients in need of different health services, it is necessary that the care they receive meets not only the requirements of their health status but also the expectations each individual has within a particular situation. From a societal standpoint, when services are financed with taxes, it is essential that the system is efficient, effective, equitable and of high quality. Otherwise, the system will lose the tax payers' support.

Historically, in many countries (despite e.g. the United States) healthcare services have been provided through centralised, non-market means. Yet, within past the decade or two, different market-oriented reforms have been adopted or are considered in many countries including Sweden, the United Kingdom, Netherlands and Australia. (Gaynor et al. 2013.) Finland is also undergoing a massive health and social care reform that, among other things, aims to increase productivity and quality via competition between providers in primary health care (and partly in specialised care) by enlarging the supply side to private and third sector providers instead of relying only on public providers. Competition is to be boosted by the implementation of freedom of choice – in the future patients will be able choose from all three provider groups (public, private, third sector) based on their individual preferences.

Previous theoretical and empirical literature on the effects of competition and quality are mainly from the United States and the United Kingdom and it focuses primarily on the hospital market. The literature tells us that competition indeed improves efficiency and has some effect on prices but the effect on quality is unclear. Competition seems to improve quality especially if prices are regulated. The intuition is that with regulated prices, firms compete for patients solely on non-price dimensions, i.e. quality. If firms are to raise profits, they need to increase volume. This is possible only by raising quality if patients have free choice and money follows the patients. However, there is evidence that usually the effect competition has on quality varies in different operational environments and markets. Also other factors, such as imperfect information, affect firms' behaviour is respect to quality, price and quantity decisions. (See e.g. Gaynor and Town 2011; Brekke et al. 2014.)

In Finland, Kela uses public procurement mechanisms in its effort to organise rehabilitation services. However, it introduced patient choice in its rehabilitation services, such as physiotherapy, targeted at disabled individuals in 2011. During the same time, fixed-price service vouchers were also piloted in this particular service in two Kela insurance districts during the contract period 2011–2014. This means that instead of using competitive bidding and non-regulated prices in all insurance districts, the procurement changed in the two insurance districts with the major difference being the pricing.

Within this operational environment, it was possible to analyse whether competition and price regulation affect firms' incentives and behaviour regarding especially quality and price decisions in line with findings from theoretical literature. With this thesis, it was possible to expand the empirical literature to rehabilitation and to the Finnish healthcare sector, as previous literature in this respect is non-existent.

The aim of the thesis is to analyse (within different pricing schemes) whether competition and price regulation has a causal effect on quality in physiotherapy.

I want to answer the following theoretical question: Under different pricing schemes, is market competitiveness associated with firms' incentives in respect to quality (and price) decisions?

To be able to reply to this question, I need an answer to the following empirical questions:

1) Does competition have an effect on quality in physiotherapy when prices are regulated?
2) Does competition have an effect on price and quality in physiotherapy when prices determined by firms?
3) Do price regulation and freedom of choice have an effect on quality in physiotherapy?

Our findings from articles I and II, which analyse the effects of competition on quality with regulated and non-regulated prices, show that competition decreases quality in physiotherapy targeted at disabled individuals. The effect is statistically significant, yet weak. The results are most likely caused by imperfect information. Despite freedom of choice, Kela does not provide any public and comparable quality information for patients. If information were distributed, it would most likely help patients in their decision making, but based on literature, it would also increase firms' responsiveness towards their own and competitors' quality (Le Grand 2009; Dixon et al. 2010).

In article II, the effect of competition on prices was also analysed. Based on the results, when firms participate in competitive bidding and define prices in tenders, competition has no effect on prices. The results show that when there are no out-of-pocket payments for patients using the service and when firms are likely to have market power over Kela due to legal obligations on how to organise these particular services, firms probably do not have an incentive to compete against each other with price.

Article III analysed the effect of price regulation and freedom of choice on quality. The study shows that in physiotherapy, theoretical predictions behind price regulation dominate, as quality decreased in the two insurance districts where prices were regulated despite freedom of choice. It has been stated in previous theoretical literature that price regulation must be linked to competition; otherwise, firms will have an incentive to manage or decrease costs by reducing quality. However, as the results from physiotherapy suggest, information is imperfect and thus quality decreased despite fixed prices and freedom of choice.

Based on the procurement and regulation of physiotherapy, firms first take part in competitive bidding or register as service providers if service vouchers are in use. After receiving a contract with Kela, firms form a pool of producers where patients may select a provider based on their individual preferences. Despite this seemingly very competitive environment, the results of this thesis show that firms are not incentivised to compete against each other on quality. It is clear that firms operating in this sector have market power over Kela as the selection criteria of the competitive bidding are not very strict and, on the other hand, Kela does not provide comparable and easily accessible public information on quality.

There are at least two questions worth raising that could have an effect on firms' behaviour (i.e. competition) and our results: the patient segment (including the proportion of disabled individuals treated) of the firms and patients' enthusiasm about informed decision making based on quality information.

In Finland, physiotherapy for disabled individuals could be considered as a separate market from other physiotherapy services because the patient's right to these services is defined in the law. These particular services are organised by Kela and financed by the NHI. Compared to other regular physiotherapy services, disabled individuals have no out-of-pocket payments and they receive these services for years on a weekly basis (Pitkänen and Pekola 2016; Pekola et al. 2017a).

Other physiotherapy services are organised in at least three different ways in Finland: services are provided by municipalities as part of public health care. In this case, the service is produced either by municipalities or by private firms through competitive bidding or a service voucher scheme. Some physiotherapy services are included in occupational health services, and physiotherapy is also provided by private firms, in which case patients are only entitled to moderate subsidies (the average being approximately €81/patient in 2012 compared to €3,535/disabled individuals) from the NHI scheme (Kela 2012; Pekola et al. 2017b). As is seen, the latter part of regular physiotherapy is largely financed by patients themselves and Kela does not control or organise the market. Instead, patients choose the provider from the market, and therefore the market design is very different from the one studied (Pekola et al. 2017a; Pekola et al. 2017b).

It could be argued that firms which focus mainly in treating other than disabled individuals might not be incentivised to compete, i.e. invest in quality or aim at better service, for this target group in order to gain repeated visits and ultimately increase profits in this respect. The physiotherapy market for disabled individuals forms approximately 22% of all physiotherapy provided in Finland, and about 40% of all physiotherapy firms had a contract with Kela to provide services for disabled individuals in 2011. The share of services studied forms only about one fifth of all production in the physiotherapy industry. Nonetheless, it could be argued that disabled individuals are most likely a desired patient group because they receive the service frequently and regularly, costs are covered by Kela, and care is provided for a long period (approximately 13 years/patient). (Pitkänen and Pekola 2016; Pekola et al. 2017a; Pekola et al. 2017b.) Thus, for the firms this particular service is a steady income and the service should be worth competing for as it complements the firms' product range.

Another question is whether information will induce patients and providers to actually change their behaviour in this sector and whether increased information will increase competition. Despite the fact that, in health care, patients are not very eager to make active choices and many base their decisions on other than outcome variables (Victoor et al. 2012), it could be argued that efforts to increase available information are worth taking. First, patients highly appreciate the right to choose (Dixon et al. 2010; Junnila et al. 2016) and disabled individuals make no difference. In fact, over 80% of disabled individuals receiving physiotherapy consider the right very important or important (Pitkänen and Pekola 2016). Therefore, it is vital that information is also provided or there is no sense in implementing choice policy at all.

In addition, information affects providers as well. Based on Dixon et al. (2010), for example, a key aspect of how providers respond to patient choice is how they interpret the signals that patients implicitly send through the choices they make. Providers also monitor and analyse market information. A special interest of providers in the previous Dixon et al. study was the waiting time, but there was evidence that providers use information to improve services.

Despite previous signals, results from studies regarding report cards indicate mixed results. Some studies have found that, for example, in the hospital market, public information of patients' health outcomes has incentivised hospitals to cream skimming in order to improve available information on treatment results. However, results also show that public information has somewhat increased patients' willingness to seek treatment from better quality hospitals (Bundorf et al. 2009; Wang et al. 2011). Thus, based on previous results, information is crucial and affects both the demand and supply side, and the effect most likely occurs in physiotherapy as well. In spite of the current trend of stable patient relationships, disabled individuals are a very experienced patient group because service is delivered frequently for a long period of time. Also for this reason, competition and freedom of choice should encourage firms to invest in quality if publicly available quality information is provided. Until then, the power of incentives that information holds when free choice is in use is missed.

To sum up the results, it is evident that the incentive structure needs more focus from the regulator when health care is organised by using different market mechanisms. As the service is tax financed, all benefits drawn from competition (i.e higher quality and better efficiency) promote patient well-being but also push the system towards being more legitimate in the face of economic burden through taxes. Most importantly, quality competition would benefit patients because it is never a disadvantage for patients if providers exercise competition in health care (Gaynor and Town 2011). This is especially true, when the regulator builds an incentive structure that steers production in the desired direction.

From competitive bidding to regulated price service vouchers and free choice in physiotherapy. Finland is undergoing a massive health and social care reform that also aims to increase competition and freedom of choice especially in primary care. The aim is to enhance productivity especially in primary health care. Based on these developments, the findings of this thesis are important, and so are future actions because the costs of health care are constantly increasing, yet patients have faced difficulties in, for instance, access to care especially in primary care.

Kela introduced freedom of choice in rehabilitation such as physiotherapy targeted at disabled individuals in 2011. Earlier, patients in this sector chose providers in co-operation with Kela officials. In addition to patient choice, Kela also uses public procurement mechanisms, mainly competitive bidding in organising rehabilitation services in Finland. The aim of the tendering is to enhance competition between providers, and freedom of choice could intensify that competition. When fixed-price vouchers were introduced in two insurance districts, the competitive environment became even tenser and thus had the potential to influence firms' behaviour and financial incentives in the market even more.

The logic behind previous regulation is this: When firms participate in competitive bidding, they engage in a two-stage competition process. First, they need to compete on price and quality during the tendering, and after receiving a contract, firms compete for patients solely on quality because there are no out-of-pocket payments required from patients. Money always follows the patients in rehabilitation and thus the patients' decisions have financial repercussions for firms. Based on our results from article II, firms did not engage in quality competition nor did they compete on price during the tendering. Competition was shown to have a slightly negative effect on quality and no effect on prices. The results are most likely influenced by imperfect information since patients are not provided quality or other information to ease the decision making in choosing a provider.

Regardless of the poor results, quality did not decrease heavily and there was no major increase in prices, although the rise was more than the consumer price index would indicate. This suggests that freedom of choice works to some extent in physiotherapy but competitive bidding does not. Thus, Kela needs to focus more on the incentive issues when planning competitive bidding. Based on the results, it is likely that firms have market power over Kela, and it would be beneficial for Kela to try to influence this market power by focusing on the incentives that would eventually enhance competition. Also, the effectiveness of the care provided could be added to a list of selection criteria in the future and patients' (and perhaps relatives' or other caretakers') opinions about the care should be surveyed, publicised and taken into account during the contract period and tendering.

Therefore, the *first remark* of this thesis has to do with organising health services in general and using public procurement, such as competitive bidding, in particular. At the moment, Kela does not have a sparring organisation is Finland which would encourage it to constantly innovate and enhance its activities or encourage it to study the rehabilitation market and its incentive mechanisms more thoroughly. Thus, in the future Kela must follow societal development and especially the needs of patients and, if necessary, change its policy in organising services so that it would meet the expectations of tax payers and the citizens using rehabilitation services even better.

If Kela wants to influence firms' incentives, it needs to focus more on, for example, the tendering selection criteria. The effectiveness of care is also an important issue, as well as patient satisfaction with the care they receive. At the moment, many providers have had a contract with Kela for years, even decades, and competitive bidding is probably merely a formality repeated every four years, but based on our results, it does not affect their decisions on quality investments or prices. Thus capacity-wise, a balance should be found between tendering and freedom of choice – free choice naturally requires enough capacity but by intensifying the selection criteria it would be possible to influence firms' incentives when they participate in competitive bidding. Based on capacity data from the period 2011–2014, firms which had a contract during the periods 2007–2010 and 2011–2014 raised their relative share of capacity by 80% for the latter period and the capacity of the market is twice or even three times larger than the annual demand.

When fixed-price service vouchers were introduced in 2011 in two insurance districts, it was possible for Kela to further intensify quality competition between providers, as they no longer competed against each other on price. Rather, firms registered as service providers and those who fulfilled minimum quality criteria received a contract with Kela to produce services for disabled individuals. As mentioned previously, freedom of choice was also introduced during the time and, in order to gain profit, firms needed to compete on quality to increase volume and sales. Again, all costs were covered for patients and firms were not allowed to charge any extra fees from patients.

Despite this seemingly very competitive environment, results from article I show that Kela has been inefficient in promoting competition between service providers in physiotherapy. In spite of the theoretical predictions with fixed prices, firms were not incentivised to invest in quality and thus exercise quality competition. The market where service vouchers were tested was very concentrated; only two municipalities had an HHI under 1800, which is commonly seen as a threshold for a competitive market. Thus, it is not a surprise that competition had a negative (yet weak) effect on quality when prices were regulated by Kela and firms participated in the service voucher pilot.

A completely other question is the combined effect of price regulation and freedom of choice on quality. As is known, we found competition to have no effect on quality but it was important to investigate what effect a service voucher reform had on quality in physiotherapy. Based on theoretical predictions regarding price regulation, the responsibility of costs is transferred from the regulator to firms when prices are regulated. In this situation, firms have two choices in tackling the cost demands. They either need to enhance productivity or they may end up decreasing costs through service quality. Article III shows that the reform introducing fixed-price service vouchers and freedom of choice decreased quality in physiotherapy. This means that theoretical expectations regarding price regulation and especially cost containment via quality seem to dominate in the market. On the other hand, freedom of choice did not incentivise firms to compete for volume on quality despite theory may suggest such an outcome with fixed prices and freedom of choice. Thus, with fewer resources in use, firms decreased quality instead of increasing productivity, and this effect is most likely intensified by imperfect and asymmetric information.

Based on the results of this thesis, it is evident that a mere administrative decision to use public procurement, initiate free choice or regulate prices will not influence firms' incentives or change patients' and firms' behaviour unless other issues (such as imperfect information) are tackled as well. As is known, freedom of choice and quality competition require adequate and comparable quality and other information, and this data must be publicly available. These efforts would balance the information asymmetry between patients and providers although information is hardly ever perfect – in health care or in any other market.

Therefore, the *second remark* of the thesis is the importance of gathering information and distributing it to all parties involved. The regulator of health services needs to alter its strategy from simply organising the service to actively gathering and publishing comparable quality information instead. It is known that not all patients change their providers despite comparable quality information being provided. Sometimes there are no competitors in the neighbourhood to switch to even when patients receive enough information. Still, as long as switching providers is possible, there is an incentive for firms to compete for patients, and public information encourages firms to raise interest towards their own quality as well as competitors' quality.

Within the hospital market, the incentive to increase quality due to intensified competition may be diluted if decision makers are not financially affected by their decisions (Brekke et al. 2014). As firms producing physiotherapy all operate in the private sector, it can be argued that quality decisions are made intentionally and thus the role of the decision maker does not affect quality choices in the same way as it would in the public sector. However, information asymmetry has a big role in this sector because (regardless of the procurement mechanism) patients being unable to compare firms means that firms are not threatened by losing customers, which then dilutes firms' incentives to compete against each other. The former situation could mean that firms only compete for new patients or patients forced to change providers due to procurement or other external reasons (e.g. a firm does not receive a contract after competitive bidding or registration and thus patients are forced to change providers or a provider retires) and not so much for patients who have had a longer relationship with a provider.

The *third remark* is somewhat linked to comparable quality information and especially the desire for freedom of choice to act as a driving force for quality. When freedom of choice is introduced, both patients and firms need to start acting and reacting to quality differences of firms in the market. Based on theory, when the number of firms in the market increases, the demand for a firm becomes more elastic with respect to quality and, therefore, firms choose higher quality in order to attract more customers (Gaynor and Town 2011). Yet, Dranove and Satterthwaite (1992) demonstrate in their theoretical study that a firm's elasticity of demand is directly affected by consumers' capacity to observe quality. Therefore, all sides must be properly informed about quality but also about the right to choose a provider and the practicalities involved. Here, the regulator must ensure that changing providers is made easy and flexible, and the contract between the provider and the regulator must guide firms to co-operate in a situation where the patient switches providers so that patient records are transferred along with the patient. Perhaps in the future digitalisation supersedes this phase also for rehabilitation patients.

The *fourth remark* has to do with the procurement process and especially the measuring of quality. The regulator should develop quality scoring towards measuring quality outcomes instead of measuring quality investments. Also, if competitive bidding is used in the future, different innovative procurement practices should be developed and used in order to maximise efficiency, effectiveness and quality. In case the system is developed towards an any-willing-provider scheme, different measurement indicators regarding previously mentioned factors should be developed and the results of quality measuring should be published.

As a summary, the regulator should improve factors that affect behaviour on both the demand and the supply side. By adding comparable quality information, both patients' interests towards comparing and changing providers and firms' incentives towards quality competition may be influenced. It seems that in the physiotherapy studied, firms have market power over Kela, which makes it wise to concentrate more on the financial incentives of firms active in the market during the procurement process, as it is evident that neither the demand nor supply side is affected by a mere administrative decision of a regulator to alter the organisation of services.

9 Conclusion

Political rhetoric regarding competition and quality in health care is quite straightforward – competition will increase quality especially when prices are fixed. Based on previous literature and the results of this thesis, the effect of competition on quality is more ambiguous. Factors such as imperfect information are causing firms to produce quality at a suboptimal level, and price regulation causes firms to decrease quality to control costs rather than to increase productivity. Therefore, it is important to analyse and build up incentive structures alongside with the actual reform that would encourage providers to move in the desired direction, such as quality competition.

It is evident that mere administrative decisions are inefficient in launching different reforms such as free choice or fixed-price service vouchers and inadequate in changing the behaviour of firms (and probably also patients). Thus, necessary steps should be taken to correct this. However, the regulator could also enhance its activities in facilitating information.

Because starting to market services under freedom of choice takes a lot of resources and skills particularly from small and medium-sized firms, it would be important in the future for the regulator to invest in an information system that enables information gathering and distribution within the Finnish healthcare scheme. Equal and comparable quality information would thus benefit both patients and firms. The regulator must also change its position from being a mere organiser of health services to becoming a more active participant in the system and providing information and supporting patients in making choices. As Arrow pointed out already in 1963, there is a market for information, and in the future the importance of such a market is further enhanced.

10 Limitations and future studies

Articles I and II are unfortunately cross-sectional studies, and thus more research that uses data from longer time periods is needed. With a longer time span, both firms and patients have enough time to adjust to a new and more competitive environment where choice might alter behaviour in both the demand and supply side. This would also enable more thorough and liable statistical analyses.

Further studies with panel data and a more precise measurement of the competition variable as well as the effectiveness of care are also needed in the future because they would guarantee more accuracy. Future studies should focus more on the definition of market structure, for instance, so that the distances between patients and providers are considered more thoroughly.

Analyses that measure changes in patients' well-being or health outcomes are needed in order to draw conclusions about social welfare. Therefore, measuring quality as an actual outcome of care would be preferable in the future. Similarly, competition measures could be improved since measuring competition in a way that takes, for instance, patient flow into account should be considered in future studies.

Also, we did not have access to the cut-off point used in the competitive bidding process. Having access to this information would certainly add an interesting perspective in future studies because it would allow researchers to analyse also those firms that were not successful during the procurement process. Data regarding all patient groups treated in the firms studied is also needed in the future as it may have an effect on the firms' behaviour and their incentive towards quality competition within certain patient groups.

Based on previous limitations regarding all articles but especially article III, studies regarding quality competition that use more accurate data from longer time periods are needed. This is particularly important in the future when health and social care reforms are analysed. When parallel paths are properly controlled for, internal validity of the model is also accurately ensured.

It would be important to extend competition studies to other fields of rehabilitation services (or other health services that use different market mechanisms and have consistent quality information) and continue the research with larger and more precise data sets. Furthermore, studies that analyse changes in the market structure are needed because pro-competition policy tends to have an effect on firms incentives to merge. Overall, it would be important to build up a research tradition in the field of competition studies in Finland, because so far research has been very limited. Future studies are necessary and important also due to the ongoing social and health care reform. The reform also relies on competition and freedom of choice and thus the experiences from the social insurance sector would be beneficial in studying other health services as well.

Finally, more competition studies are needed in Finland (and elsewhere) because health and social care in general is going to rely more and more on any-willing-provider mechanisms and freedom of choice (i.e. competition). Despite the fact that the general results of this thesis on imperfect information most likely apply to other fields of health services as well, it is known that competition and its effect on quality are affected by the environment or market structure of a particular service. Therefore, issues such as market regulation, provider incentives and patients using the specific service should be considered case by case when competition effects are studied in health care.

References

Acts and decrees:
907/1946. Act on Invalid Care (Invaliidihuoltolaki).
1309/2003. Act on Amending Section 4 of the Act on Welfare and Health Care Planning and State Subsidy (Laki sosiaali- ja terveydenhuollon suunnittelusta ja valtionosuudesta annetun lain 4 §:n muuttamisesta).
566/2005. Act on the Social Insurance Institution of Finland's Rehabilitation Benefits and Rehabilitation Allowance Benefits (Laki Kansaneläkelaitoksen kuntoutusetuuksista ja kuntoutusrahaetuuksista).
348/2007. Act on Public Contracts (Laki julkisista hankinnoista).
569/2009. Act on Service Vouchers in Social Welfare and Health Services (Laki sosiaali- ja terveydenhuollon palvelusetelistä).
1326/2010. Health Care Act (Terveydenhuoltolaki).

Akerlof GA. The market for "lemons". Quality uncertainty and the market mechanism. The Quarterly Journal of Economics 1970; 84 (3): 488–500.

Allen F. Reputation and product quality. Rand J Econ 1984; 15 (3): 311–327.

Allen T, Fichera E, Sutton M. Can payers use prices to improve quality? Evidence from English hospitals. Health Econ 2016; 25 (1): 56–70.

Barros PP, Brouwer W, Thomson S, Varkevisser M. Competition among health care providers. Helpful or harmful? European Journal of Health Economics 2016; 17: 229.

Bloom N, Propper C, Seiler S, Van Reenen J. The impact of competition on management quality. Evidence from public hospitals. The Review of Economic Studies 2015; 82 (2): 457–489.

Brekke K, Nuscheler R, Straume OR. Quality and location choices under price regulation. Journal of Economics & Management Strategy 2006; 15 (1): 207–227.

Brekke K, Siciliani L, Straume OR. Hospital competition and quality with regulated prices. Scand J Econ 2011; 113 (2): 444–469.

Brekke K, Gravelle H, Siciliani L, Straume OR. Patient choice, mobility and competition among health care providers. In: Levaggi R, Montefiori M, eds. Health care provision and patient mobility. Health Integration in the European Union. Milan: Springer, Developments in Health Economics and Public Policy 12, 2014: 1–24.

Bundorf MK, Chun N, Goda GS, Kessler DP. Do markets respond to quality information? The case of fertility clinics. J Health Econ 2009; 28 (3): 718–727.

Cameron CA, Trivedi PK. Microeconometrics. Methods and applications. New York, NY: Cambridge University Press, 2009.

Chalkley M, Malcomson JM. Contracting for health services with unmonitored quality. The Economic Journal 1998; 108 (449): 1093–1110.

Colla CH, Escarce JJ, Buntin MB, Sood N. Effects of competition on the cost and quality of inpatient rehabilitation care under prospective payment. Health Serv Res 2010; 45 (6p2): 1981–2006.

Cooper Z, Gibbons S, Jones S, McGuire A. Does hospital competition save lives? Evidence from the English NHS patient choice reforms. The Economic Journal 2011; 121 (554): F228–F260.

Dafny LS. How do hospitals respond to price changes? The American Economic Review 2005; 95 (5): 1525–1547.

Dixon A, Robertson R, Appleby J, Burge P, Devlin N, Magee H. Patient choice. How patients choose and providers respond. London: King's Fund, 2010.

Dranove D, Satterthwaite MA. Monopolistic competition when price and quality are imperfectly observable. Rand J Econ 1992; 23 (4): 518–534.

Ellis RP. Creaming, skimping and dumping. Provider competition on the intensive and extensive margins. J Health Econ 1998; 17 (5): 537–555.

Ellis RP, McGuire TG. Hospital response to prospective payment. Moral hazard, selection, and practice-style effects. J Health Econ 1996; 15 (3): 257–277.

Folland S, Goodman AC, Stano M. The economics of health and health care. Upper Saddle River, NJ: Routledge, 2007.

Forder J, Allan S. The impact of competition on quality and prices in the English care homes market. J Health Econ 2014; 34: 73–83.

Gaynor M. What do we know about competition and quality in health care markets? Bristol: Centre for Market and Public Organisation, 2006.

Gaynor M, Town RJ. Competition in health care markets. In: Pauly MV, Mcguire TG, Barros PP, eds. Handbook of health economics, volume 2. Amsterdam: North Holland, 2012: 499–637.

Gaynor M, Moreno-Serra R, Propper C. Can competition improve outcomes in UK health care? Lessons from the past two decades. Journal of Health Services Research & Policy 2012; 17 (suppl 1): 49–54.

Gaynor M, Moreno-Serra R, Propper C. Death by market power. Reform, competition, and patient outcomes in the National Health Service. American Economic Journal: Economic Policy 2013; 5 (4): 134–166.

Gowrisankaran G, Town RJ. Competition, payers, and hospital quality. Health Serv Res 2003; 38 (6p1): 1403–1422.

Grabowski DC, Town RJ. Does information matter? Competition, quality, and the impact of nursing home report cards. Health Serv Res 2011; 46 (6pt1): 1698–1719.

Gravelle H, Masiero G. Quality incentives in a regulated market with imperfect information and switching costs. Capitation in general practice. J Health Econ 2000; 19 (6): 1067–1088.

Gravelle H, Santos R, Siciliani L, Goudie R. Hospital quality competition under fixed prices. York: University of York, 2012.

Heckman JJ. Econometric causality. Cambridge, MA: National Bureau of Economic Research, 2008.

Ho V, Hamilton BH. Hospital mergers and acquisitions. Does market consolidation harm patients? J Health Econ 2000; 19 (5): 767–791.

Imbens GW, Wooldridge JM. Recent developments in the econometrics of program evaluation. Journal of Economic Literature 2009; 47 (1): 5–86.

Joskow, PL, Rose NL. The effects of economic regulation. In: Schmalensee R, Willig RD, eds. Handbook of industrial organization, volume 2. Amsterdam: North-Holland, 1989: 1449–1506.

Junnila M, Hietapakka L, Whellams A. Hallintoalamaisesta aktiiviseksi valitsijaksi. Valinnanvapauden muotoutuminen sote-palveluissa. Helsinki: THL, 2016.

Kela. Sairausvakuutustilasto 2012. Helsinki: Kela, 2012.

Kela. Kuntoutustilasto 2015. Helsinki: Kela, 2016a.

Kela. Statistical database Kelasto. Costs and recipients of rehabilitation services. Helsinki: Kela, 2016b. Available at: ‹http://raportit.kela.fi/ibi_apps/WFServlet?IBIF_ex=NIT099AL›. Accessed 15 June 2016.

Kessler DP, Geppert JJ. The effects of competition on variation in the quality and cost of medical care. Journal of Economics & Management Strategy 2005; 14 (3): 575–589.

Kessler DP, McClellan MB. Is hospital competition socially wasteful? The Quarterly Journal of Economics 2000; 115 (2): 577–615.

Klein B, Leffler KB. The role of market forces in assuring contractual performance. Journal of Political Economy 1981; 89 (4): 615–641.

Kranton RE. Competition and the incentive to produce high quality. Economica 2003; 70 (279): 385–404.

Le Grand J. Other invisible hand. Delivering public services through choice and competition. Princeton, NJ: Princeton University Press, 2007.

Le Grand J. Choice and competition in publicly funded health care. Health Economics, Policy and Law 2009; 4: 479.

Ma CA. Health Care payment systems. Cost and quality incentives. Journal of Economics & Management Strategy 1994; 3 (1): 93–112.

Ma CA, Burgess JF. Quality competition, welfare, and regulation. Journal of Economics 1993; 58 (2): 153.

Mehta A. Spatial competition and market definition in the nursing home industry. Boston, MA: Boston University, 2006.

Meltzer D, Chung J, Basu A. Does competition under Medicare Prospective Payment selectively reduce expenditures on high-cost patients? Rand J Econ 2002; 33 (3): 447–468.

Ministry of Economic Affairs and Employment. Public procurement. Helsinki: Ministry of Economic Affairs and Employment, 2016. Available at: ‹http://tem.fi/en/public-procurement›. Accessed 15 June 2016.

Mougeot M, Naegelen F. Hospital price regulation and expenditure cap policy. J Health Econ 2005; 24 (1): 55–72.

Mukamel DB, Spector WD. The competitive nature of the nursing home industry. Price mark ups and demand elasticities. Appl Econ 2002; 34 (4): 413–420.

Mukamel DB, Zwanziger J, Tomaszewski KJ. HMO penetration, competition, and risk-adjusted hospital mortality. Health Services Research 2001; 36 (6): 1019–1035.

Mukamel DB, Zwanziger J, Bamezai A. Hospital competition, resource allocation and quality of care. BMC Health Services Research 2002; 2 (1): 10.

Nyman JA. The effects of market concentration and excess demand on the price of nursing home care. The Journal of Industrial Economics 1994; 42 (2): 193–204.

Pekola P, Linnosmaa I, Mikkola H. Competition and quality in a physiotherapy market with fixed prices. Eur J Health Econ 2017a; 18 (1): 97–117.

Pekola P, Linnosmaa I, Mikkola H. Does competition have an effect on price and quality in physiotherapy? Health Econ 2017b; 26 (10): 1278–1290.

Pitkänen V, Pekola P. Asiakkaiden näkemykset valinnanvapaudesta. Tulokset fysioterapiaa saaville vaativan lääkinnällisen kuntoutuksen asiakkaille tehdystä kyselystä. Helsinki: Kela, Työpapereita 95, 2016.

Propper C. Competition, incentives and the English NHS. Health Econ 2012; 21 (1): 33–40.

Propper C, Burgess S, Green K. Does competition between hospitals improve the quality of care? Hospital death rates and the NHS internal market. Journal of Public Economics 2004; 88 (7): 1247.

Propper C, Burgess S, Gossage D. Competition and quality. Evidence from the NHS internal market 1991–1999. The Economic Journal 2008; 118 (525): 138–170.

Puumalainen J. Kuntoutuksen historiaa. In: Rissanen P, Kallanranta T, Suikkanen A, eds. Kuntoutus. Helsinki: Duodecim, 2008: 16–30.

Santos R, Gravelle H, Propper C. Does quality affect patients' choice of doctor? Evidence from England. The Economic Journal 2017; 127: 445–494.

Shapiro C. Premiums for high quality products as returns to reputations. The Quarterly Journal of Economics 1983; 98 (4): 659–679.

Shen Y. The effect of financial pressure on the quality of care in hospitals. J Health Econ 2003; 22 (2): 243–269.

Sitra. Palvelusetelin käyttöönoton käsikirja. Helsinki: Sitra, 2011.

Sood N, Buntin MB, Escarce JJ. Does how much and how you pay matter? Evidence from the inpatient rehabilitation care prospective payment system. J Health Econ 2008; 27 (4): 1046–1059.

Stock JH, Watson MW. Introduction to econometrics. Boston, MA: Pearson Education, 2007.

Tay A. Assessing competition in hospital care markets. The importance of accounting for quality differentiation. Rand J Econ 2003; 34 (4): 786–814.

Thomas K, Nicholl J, Coleman P. Assessing the outcome of making it easier for patients to change general practitioner. Practice characteristics associated with patient movements. Br J Gen Pract 1995; 45 (400): 581–586.

Tuominen-Thuesen M. Palvelusetelin käyttö kunnissa. Helsinki: Sitra, 2009.

Victoor AV, Delnoij DMJ, Friele RD, Rademakers JJ. Determinants of patient choice of healthcare providers. A scoping review. BMC Health Services Research 2012; 12 (1): 272–287.

Volpp KGM, Williams SV, Waldfogel J, Silber JH, Schwartz JS, Pauly MV. Market reform in New Jersey and the effect on mortality from acute myocardial infarction. Health Serv Res 2003; 38 (2): 515–533.

Vrangbaek K, Robertson R, Winblad U, Van de Bovenkamp H. Choice policies in Northern European health systems. Health Economics, Policy and Law 2012; 7 (1): 47–71.

Wang J, Hockenberry J, Chou S, Yang M. Do bad report cards have consequences? Impacts of publicly reported provider quality information on the CABG market in Pennsylvania. J Health Econ 2011; 30 (2): 392–407.

Wooldridge JM. Econometric Analysis of Cross Section and Panel Data. Cambridge, MA: MIT Press, 2010.

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Different market mechanisms are used increasingly in health care around the world. Competition is hoped to improve efficiency and quality without raising costs. One mechanism of increasing competition among providers is the patients' freedom of choice. Especially when prices are regulated, free choice is expected to incentivise providers to seek volume through increasing quality and thereby make the system beneficial for all parties – patients, providers and the regulator.

This seems like a straightforward mechanism. However, many aspects – such as imperfect information – affecting provider incentives must be considered for competition to be effective in health care. This study shows that despite the apparently competitive operational environment, competition may not have a desired effect on quality after all. The reason is most likely found in imperfect information and the lack of incentives it produces.

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