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MARKETIZATION AND THE QUALITY OF RESIDENTIAL ELDERLY CARE IN SWEDEN

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ABSTRACT

Against a backdrop of increased levels of marketization of welfare services in OECD countries, this article aims to shed light on the separate effects of private ownership and competition on service quality. Using residential elderly care in Sweden as our case, we leverage unique panel data of ownership and competition against a set of indicators, pertaining to the structure, process and outcome dimensions of care quality. The main finding of our analyses is that competition does surprisingly little for quality: private entrepreneurs perform neither better nor worse under stiff competition and the quality of care is approximately the same in those nursing homes that are exposed to competition from private actors as in those that are not.

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Introduction

Over the last several decades many OECD countries have undergone fundamental changes in the provision of social services. In particular, there has been a trend towards marketization (the opening up of service provision to private providers through both privatization and outsourcing) in areas such as child and elderly care, where previously services were almost exclusively provided by the public sector.[1] This has not only affected social service provision in liberal welfare states, like the UK, where the trend began earlier and has been more pronounced (Hood and Dixon 2015), but also in social-democratic welfare states such as Sweden (Gingrich 2011). By the end of the 1980s, privately-owned care homes in the UK made up about 10 percent of all providers. Ten year later it was 90 percent (Land 2006). Meanwhile in Sweden, the share of elderly care residents living in facilities run by private entrepreneurs has increased from 5 percent in the early 1990s to about 20 percent presently (Erlandsson et al. 2013, Socialstyrelsen 2018; Stolt et al 2011).

There are several reasons for the marketization of public service provision. Some observers see it as part of an ideology-driven reform, often labeled *New Public Management* (NPM), aimed at bringing management approaches and practices from the private sector into the provision of public goods and services (Blomqvist 2004; Hood and Dixon 2015; Stolt et al. 2011). Others instead point to the demographic changes and fiscal challenges (an aging population requires more care, while the proportion of tax contributors in the population declines) that created a pressing need for cost control in the social service sector (Bergman et al. 2016; Szebehely 2010). In Sweden, cost reduction has been an important motive for the marketization of social services (Elinder and Jordahl 2013a), but there has also been a long-standing critique against what is seen as a faceless welfare bureaucracy, unable to take necessary individual preferences into consideration (see for example the conclusions of the ambitious public inquiry on power in Swedish society *Maktutredningen* 1990, 44).

Irrespective of the prime motivation for marketization in every specific country or service, the fundamental theoretical argument for marketization emphasizes its efficiency-enhancing effects. The abridged form of the argument holds that efficiency gains are associated with private ownership

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and competition. The advantage of private ownership is that it stimulates entrepreneurs to innovate, which is at the heart of quality improvements (see Shleifer 1998 for a review). When it comes to competition, opening up to private provision is expected to decrease the slack of public providers, as these lose their monopolistic position (Niskanen 1971; Tullock 1965), while stiff competition from counterparts provides high-powered incentives for entrepreneurs to produce the highest quality at the lowest price (Shleifer 1998).

Nevertheless, there are also sound theoretical reasons to be skeptical about the unconditionally positive effect of marketization (for a review, see Dahlström et al. 2018, 2-3). For example, the influential cost-quality trade-off framework (Hart et al. 1997) points out that non-contractible qualities—difficult to specify yet ubiquitous in fields like care services and education (Brown et al. 2016)—are likely to suffer because private providers are incentivized to increase their profit margin by cost-cutting on such aspects. Similarly, a recent literature suggests that the net effect of competition on quality cannot be established without reference to the specific characteristics of the market under study (Brekke et al 2010, 471).

The conflicting theoretical predictions about the impact of marketization on service quality are accompanied by a relatively small and inconclusive empirical literature: while some studies find positive effects of marketization (Bergman et al. 2016; Castle et al. 2007; Holum 2018; Stolt et al. 2011), others do not (Dahlström et al. 2018; Forder and Allan 2014), and a third strand finds mixed results (Winblad et al. 2017). Critically, much of the empirical literature is limited to the investigation of broad differences between private and public providers, without explicitly testing which of the probable causes are at work. Specifically, while the effect of competition is almost always assumed, it is less often directly investigated. When competition is explicitly examined empirically, it is most often proxied either by a measure of market concentration, which is an inverse of competition (Castle et al. 2007; Grabowski 2004; Forder and Allan 2014), or measures of market contestability and excess demand (Gage et al. 2009; Starkey et al. 2005). While the former measure predominantly produces "higher competition–lower quality" findings (but see Castle et al. 2007), the latter, by contrast, produces results consistent with the orthodox view of competition as a quality-enhancer.

The paucity of studies on the quality effects of competition, especially beyond a US context, and the limited range of empirical indicators of competition, are major limitations of the existing litera-

ture. This paper aims to address these issues, first, by theoretically elucidating the quality-related effects of competition; second, by providing a novel measure of competition through the number of bidders who submitted applications to run a welfare service; and, third, by directly testing the postulated mechanisms empirically.

The empirical milieu of the paper is residential elderly care (care/nursing homes) in Sweden. This is an interesting case, as, while being the epitomal example of a welfare state, Sweden also permits the delivery of social services, such as elderly care, by private companies, thereby providing an opportunity to examine the effects of ownership and competition. Furthermore, being a country of strong institutions and low levels of corruption—a context where the functioning of both market and the state approximates standard economic theories—Sweden is a case where the force of private ownership and competition should reveal its full strength. By examining what ownership and competition have achieved in a model institutional setting, the case of Sweden is of wider significance.

Residential elderly care in Sweden is the responsibility of municipalities, which normally contract this service out through open tendering for each facility (Elinder and Jordahl 2013a). We employ unique panel data of almost the entire population of care homes, including indicators on ownership type and service quality, in combination with data on the extent of competition among private suppliers. The key finding of our analysis is that competition from and among private providers does surprisingly little for quality: higher competition has no association with service quality, neither in structure (measured as staffing levels and personnel education) nor in outcome (measured as customer satisfaction), but it has positive effects on a process-related quality measure (maintenance of an up-to-date care plan).

The paper is organized as follows: Section 1 reviews the relevant literature; section 2 discusses relevant theoretical considerations and formulates testable propositions; section 3 explains research design, data collection and method; section 4 discusses the empirical results; section 5 discusses the main findings, and section 6 concludes with implications and suggestions for future avenues of research.

Literature review

The case for marketization of public service provision fundamentally rests on the importance of private ownership and competition. A standard economics narrative suggests that private ownership, associated with a bundle of rights such as the right to earn income from property, "is the crucial source of incentives to innovate and become efficient" (Shleifer 1998, 135), where innovation is associated with better quality and efficiency with lower prices. "The weak incentives of government employees with respect to both cost reduction and quality innovation underline the basic case for the superiority of private ownership" (Shleifer 1998, 138). Competition, however, has also been seen as a separate source of efficiency. As Stigler (1957, 4) put it: "The main claims for a private-enterprise system rest upon the workings of competition."

Indeed, while competition provides high-powered incentives for entrepreneurs to produce the best quality at the lowest price to capture a larger share of the market and/or prevent customers switching to an alternative provider (Shleifer 1998), exposure of public providers to competition from the public sector will encourage public providers to decrease bureaucratic slack, both in terms of price and quality, as they are no longer monopolists (Niskanen 1971; Tullock 1965). These two effects of competition are often bundled together under the generic term "competition," and, to the best of our knowledge, have not been empirically tested as independent mechanisms of competition.

There are, however, also sound theoretical and empirical reasons to be skeptical about an unconditional positive effect of marketization on service quality. A powerful case against the benefits of private ownership on service quality was laid down by the cost-quality trade-off framework (Hart et al. 1997). According to this framework, when it comes to quality, which is difficult to specify and measure, as in the case of the overwhelming majority of public services (Brown et al. 2016), it is indeed private ownership that is the source of quality-shading incentives. With regard to competition, contemporary economic theory suggests that in markets with variable (non-fixed) prices "the net effect of competition on quality is *a priori* uncertain from a theoretical perspective" (Brekke et al 2010: 471) and depends on a host of market circumstances, such as the preferences of buyers and providers, or the ability of potential service users to accurately assess the quality of care they will receive. For example, Forder and Allan (2014) formally showed that in a quasi-market, where public purchasers care for low prices and achieving only minimum quality standards, high competition

among private providers will drive down not only prices, but also quality (close to the minimum level, as stipulated by the purchaser).

The empirical literature on the effect of ownership on the quality of residential care provides mixed evidence (Gage 2009; O'Neil et al 2003). However, the only meta-analysis of research comparing the quality of care in for-profit and not-for-profit nursing homes (Comondore et al. 2009) found clear evidence for higher quality in the for-profit sector in only 3 out of 82 studies. More recent research remains inconclusive: for example, while the evidence from the UK suggests that for-profit providers exhibit lower quality of care than public or non-profit care facilities (albeit the differences are small; Barron and West 2017), a study from Italy's Lombardy region finds that private nursing homes outperform their public counterparts (Garavaglia et al 2011). In Sweden, the picture is also mixed. Stolt et al. (2011) and Winblad et al. (2017) find that private care providers score lower on measures of structural quality, such as staffing levels, but higher on process-related quality aspects, such as participation in the development of their care plan, medication review, time between evening meal and breakfast, and offering food alternatives. Contrastingly, Bergman et al. (2016) show that mortality rates among residents of nursing homes are lower in those Swedish municipalities that have opened up to private service provision and argue that it is due to the joint positive effect of private ownership and competition. Nevertheless, other scholarly work (Dahlström et al. 2018; Szebehely 2010) and public evaluations (Socialstyrelsen 2012) of the quality effects of outsourcing are less supportive of the private ownership advantage argument.

When it comes to the empirical research on the quality effects of competition in residential elderly care, the literature remains small, predominantly US-based, and inconclusive. Furthermore, the overwhelming majority of studies either consider the net effect of competition on quality in both private and public providers (Bergman et al. 2016) or private providers only (Forder and Allan 2014). The only empirical research known to us that hones in on public providers, finds that marketization of residential elderly care in Lombardy led to quality improvements in public nursing homes (Garavaglia et al. 2011). The former literature has produced mixed evidence: while the majority of studies find a negative impact of competition on service quality in care homes (Gammonley et al. 2009; Grabowski 2004; Forder and Allan 2014), there are also positive (Castle et al. 2007; Starkey et al. 2005), mixed (Zinn et al. 2009) and no effects (Gage et al. 2009). In the context of Swedish care homes, the effect of competition on service quality has so far not been given a singu-

lar treatment, as previous research at best estimates the joint effect of ownership and competition (Bergman et al. 2016; Winblad et al. 2017).

As a recent review (Forder and Allan 2014, 73) notes, these results seem to be at least partially driven by the selected proxy for competition: while measures that capture market concentration (the inverse of competition) are associated with "higher competition–lower quality" results, studies that use indicators tapping into the degree of market contestability (through market entry regulation) normally offer support for the "higher competition–higher quality" orthodoxy.

The literature, therefore, exhibits some considerable limitations. From a theoretical point of view, since the quality-related consequences of competition are not universal (Brekke et al. 2010; Forder and Allan 2014), the individual characteristics of the market in question should be routinely considered in theoretical accounts. Empirically, the mechanisms of the stipulated superiority of market solutions—private ownership and competition—have been too often treated in combination, and therefore without due attention to their separate effects. Similarly, the distinct effects of competition on private and public providers are understudied. The empirical literature has also suffered from the prevalence of US-based studies and the lack of diversity when it comes to indicators of competition, which may bias the results. We try to advance the field by explicitly focusing on the quality-related effects of competition on public and private providers and by introducing a novel measure of competition between private suppliers, which aids the empirical evaluation of the hypotheses.

Theory and Hypotheses

As noted above, the existing theoretical accounts underpin both *pro* and *contra* arguments regarding the positive link between private ownership and service quality. While the orthodox microeconomic theory is univocally *pro* private ownership (for a review see Shleifer 1989), the extension of Hart et al.'s (1997) argument that private property is harmful for non-contractible quality is certainly extendable to care home markets, where many aspects of service quality, ranging from pressure ulcers to mortality are considered as non-contractible (Bergman et al. 2016; Dahlström et al. 2018; Winblad et al. 2017). We, therefore, remain agnostic, and formulate the following testable propositions:

H_{1a}: Private providers provide better quality of home care services than public providers.

H_{1b}: Public providers provide better quality of home care services than private providers.

With respect to the quality-effects of competition between private providers, there are also theoretical reasons to be open to both negative and positive associations. On the one hand, we consider the Swedish care market to be similar to the local authority-funded segment of the English care home market. As in England, the bulk of the Swedish residential care market is a quasi-market as the purchasing is done not by the individual service users, but by municipalities acting on their behalf, and at least some of the providers are not standard private companies, but government and non-profit organizations (Jordahl and Öhrvall 2013). Further, as Forder and Allan (2014) do for England, one could assume that the key preference of the public purchaser (municipalities) is to keep costs low. This assumption is supported by the fact that lowering costs has been an important driver for marketization of welfare services for policy makers in Sweden (Erlinder and Jordahl 2013). Under these assumptions, the formally derived theoretical expectation from the cost-quality framework is of a negative effect of competition on service quality. Intuitively this implies that given the public purchaser's preferences, competition between for-profit providers will push down not only prices, but also quality. With a conventional measure of competition through market concentration, Forder and Allan's (2014) analysis reveals that a higher competition indeed increases the probability of lower quality. Furthermore, they show that the effect of competition on quality indeed goes through price changes: where competition pushes prices down, quality also goes down – to the minimum, as stipulated by the regulator.

On the other hand, the more traditional view on the effects of competition allows for both cost reduction and quality improvements. This is based on the idea that just as profit-maximizing motives drive entrepreneurs to capture an ever-larger share of the market by way of convincing customers to stay, while also securing new ones, competition incentivizes them to produce the best quality at the lowest price (Shleifer 1998). Stiff competition also incentivizes entrepreneurs to undertake steps to minimize costs, and as long as the purchaser is able to effectively monitor the quality level of the service provided, the entrepreneur is able to achieve cost reduction without a detrimental effect on quality. There are, therefore, grounds to expect a positive association between competition and quality.

Based on the discussion above, we formulate the following two hypotheses:

H_{2a}: The higher the competition between the private providers, the lower the service quality.

H_{2b}: The higher the competition between the private providers, the higher the service quality.

Finally, with regard to the effects of competition on the quality of services provided by the public sector, we follow the classic public choice literature that univocally argues for the positive effect, because marketization deprives public bureaucracy of its monopolistic position, inducing bureaucrats to work harder (Niskanen 1971; Tullock 1965). Furthermore, opening up to private provision makes the public aware of alternatives, allowing customers under the freedom of choice system "to choose with their feet," and thus encouraging public providers to deliver better quality (Le Grand 2007).

Therefore, we posit:

H_3: Faced with competition from the private sector, public providers deliver better service quality than public providers faced with no competition.

Research Strategy: Case and Data

To evaluate the empirical merits of our hypotheses we study Swedish elderly care, specifically quasi-markets for residential care at the municipal and care-home levels, using unique data that directly measures competition in these markets. The following sections will describe, first, the Swedish case and legal regulations governing the quasi-market in residential care for the elderly and, then, the data and our main variables in more detail.

The Case: Residential Elderly Care in Sweden

Although traditionally viewed as the archetype of a universal welfare state with publicly-produced high-quality social services (Esping-Andersen 1990), Sweden also allows for private providers in areas like education, health- and elderly care (Blomqvist 2004; Jordahl and Öhrvall 2013). Sweden is still one of the top-spenders on elderly care measured as a percentage of GDP (OECD 2017), but private provision of elderly care is rather extensive, with about a fifth of care home residents living

in publicly funded but privately run facilities (Socialstyrelsen 2018). Thus, as in many other countries, Sweden's residential elderly care is a quasi-market with public buyers and both private and public providers. However, compared to other countries, such as the Netherlands, and especially the UK, marketization in Sweden has transferred less power to private companies. The quasi-market is organized so that there is more emphasis on efficiency and quality objectives than on opportunities for profits for the private entrepreneurs (Gingrich 2011: 12 and 190-195). Moreover, as Sweden is a country characterized by strong institutions and low levels of corruption, a context where the functioning of both market and state approximates standard economic theories, it is a case where the power of private ownership and competition should reveal their full strength.

Swedish residential elderly care is the responsibility of its 290 municipalities, which enjoy, comparatively speaking, a remarkable degree of policy autonomy. Municipalities are governed by elected assemblies (*Komunfullmäktige*), which appoint local governments (*Komunstyrelsen*). Similar to the national level, the proportional electoral system brings to local politics a relatively large number of parties: usually the same seven or eight that are represented in the national parliament, with the presence of local parties common (Erlingsson and Wänström 2015).

Municipalities are in charge of providing most public services, and consequently employ the majority of the country's public servants (Statistics Sweden 2014). They can either provide social services "in-house" or procure them from private providers. In the case of elderly care, public provision still dominates, but the 2000s have seen a sharp increase in the number of private actors (Socialstyrelsen 2018), unevenly distributed across Swedish municipalities (Bergman et al. 2018; Jordahl and Öhrvall 2013; Szebehely 2010), thus providing plenty of variation between them in matters relevant to this research.

Residential care for the elderly, which has been the responsibility of the municipalities since 1992, exhibits a similar trend. In our sample, private companies operate care homes in 99 (34%) municipalities, but their share varies from zero, often in lowly populated and rural municipalities, to the majority, often in the municipalities of the metropolitan areas (Stockholm, Gothenburg and Malmö). At the extreme, wealthy suburban municipalities such as Staffanstorp or Vellinge had in 2012 only privately-operated nursing homes (Jordahl and Öhrvall 2013: 68).

There are two primary ways that Swedish municipalities contract out residential elderly care: either through direct procurement, according to the Public Procurement Act (*Lagen om offentlig upphandling*

2016: 1145), or the freedom of choice system (henceforth the choice system), according to the Free Choice Act (*Lagen om valfrihet* 2008: 962). In the former case, private companies submit offers, either exclusively on price or on price and quality combined, and a municipality decides who gets the contract. In the latter case, the municipality sets the price and specifies some minimum quality requirements and the customer (the elderly person) choses a provider, according to her preferences, from an authorized list of providers that have met the municipality's criteria (Jordahl and Öhrvall 2013; Szebehely 2010). In this paper, we focus on the quality effects of procurement, as it is the dominant form of the marketization of residential elderly care in Sweden (Jordahl and Öhrvall 2013a). Furthermore, since competition under fixed prices is a distinct case (Bergman et al. 2018), its quality effects require extensive theorization, which is not possible given the already broad scope of this study. We will, however, report and briefly discuss the results of a preliminary analysis of the choice system's effect on the quality of care in privately-run nursing homes.

Data: Care Homes and their Residents

The data was obtained from the Swedish National Board of Health and Welfare, (SNBHW [Socialstyrelsen]), which has continuously surveyed residential care homes since 2012. SNBHW conducts two parallel surveys: *Survey of Elderly Care and Municipal Health Care Facilities* and *What do the Elderly Think about Elderly Care?* The first survey (henceforth, "the facility survey") gathers a wide range of information from care homes' management, including ownership, size, type, and several care quality indicators. The second (henceforth, "the resident survey") is aimed at care home residents and contains eighteen questions pertinent to their experiences at the facility and satisfaction with the care provided. The resulting dataset contains almost the entire population of residential care homes[2], 10,743 observations distributed across 2,750 distinct nursing homes, over five years (2013-2017).[3]

[2] We excluded facilities that provide only short-term care (a category present in the 2013 and 2014 facility surveys, but excluded in subsequent rounds), as well as mental health institutions and rehabilitation centers that could have elderly patients. To investigate how close our sample comes to the total population of elderly care homes, we compared the number of observations in our dataset for the year 2017 (2,202) to a list of elderly care facilities, compiled in early 2018 by a private information portal for Swedish elderly care (www.seniorval.se). Their list contains 2,514 facilities, which is 14% larger than ours. Considering that Seniorval's list has facilities opened after the last SNBHW survey was conducted in fall 2017, and that 117 observations have the word "short-term" in their name, the actual difference between the samples is likely to be negligible.

[3] In 2013 no facility survey was conducted, but the 2012 survey was executed in October, and its data is treated by SNBWH as pertinent to the year 2013 (Socialstyrelsen n/d).

Independent variables

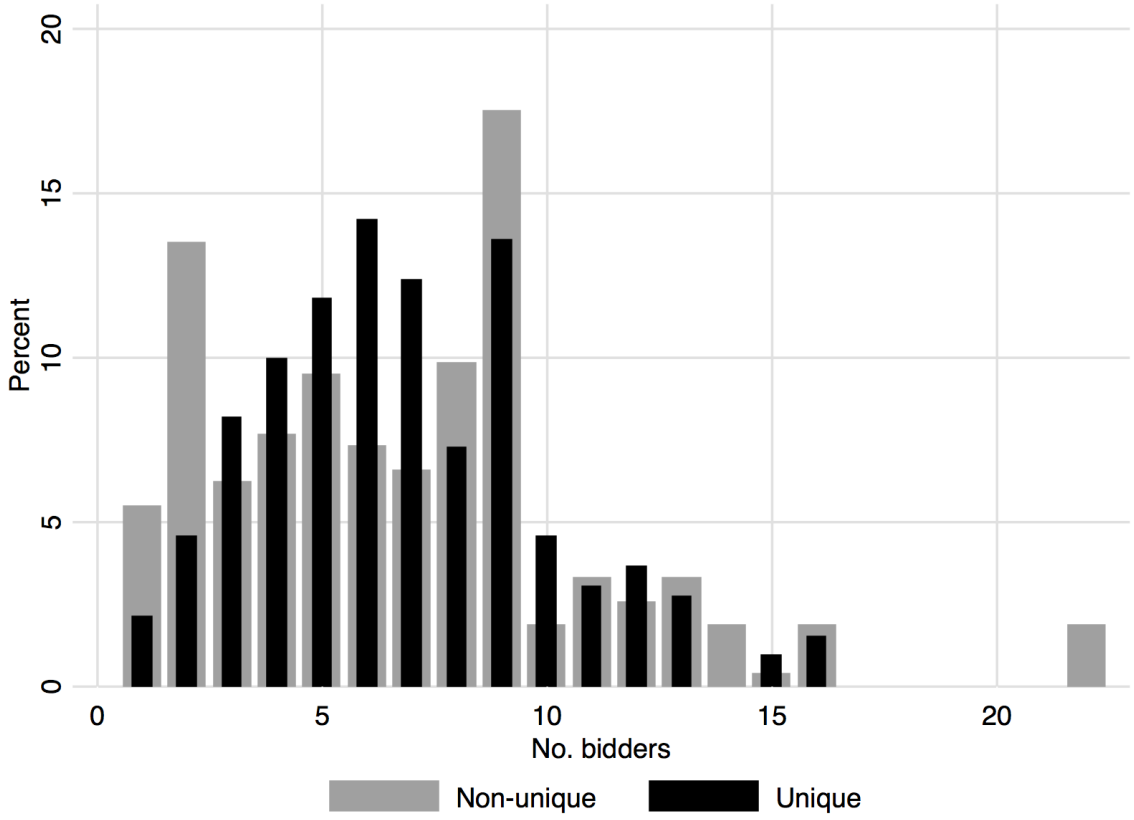
To examine the ownership and competition effects on service quality, our main independent variable measures both of these two concepts. For H_1, which concerns ownership, we use an item from the facility survey indicating whether the home is public or privately-run. This information was cross-referenced with the 2018 data from the information portal Seniorval (see footnote 1) to treat missing data and resolve inconsistencies. Altogether 519 (18.9%) care homes were, at some point between 2013 and 2017, run by private (for-profit and non-profit) organizations, including 445 (86%) that were privately-operated throughout the period. In the full home-year dataset 1,906 (17.7%) observations are categorized as privately-run.

For H_2, which concerns the competition between private providers, we employ data on the number of bidders that submitted a tender to run a care home for a certain time period, as per Sweden's Public Procurement Act. Competitive tendering presupposes that entrepreneurs make offers to the public purchaser, either on price or a combination of price and quality, and the public purchaser selects the bidder with the most attractive offer (Elinder and Jordahl 2013a; Jordahl and Öhrvall 2013). This process makes it possible to tap directly into the level of competition for a specific facility. As a larger number of bidders is indicative of lower prices (McAfee and McMillan 1987), the number of bidders suitably captures the intensity of competition in this particular market, where the public purchaser's top preference is cost reduction (Elinder and Jordahl 2013a; Forder and Allan 2014). The data on the number of bidders come from a public database (Opic), provided by a private company (Visma) that publishes advertisements for public procurement tenders in Sweden. The bidding information is available for 607 observations (32% of all observations categorized as privately-run). A considerable number of the observations (532) lack any bidding information.[4] To control for a situation where tenders were not exclusive to bidding on a single facility, we created a dummy variable (*Unique tender*), capturing whether a tender exclusively concerns the given facility or not. Figure 1 reports the distribution of the number of bidders, split into unique- and non-unique tendering. It shows that single bidder procurements are relatively rare (about 5%),

[4] This is likely to arise for the following reasons: a municipality is practicing the choice system only, an advertisement is missing, the information in an advertisement is not sufficiently detailed to be linked to a facility or the information on the resulting number of bidders is missing. Furthermore, as we could not fully ascertain a match between tender and facility for 87 observations, bidding information for these observations was entered as missing.

a finding indicative of a modicum of competition, while the overwhelming majority of tenders attracts less than ten bidders.

FIGURE 1, (DISTRIBUTION OF THE NUMBER OF BIDDERS)

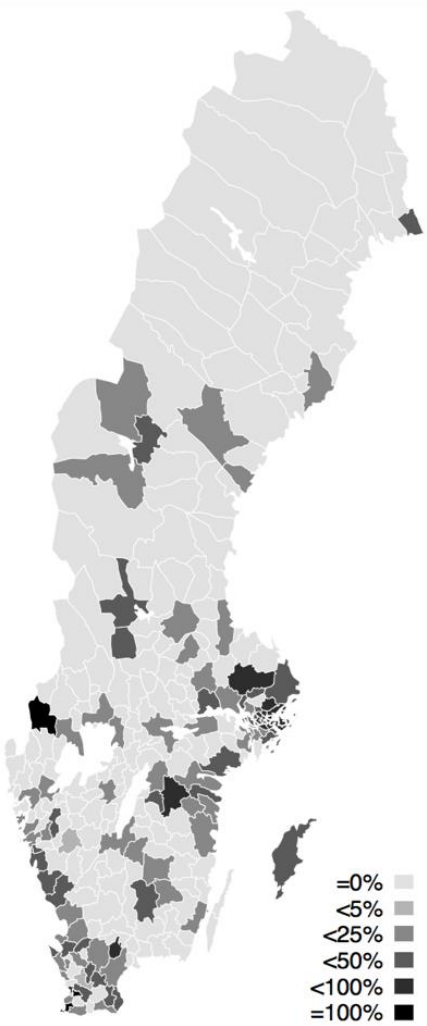


Note: data from Opic database (www.opic.com).

Finally, to test H_3—that public providers deliver better service quality when faced with competition from private providers—we created a municipality-level variable, taking on the value "1" if a municipality has privately-operated facilities in a given year and "0" otherwise.[5] Figure 2 visualizes *Private exposure*—the average share of privately-operated nursing homes in 2013-2017 per municipality—revealing that such are predominantly located in the southwestern and eastern parts of the country, particularly in the metropolitan areas of Stockholm, Göteborg and Malmö.

[5] Cognizant of the possible disparity between our sample and the actual universe of Swedish care homes, we checked www.seniorval.se to detect the presence of private facilities not present in our data and found this to be the case for five municipalities. We made the necessary changes to the variable to reflect this.

FIGURE 2, (SHARE OF PRIVATELY-RUN ELDERLY CARE FACILITIES IN SWEDISH MUNICIPALITIES (2013-2017 AVERAGE))



Note: Authors' calculation based on the SNBHW's Survey of Elderly Care and Municipal Health Care Facilities.

Dependent Variables

With regard to the outcome indicators, the primary data stems from the two SNBHW-surveys, which include a number of care quality questions. Following one of the most widely used care quality conceptualizations, the structure-process-outcome framework (Donabedian 1988), we use data from the facility survey to capture structural and process quality. As both staffing levels and quality are key prerequisites for care practices (Stolt et al. 2011; Szebehely 2010), we employ three indicators of structural quality: share of staff with appropriate education, staff-to-resident ratio, and nurse-to-resident ratio. To capture the encounter between the care home worker and the resident—

process-related quality—we employ the share of residents with an up-to-date care plan. To capture output quality, we use data from the resident survey on satisfaction with their care. Since we have data at the facility level, each indicator is reported as share of residents giving a positive reply. These user surveys have been the subject of seemingly justifiable critique, for example, on the grounds that relatives help residents in filling them in, thus diminishing data reliability (Westerlund and Breitner 2018). While it is beyond the scope of this paper to fully engage with such a critique, we try to minimize validity- and reliability-concerns by constructing a comparatively nuanced and specific picture of satisfaction. For this we eschew employing the general question on satisfaction, using instead respondents' replies to eighteen specific questions, pertaining to satisfaction with home amenities, activities, meals, and staff (for a full list of questions see Appendix A1). The resulting index (*Satisfaction index*) is highly internally consistent (Cronbach's alpha = .91). It is also strongly correlated with the general question of satisfaction present in the survey (r =.74), but holds the advantage of being normally distributed, unlike the general satisfaction variable, which is skewed toward the theoretical maximum, a reasonable sign that individuals answering this general question may have overlooked important dimensions of quality (see appendix A1).[6]

Altogether, these quality indicators tend to correlate in the expected direction (Table 1). In particular, *Satisfaction index* is significantly and positively associated with all structural and process indicators, except *Nurse-to-resident* ratio, which coefficient is positive but not statistically significant. In contrast, *Staff education* is significantly and negatively associated with *Staff-to-resident ratio*, a plausible consequence of inter-facility differences regarding staffing priorities. This is also an illustrative argument for further refinement in the operationalization of the quality of complex services: some nursing homes are likely to put emphasis on staff competence, others on staff density.

[6] The share of missing data for quality variables varies between 3% (for up-to-date care plan) and 45% (for Satisfaction index, which has all observations missing for the year 2013, and 17% missing for the 2014-2017 period).

TABLE 1, (CORRELATION BETWEEN DIFFERENT ASPECTS OF RESIDENTIAL ELDERLY CARE QUALITY)

	Staff education	Ratio staff: residents	Ratio nurses: residents	Up-to-date care plan
Ratio staff: residents	-0.03***			
Ratio nurses: residents	0.01	0.06***		
Up-to-date care plan	0.08***	-0.01	0.02*	
Satisfaction index	0.05***	0.07***	0.01	0.05***

*Note: coefficients display Pearson's correlation coefficient (r); *** p<0.01, ** p<0.05, * p<0.1.*

Analysis

Private vs Public Ownership

To test H_{1a} and H_{1b}, we estimate the levels of the outcome variables as a function of ownership, controlling for a set of facility-year covariates. *Private ownership* is a dummy variable, which takes on value "1" if a facility is operated by a private company, both for-profit and non-profit, and "0" otherwise.

We note that private ownership is unlikely to be randomly distributed. Indeed, apart from the geographical clustering, discussed above, private ownership is overrepresented in facilities specializing in dementia and general care, but underrepresented in service- and short-term facilities. Further, larger facilities tend to be operated by private companies, except for very large—from about 100 residents—homes (see online Appendix A2). Since these factors are plausibly related to quality, for example, larger facilities are likely to take advantage of economies of scale and maintain lower staffing levels, while service facilities may have a lower need for more educated staff, compared to facilities specializing in dementia care, we control for the number of places in a facility (and its squared

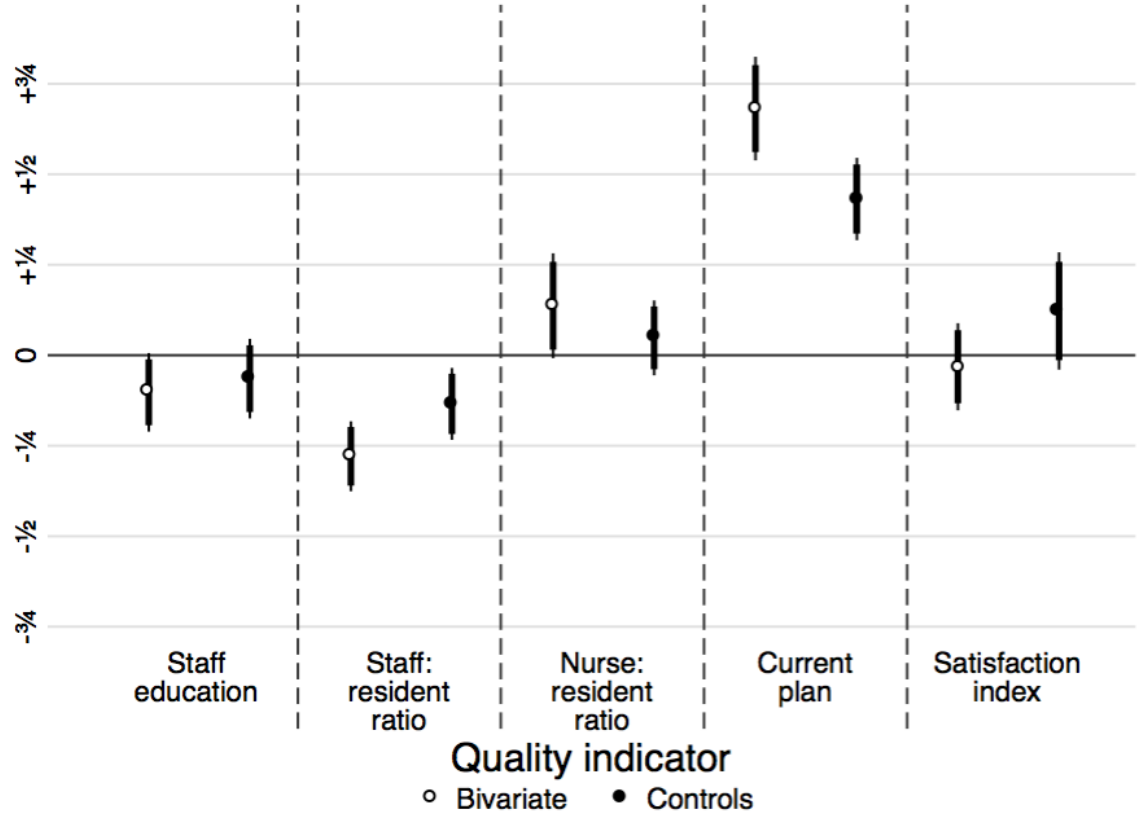
term) and facility type in all ownership-quality models[7]. In addition, we include municipal- and year-fixed effects to preclude unobserved contextual and temporal trends biasing the results.[8]

While the detailed results of the main and robustness analyses are reported in online Appendix A4, Figure 3 depicts the coefficient for *Private ownership* on each quality indicator bivariately and under controls. The results suggest that there is no all-encompassing difference in quality between public and private facilities. While *Staff-to-resident ratio* is significantly lower in private facilities, process quality (*Up-to-date care plan*) is significantly higher. For the remaining indicators, the relationship is null. Although bivariately private ownership weakly ($p<.1$) predicts lower *Staff education* and higher *Nurse-to-resident ratio*, both revert to null with the inclusion of controls. We conclude that the data provide strong support for neither H_{1a}, nor H_{1b}. Having said this, our finding that private ownership of nursing homes has a positive effect on process-related quality, but a negative effect on structure-related quality, is in line with the results from previous studies (Stolt et al. 2011; Winblad et al. 2017).

[7] We imputed missing data for the facility-year controls, using a conservative scheme. For the middle years of the panel (2014-2016), we replaced a missing observation with the value for the neighboring years, if these are identical. For the first (2012) and last (2017) years, we replaced a missing value with the value of the following/previous year, if values for the two following/previous years are identical.

[8] Standard errors are clustered at the municipal level. Although facility-level clustering is problematic as the average number of observations per facility is less than four, estimates with standard errors clustered at the facility level can be found in the online appendix. As serial correlation is variably present, albeit modest, we also report estimates with AR(1) errors in the online appendix. To account for this non-normal distribution of Staff education and Up-to-date care plan (skewed toward the maximum level, i.e. most staff have appropriate education and most residents have an up-to-date care plan), we employ fractional logistic regression to predict these indicators in the main analyses.

FIGURE 3, (RESIDENTIAL ELDERLY CARE QUALITY IN PRIVATE AND PUBLIC FACILITIES)



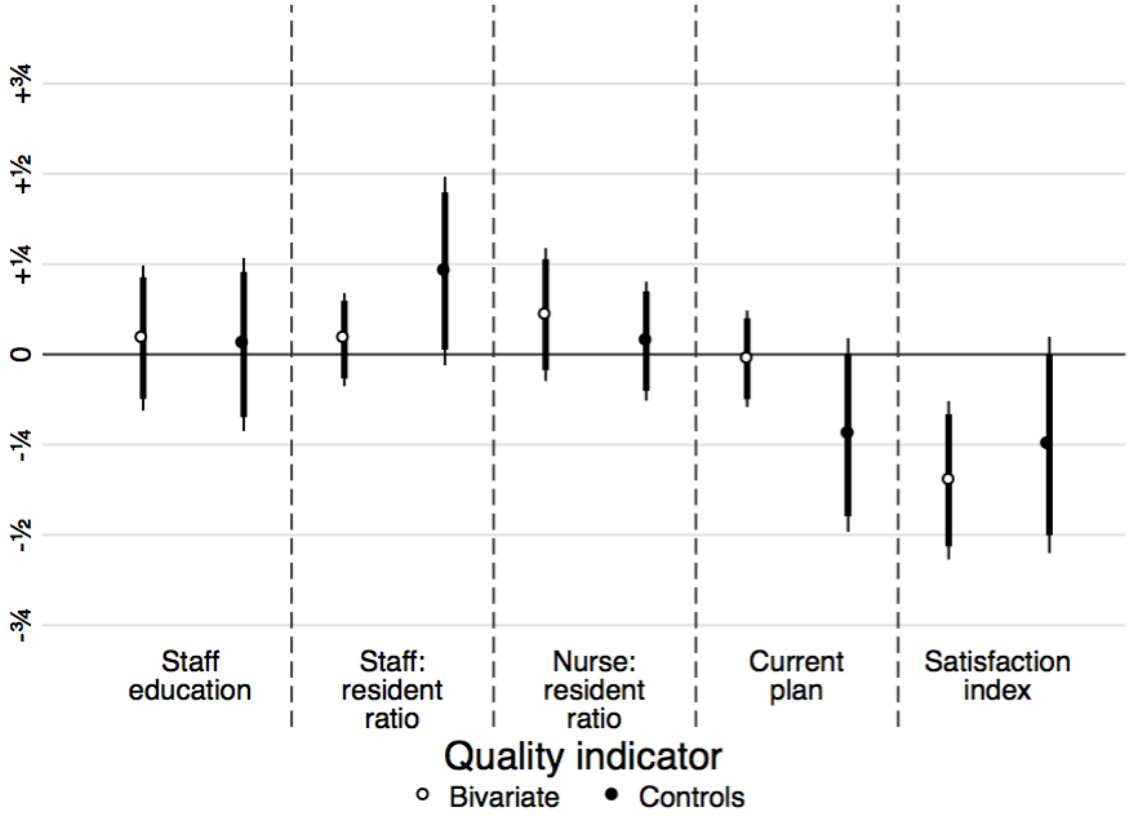
Note: the reported coefficients are for Private ownership (rescaled as standard deviations of the dependent variables) for each quality indicator. Thick lines display 90% confidence intervals and thin lines 95% confidence intervals. Controls: type of facility, size, municipal and year fixed effects. Full results are reported in Table A4A in online Appendix A4.

Competition between Private Providers

We test two hypotheses on competition between private actors, which could either be detrimental (H_{2a}) or beneficial (H_{2b}) for quality, using the number of bidders that submitted applications to run a care home as the key explanatory variable. With this measure we directly tap into the level of competition between private actors, which makes this analysis the most direct test of the competition-spurs-quality argument possible. Here we employ an estimation strategy nearly identical to that used above, but with two additional control variables: *Unique tender* and the *Number of days* a tender was open for bidding. In the main analysis our predictor is the *Number of bidders* (log-transformed), while the results for the raw number of bidders and *Single bidder*—a binary indicator, capturing whether there was only one bidder, which signifies a *de facto* non-competitive process—are reported in online Appendix A5.

Figure 4 reports the *Number of bidders*' coefficient on five quality indicators bivariately and under the full sets of controls. The results attest to a striking absence of links between competition and quality. Apart from the weakly significant (p<.1) positive coefficient for the fully controlled estimation of *Staff-to-resident ratio* and weakly significant negative coefficients for *Up-to-date care plan* and *Satisfaction index*, there are no discernable links. Although the data provides no support for either of the hypotheses, we consider the lack of a positive association between competition and quality to be a noteworthy finding in itself. If the proposition that stiff competition incentivizes entrepreneurs to produce higher quality, including higher quality of such complex goods as welfare services, is true, then there are fewer places better suited to unearth this regularity empirically than Sweden. This raises an important question: "What quality outcomes can be reasonably expected from quasi-markets in settings with weak institutions and high corruption?"

FIGURE 4, (RESIDENTIAL ELDERLY CARE QUALITY AND COMPETITION AMONG PRIVATE PROVIDERS)



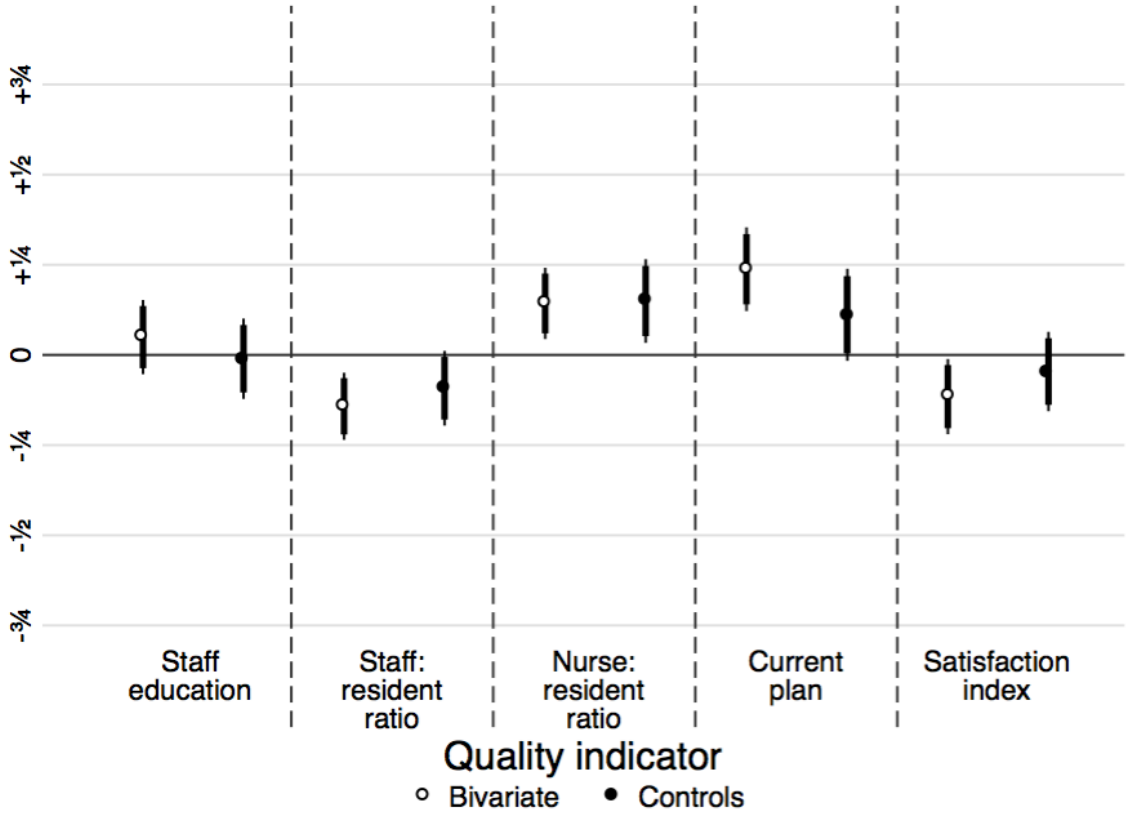
Note: the reported coefficients are for the logged Number of bidders (rescaled as standard deviations of the dependent variables) on each quality indicator. Thick lines display 90% confidence intervals, thin lines 95% confidence intervals. Controls: type of facility, size, unique tender, time for bidding, municipal and year fixed effects. Full results are reported in table A5A in online Appendix A5.

Competition between Private and Public Providers

Finally, we test H_3 by leveraging the exposure of public providers to competition at the municipal level against the quality indicators and adopting a multilevel estimation strategy. In addition to the facility-year controls used in the analyses above, a set of municipality-year control variables, capturing underlying structural factors is employed here.

While detailed results of the main and robustness analyses can be found in online Appendix A6, Figure 5 reports the estimates for *Private exposure* on the quality indicators. The results, yet again, produce no clear overall picture: while exposure to competition from private actors is associated with higher quality in process (*Up-to-date care plans*; $p<.1$ with controls) and one of the structure-level quality indicators (*Nurse-to-resident ratio*), it conversely predicts lower *Staff-to-resident ratio* ($p<.1$ with controls), and has no statistically significant relationships with the remaining two quality indicators. These findings are congruent with those from the ownership-quality analysis, suggesting that public providers exposed to competition from the private sector, may begin emulating the behavior of private actors. However, considering that in the fully specified models it is only the *Nurse-to-resident ratio* that is above the standard 95 percent threshold for statistical significance, we conclude that public providers deliver more or less the same quality, irrespective of their exposure to competition from private actors.

FIGURE 5, (RESIDENTIAL ELDERLY CARE QUALITY IN MUNICIPALITIES WITH AND WITHOUT COMPETITION FROM THE PRIVATE SECTOR)



Note: the reported coefficients are for Private presence *(rescaled as standard deviations of the dependent variables) on each quality indicator. Thick lines display 90% confidence intervals, thin lines 95% confidence intervals. Facility-year controls: type of facility and size. Municipal-year controls: share of elderly population (80-plus and 95-plus years of age) and its squared term; total population and its squared term; land area and its squared term; share of population with higher education; (log) share of foreign citizens; the municipality's financial result (before extraordinary costs) and its squared term; and the vote share of each of the three parties that historically have dominated Swedish local politics (the Social Democrats, the Conservatives, and the Center Party),*[9] *and year fixed effects. Full results are reported in Table A6A in online Appendix A6.*

Discussion

The most important finding of our analyses is the absence of consistent associations between the type of ownership or competition and the quality of residential care service. Having adopted a strict

[9] The political factor is salient in terms of 1) parties' preferences for outsourcing, with the parties right of center (the Center party and, in particular, the Conservatives) being more pro-marketization, and 2) the socioeconomic and demographic differences between municipalities dominated by these three parties. See Elinder and Jordahl (2013b) for an analysis of the partisan causes of outsourcing.

criterion for the acceptability of the results of the statistical analysis, we conclude that, on average, private providers deliver residential care home services of comparable across-the-board quality to that of public providers (H_{1a} and H_{1b}), that private entrepreneurs perform neither better nor worse under stiffer competition (H_{2a} and H_{2b}), and that exposure to competition from private providers does not affect the care quality in public residential homes (H_3). Painting with a broad brush, the picture is, therefore, of a null result.

Having said this, there are also important nuances. First, private entrepreneurs seem to perform better in terms of process quality, as, unlike public providers, they tend to keep residents' care plans up-to-date. This is in line with previous research (Stolt et al. 2011; Winblad et al. 2017) and is also consistent with the cost-quality trade-off framework (Hart et al. 1997) because maintaining an up-to-date care plan is the indicator, which is, arguably, the easiest from the selected five to stipulate *ex ante* in a contract and to audit *ex post*. Care plans are also one of the two quality indicators on which public providers perform better when faced with competition from private companies. At best this is only a qualified support to H_3 as it is not entirely clear why under competition public providers would improve only one of three staff-related inputs into the care process This points to the need to expand the esteemed, but dated, public choice accounts (Niskanen 1971; Tullock 1965) so as to accommodate more recent theoretical works on the contracting out of complex goods and services (Brown et al. 2016) and the multi-dimensional nature of the quality of complex services (Donabedian 1988).

Second, there is a weak tendency towards lower structural quality by private providers, which is in line with the existing literature (Stolt et al. 2011; Winblad et al. 2017). We also found that public providers exposed to competition perform worse on the staff-to-resident ratio indicator (albeit at a lower confidence level of statistical significance). As staff quality is the backbone of elderly care (Szebehely 2010), these quality indicators are of immense importance. Staff is, however, a large cost item, and therefore it is plausible that the presence of fewer and lesser-educated staff is the result of efficiency-enhancing measures taken by the private companies and those public providers exposed to competition from the private sector. An inquiry into whether this actually may be the case seems like a suitable extension of the literature.

Third, there is a negative bivariate relationship between the number of private bidders for a contract and the process and outcome quality indicators (with controls included it is, however, only

weakly statistically significant). The latter finding, suggesting that stiffer competition produces less satisfied "customers", is particularly puzzling from the orthodox perspective on competition, but more in accord with those who are skeptical about the unconditional positive effect of marketization on service quality on theoretical (Hart et al. 1997) or empirical grounds (Comondore et al. 2009; Dahlström et al. 2018; Forder and Allan 2014).

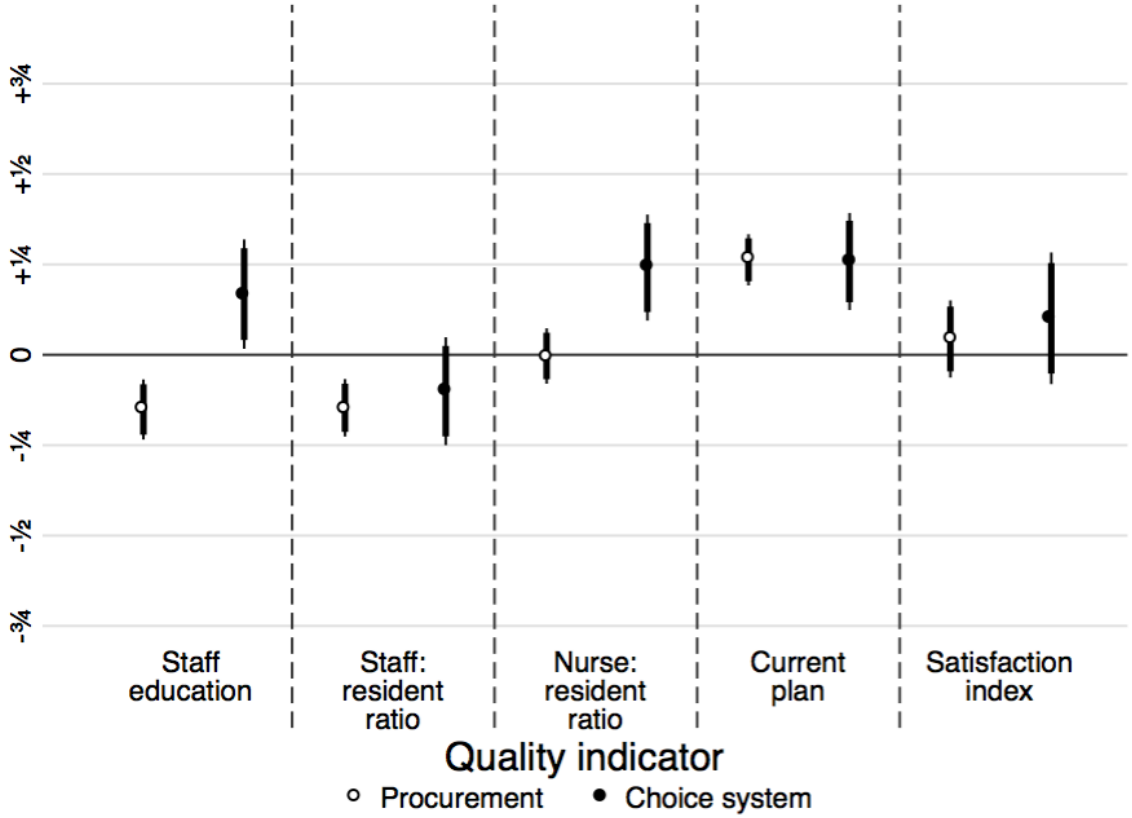
Reflecting on the mixed nature of our findings, we ask whether it could be due to the exclusion from our analyses of a legally permissible (under the 2008 Free Choice Act) mode of marketization—the freedom of choice system. As argued earlier, the main reason for this is that the residential care market is still dominated by procurement (Jordahl and Öhrvall 2013). There are, however, theoretical reasons to assume a positive effect of marketization when prices are fixed and competition, thus, is exclusively concentrated around quality, especially if the choice is left to the potential service recipient (Le Grand 2007). Indeed, a recent study (Bergman et al. 2018) on the quality effects of the choice system in home care for the elderly in Sweden (which is distinct from the residential elderly care that we examine)[10] found that the introduction of the choice system at the municipal level increased user satisfaction with service quality. However, they also found that the level of satisfaction is unrelated to the private providers' share in the market, concluding that "the underlying mechanism seems to be new choice opportunities rather than competition or an advantage of private providers" (Bergman et al. 2018, 1).

To engage with this literature, we re-run the multilevel analysis reported in Figure 5, introducing a binary variable that captures the presence of the choice system (*Choice system*) as a moderating influence of private ownership. Figure 6 reports the marginal effects of *Private ownership*, conditional on *Choice system*, for each quality indicator. These suggest that staff quality (*Staff education* and *Nurse-to-resident ratio*) is higher in privately-run nursing homes operating under the freedom of choice system. This is true in comparison with both public care homes and privately-operated facilities under the procurement system. The interaction term for ownership and the marketization system is not statistically significant for the rest of the indicators. We interpret this as indicative of the choice system being better equipped to handle more complex aspects of structural quality. This interpretation is, however, very tentative given the small number of municipalities with the choice system for resi-

[10] The freedom of choice system in home care is much more widespread than in residential care because it entails considerably lower entry costs for new entrepreneurs.

dential elderly care (16 of 290 in our sample) and the fact that the "free choice" municipalities are geographically concentrated around Stockholm (9 of 16).[11] As the number of municipalities introducing the freedom of choice system for residential elderly care is steadily increasing (as of mid-2018, six new municipalities permitted the choice system), ongoing examination of the comparative impact of the choice system is required.

FIGURE 6, (RESIDENTIAL ELDERLY CARE QUALITY IN PRIVATELY OPERATED FACILITIES BY MARKETIZATION SYSTEM: PROCUREMENT AND THE FREEDOM OF CHOICE)



Note: the reported coefficients are the marginal effects of the Private ownership *(rescaled as standard deviations of the dependent variables) for each quality indicator, conditional on whether the municipality permits the freedom of choice system (at the time point when the SNBHW survey is executed). Thick lines display 90% confidence intervals and thin lines 95% confidence intervals. Controls: identical to those in Figure 5. Full results are reported in Table A7A in online Appendix A7.*

[11] Full details of the analysis, including sensitivity to the inclusion of Stockholm county as a control, can be found in online Appendix A7.

Conclusion

While marketization has become a common form of social service delivery around the globe, scholarly examination of its effects, particularly those related to quality, has lagged behind. To address this gap, we set out to examine the effects of ownership and competition on quality of residential elderly care. We leveraged unique panel data of ownership and competition of Swedish care homes against a set of care quality indicators, pertaining to the structure, process and outcome dimensions of quality. While analyses of *ownership-quality* and *exposure of public providers to competition from the private sector* broaden the existing evidence base, the empirical assessment of the impact of competition between private providers is an important progression in the literature. We also make an important empirical contribution by introducing into scientific circulation a new measure of competition—the number of tender bids—which can be replicated in other empirical settings.

The main finding of our analyses is that competition does surprisingly little for quality: private entrepreneurs perform neither better nor worse under stiff competition, while the quality of care is approximately the same in those public nursing homes that are exposed to competition from private actors as in those that are not.

The lack of consistent association between competition and across-the-board service quality in an empirical setting conducive to the detection of such links is a problem for the orthodox theoretical accounts of competition, and call for their revision in view of recent theorization on the outsourcing of complex goods and services and the multi-dimensional nature of quality in complex services. This also has important policy implications: if competition does very little in an almost model institutional setting, what quality outcomes can be reasonably expected from quasi-markets in settings with weak institutions and high corruption?

Although the quality of the data and its interrogation bring a great deal of confidence in our results, there are several apparent avenues to advance further research, including, but not limited to, better theorization of the links between competition and different quality dimensions in this specific social service, improvements in the operationalization and measurement of the concept of quality, and better integration of the procurement and choice systems into statistical modelling.

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APPENDIX

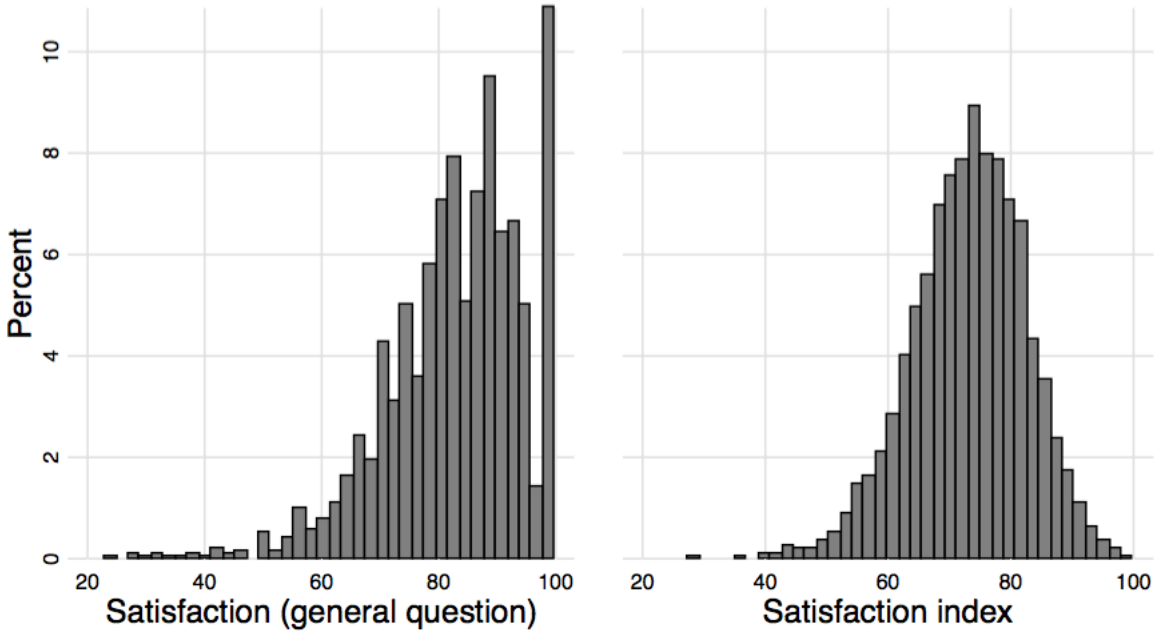
Appendix 1: resident satisfaction index

TABLE 1A, (SATISFACTION INDEX AND ITS SUBCOMPONENTS)

Original wording	English translation	Corr. w/ Satis-faction index (r)	No. obs.
Trivs du med ditt rum eller lägenhet?	Do you like your room or apartment?	0.61	6,963
Är det trivsamt i de gemensamma utrymmena? T.ex. matsalen, sällskapsrum, korridorer.	Do you like the common areas? For example, the dining room, common room, hallways.	0.72	6,967
Är det trivsamt utomhus runt ditt boende?	Are the outdoor areas around your facility pleasant?	0.55	6,914
Hur brukar maten smaka?	In general, how well does the food taste?	0.60	6,974
Upplever du att måltiderna på ditt äldreboende är en trevlig stund på dagen?	Do you experience meal times at your facility as a pleasant time of day?	0.70	6,947
Brukar personalen ha tillräckligt med tid för att kunna utföra sitt arbete hos dig?	Does the staff generally have enough time to carry out their tasks with you?	0.74	6,980
Brukar personalen meddela dig i förväg om tillfälliga förändringar? T.ex. byte av personal, ändringar av olika aktiviteter etc.	Does the staff generally let you know in advance of temporary changes? For example, changes in staff, alterations in activities, etc.	0.69	6,821
Brukar du kunna påverka vid vilka tider du får hjälp? T.ex. tid för att duscha/bada, gå och lägga dig etc.	Are you generally able to affect at what time you receive assistance? For example, time for showers/baths, bedtime, etc.	0.69	6,872
Brukar personalen bemöta dig på ett bra sätt?	Does the staff generally treat you in a good way?	0.56	6,993
Brukar personalen ta hänsyn till dina åsikter och önskemål om hur hjälpen ska utföras?	Does the staff take your opinions and requests of how the assistance should be carried out into consideration?	0.70	6,882
Hur tryggt eller otryggt känns det att bo på ditt äldreboende?	How safe or unsafe does it feel to live in your elderly care facility?	0.64	6,980
Känner du förtroende för personalen på ditt äldreboende?	Do you feel confidence in the staff at your elderly care facility?	0.68	6,975
Hur nöjd eller missnöjd är du med de aktiviteter som erbjuds på ditt äldreboende?	How satisfied or dissatisfied are you with the activities that are offered at your elderly care facility?	0.67	6,870
Är möjligheterna att komma utomhus bra eller dåliga?	Are the opportunities to go outside good or bad?	0.67	6,949
Hur lätt eller svårt är det att få träffa sjuksköterska vid behov?	How easy or difficult is it to see a nurse if needed?	0.54	6,917
Hur lätt eller svårt är det att få träffa läkare vid behov?	How easy or difficult is it to see a doctor if needed?	0.53	6,824
Hur lätt eller svårt är det att få kontakt med personalen på ditt äldreboende, vid behov?	How easy or difficult is it to contact the staff at your elderly care facility if needed?	0.68	6,975
Hur tycker du att samarbetet mellan dig och äldreboendet fungerar?	How do you think the cooperation between you and the elderly care facility works?	0.61	6,784

Note: all correlations significant at the p<.001. Cronbach's alpha for index containing all variables = .91.

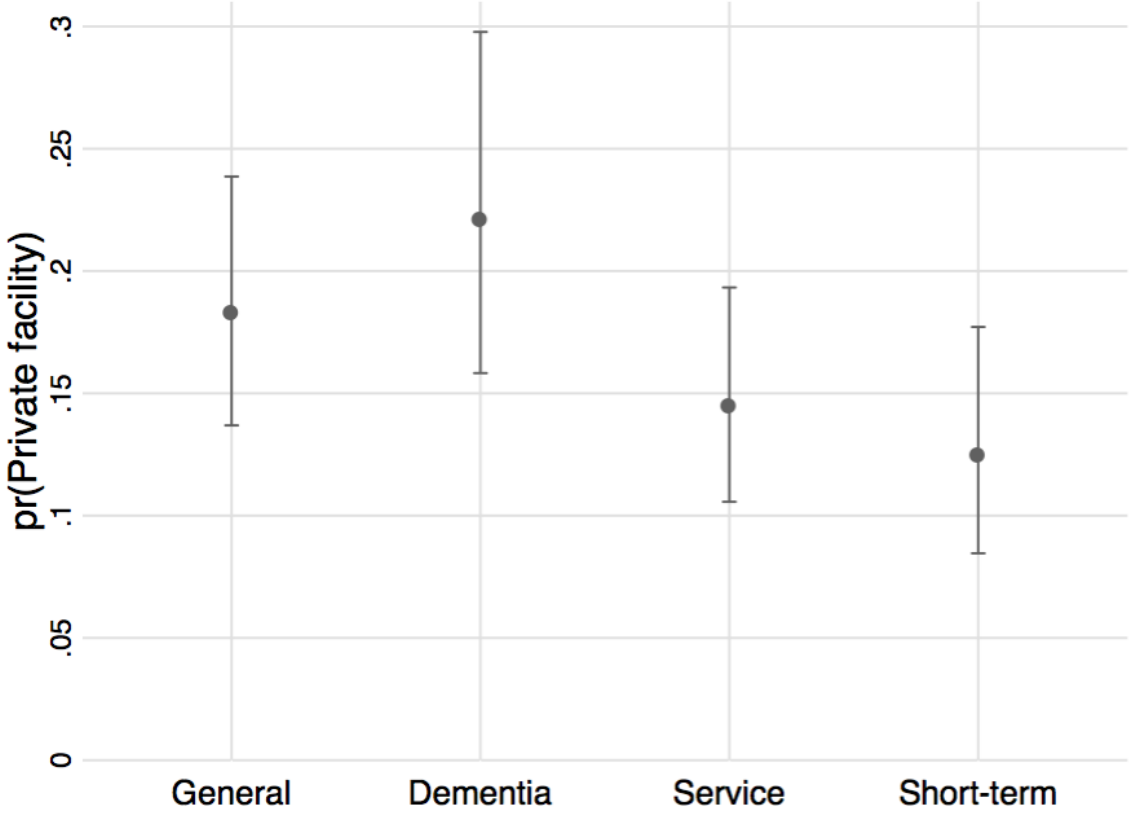
FIGURE 1A, (DISTRIBUTION OF SATISFACTION VARIABLES)



Note: the general satisfaction question is formulated: "How satisfied or dissatisfied are you with your elderly care facility overall?" Share of facility-years scoring a perfect 100 for general satisfaction question is 10.8% (N=756), while the corresponding share for the Satisfaction index is 0.01% (N=1). Correlation between the two items (r)=0.74 (p<.001).

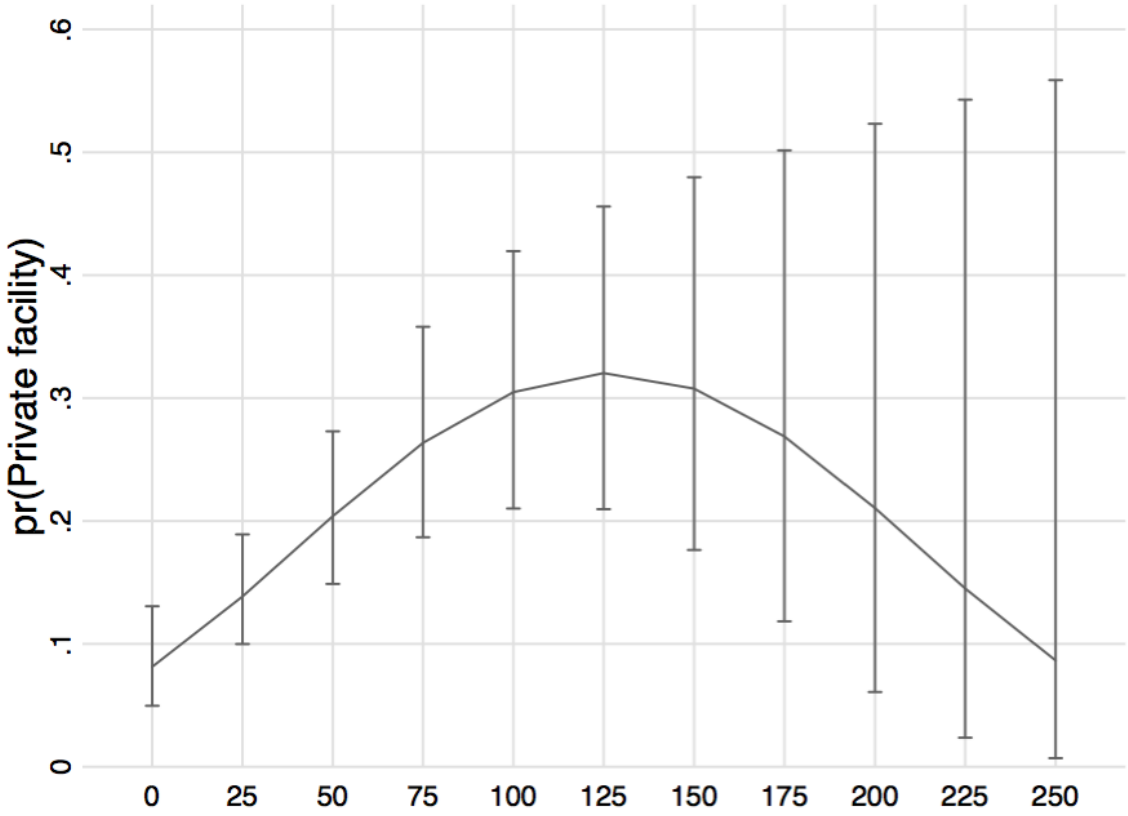
Appendix 2: private ownership and facility characteristics

FIGURE 2A, (PROBABILITY OF PRIVATE FACILITY BY TYPE OF FACILITY)



Note: capped lines display 95% confidence intervals.

FIGURE 2B, (PROBABILITY OF PRIVATE FACILITY BY FACILITY'S SIZE)



Note: capped lines display 95% confidence intervals.

Appendix 3: summary statistics

	(1)	(2)	(3)	(4)	(5)
	N	**mean**	**sd**	**min**	**max**
Facility-year level variables					
Share staff w/ appropriate education	10,157	84.74	14.40	3.250	100
Ratio staff: residents	10,096	29.74	7.678	0	133.3
Ratio nurses: residents	9,389	4.365	2.615	0	100
Share residents w/ up-to-date care plan	10,423	90.23	18.76	0	100
Satisfaction index	7,009	73.39	9.146	27.61	100
Private	10,743	0.177	0.382	0	1
No. bidders, log	607	1.748	0.633	0	3.091
Private presence	10,743	0.549	0.498	0	1
Choice system	10,743	0.0989	0.299	0	1
General	10,586	0.752	0.432	0	1
Dementia	10,592	0.604	0.489	0	1
Service	10,590	0.0828	0.276	0	1
Short-term	10,742	0.111	0.314	0	1
Number of places	10,471	40.15	23.80	1	239
Days ad posted	745	52.74	20.08	21	117
Unique tender	745	0.541	0.499	0	1
Municipal-year level variables					
Population					
<5,000	10,743	0.0161	0.126	0	1
5-10,000	10,743	0.0880	0.283	0	1
10-15,000	10,743	0.116	0.320	0	1
15-30,000	10,743	0.199	0.400	0	1
30-250,000	10,743	0.486	0.500	0	1
>250,000	10,743	0.0941	0.292	0	1
Share w/ higher education (log)	10,743	-2.088	0.405	-2.984	-1.121
Municipal election result, Moderates	10,743	21.39	8.173	0.500	51.90
Municipal election result, Social Democrats	10,743	33.68	8.557	6.700	59.40
Municipal election result, Center party	10,743	9.264	6.656	0.500	40.70
Area	10,743	1.443	2.270	0.00871	19.37
Share foreign citizens (log)	10,743	-2.677	0.407	-4.046	-1.275
Share citizens 80+ years	10,743	0.0562	0.0127	0.0237	0.106
Share citizens 95+ years	10,743	0.00213	0.000620	0.000467	0.00571
Economic result	10,743	1.566	4.348	-13.26	108.6

Appendix 4: full results and robustness, H_1

TABLE 4A, (RESIDENTIAL ELDERLY CARE QUALITY IN PUBLIC AND PRIVATE FACILITIES: FULL RESULTS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Staff education		Staff: resident ratio		Nurse: resident ratio		Up-to-date care plan		Satisfaction	
	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls
Private	-11.41*	-7.50	-2.14***	-1.03***	0.36*	0.13	146.80***	103.87***	-0.29	1.12
	(6.26)	(6.51)	(0.38)	(0.39)	(0.19)	(0.14)	(11.83)	(14.09)	(0.56)	(0.75)
General		-3.02		-0.50*		0.03		-11.16		-0.83
		(4.33)		(0.27)		(0.08)		(7.81)		(0.51)
Dementia		5.41		1.72***		-0.15*		8.25		1.12***
		(3.60)		(0.25)		(0.08)		(6.97)		(0.40)
Service		-19.12***		-2.36***		-0.27*		-24.93**		0.49
		(5.98)		(0.54)		(0.14)		(10.91)		(0.65)
Short-term		6.98		0.19		0.44***		-66.31***		-0.79
		(4.76)		(0.27)		(0.11)		(7.31)		(0.51)
Number of places		-0.01		-0.06***		-0.05***		-0.12		-0.17***
		(0.19)		(0.01)		(0.01)		(0.28)		(0.03)
Number of places^2		-0.00		0.00***		0.00***		0.00		0.00***
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
Constant	173.51***	181.47***	30.11***	31.06***	4.30***	5.88***	206.77***	268.54***	73.45***	74.86***
	(4.00)	(7.74)	(0.24)	(0.45)	(0.08)	(0.20)	(6.13)	(12.24)	(0.36)	(0.89)
R-squared			0.01	0.23	0.00	0.20			0.00	0.22
Municipality FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	10157	10156	10096	10095	9389	9349	10423	10331	7009	6806
No. facilities	290	290	290	290	290	290	290	290	290	286

*Note: models estimating Staff: resident ratio, Nurse: resident ratio and Satisfaction index employ linear OLS regression. Models estimating Staff education and Up-to-date care plan employ fractional logistic regression (estimates in table shown have been rescaled to its original values). Standard errors, clustered by unit, in parentheses; *** p<0.01 ** p<0.05 * p<0.1.*

TABLE 4B, (RESIDENTIAL ELDERLY CARE QUALITY IN PUBLIC AND PRIVATE FACILITIES: AR(1)-ERRORS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Staff education		Staff: resident ratio		Nurse: resident ratio		Up-to-date care plan		Satisfaction	
	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls
Private	-1.53***	-0.82	-2.01***	-0.96***	0.36***	0.13	8.29***	4.81***	-0.47	0.70
	(0.55)	(0.56)	(0.27)	(0.29)	(0.10)	(0.10)	(0.66)	(0.62)	(0.41)	(0.45)
General		0.36		-0.20		0.04		-0.91*		-0.90**
		(0.44)		(0.24)		(0.08)		(0.53)		(0.35)
Dementia		0.95**		1.73***		-0.14*		0.54		0.90***
		(0.39)		(0.21)		(0.07)		(0.47)		(0.31)
Service		-0.82		-1.13***		-0.18		-2.56***		-0.10
		(0.59)		(0.33)		(0.12)		(0.74)		(0.47)
Short-term		1.52***		0.70***		0.24***		-7.25***		0.13
		(0.39)		(0.23)		(0.08)		(0.53)		(0.35)
Number of places		-0.02		-0.08***		-0.05***		-0.01		-0.15***
		(0.02)		(0.01)		(0.00)		(0.02)		(0.02)
Number of places^2		-0.00		0.00***		0.00***		0.00		0.00***
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
Constant	85.05***	83.41***	30.07***	29.93***	4.36***	6.29***	88.51***	94.43***	73.58***	73.78***
	(0.24)	(3.15)	(0.12)	(1.65)	(0.04)	(0.56)	(0.29)	(3.52)	(0.19)	(3.06)
Municipality FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	10157	10156	10096	10095	9389	9349	10423	10331	7009	6806
No. facilities	2720	2720	2718	2718	2704	2702	2732	2731	2158	2138
AR(1)	0.195	0.194	0.0918	0.0912	0.207	0.211	0.143	0.149	0.200	0.214

*Note: random-effects GLS models, with AR(1) disturbance. Standard errors, clustered by municipality, in parentheses; *** p<0.01 ** p<0.05 * p<0.1.*

TABLE 4C, (RESIDENTIAL ELDERLY CARE QUALITY IN PUBLIC AND PRIVATE FACILITIES: ERRORS CLUSTERED AT FACILITY LEVEL)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Staff education		Staff: resident ratio		Nurse: resident ratio		Up-to-date care plan		Satisfaction	
	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls
Private	-11.41***	-7.50	-2.14***	-1.03***	0.36***	0.13	146.80***	103.87***	-0.29	1.12**
	(4.11)	(4.88)	(0.25)	(0.29)	(0.10)	(0.11)	(9.56)	(11.15)	(0.45)	(0.52)
General		-3.02		-0.50**		0.03		-11.16*		-0.83*
		(3.96)		(0.24)		(0.07)		(6.68)		(0.45)
Dementia		5.41		1.72***		-0.15**		8.25		1.12***
		(3.53)		(0.22)		(0.08)		(6.13)		(0.37)
Service		-19.12***		-2.36***		-0.27**		-24.93***		0.49
		(5.40)		(0.38)		(0.12)		(9.30)		(0.57)
Short-term		6.98*		0.19		0.44***		-66.31***		-0.79
		(4.00)		(0.26)		(0.09)		(6.75)		(0.50)
Number of places		-0.01		-0.06***		-0.05***		-0.12		-0.17***
		(0.17)		(0.01)		(0.00)		(0.28)		(0.02)
Number of places^2		-0.00		0.00***		0.00***		0.00		0.00***
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
Constant	173.51***	181.47***	30.11***	31.06***	4.30***	5.88***	206.77***	268.54***	73.45***	74.86***
	(1.99)	(18.94)	(0.12)	(1.36)	(0.04)	(0.26)	(3.02)	(33.24)	(0.19)	(4.09)
R-squared			0.01	0.23	0.00	0.20			0.00	0.22
Municipality FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	10157	10156	10096	10095	9389	9349	10423	10331	7009	6806
No. facilities	2750	2750	2718	2718	2704	2702	2750	2750	2158	2138

*Note: models estimating Staff: resident ratio, Nurse: resident ratio and Satisfaction index employ linear OLS regression. Models estimating Staff education and Up-to-date care plan employ fractional logistic regression (estimates in table shown have been rescaled to its original values). Standard errors, clustered by unit, in parentheses; *** p<0.01 ** p<0.05 * p<0.1.*

Appendix 5: full results and robustness, H_2

TABLE 5A, (RESIDENTIAL ELDERLY CARE QUALITY AND BIDDING COMPETITION AMONG PRIVATE PROVIDERS: FULL RESULTS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Staff education		Staff: resident ratio		Nurse: resident ratio		Up-to-date care plan		Satisfaction	
	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls
No. bidders, log	4.45	2.82	0.27	1.50*	0.22	0.07	-3.65	-74.12	-3.35***	-2.41*
	(10.14)	(12.66)	(0.42)	(0.85)	(0.18)	(0.16)	(20.77)	(45.86)	(1.05)	(1.44)
General		-28.61**		0.32		-0.15		-39.32		-3.72**
		(11.32)		(1.16)		(0.28)		(34.52)		(1.66)
Dementia		4.30		0.78		0.15		19.82		-0.92
		(10.83)		(1.13)		(0.22)		(46.88)		(2.52)
Service		-37.39		1.25		-0.03		-244.40***		-3.12
		(23.42)		(1.47)		(0.48)		(55.79)		(2.99)
Short-term		26.01		0.20		0.40		-180.58***		-3.28*
		(16.87)		(0.94)		(0.33)		(51.44)		(1.87)
Number of places		-0.47		0.00		-0.05**		0.79		-0.17**
		(1.13)		(0.06)		(0.02)		(1.83)		(0.08)
Number of places^2		0.00		0.00		0.00		-0.01		0.00
		(0.01)		(0.00)		(0.00)		(0.01)		(0.00)
Days ad posted		0.51		-0.02		-0.01		-2.58**		-0.01
		(0.57)		(0.03)		(0.01)		(1.06)		(0.06)
Unique tender		41.46***		0.89		0.13		-115.65		2.04
		(11.76)		(1.66)		(0.26)		(83.41)		(1.89)
Constant	147.31***	88.21**	27.14***	21.69***	3.91***	3.33***	333.40***	898.99***	76.95***	85.29***
	(18.79)	(41.58)	(0.84)	(3.38)	(0.31)	(0.71)	(42.36)	(145.18)	(1.51)	(5.96)
R-squared			0.00	0.30	0.00	0.37			0.05	0.38
Municipality FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	570	570	567	567	546	543	582	578	491	475
No. facilities	289	289	59	59	57	57	289	289	56	56

*Note: models estimating Staff: resident ratio, Nurse: resident ratio and Satisfaction index employ linear OLS regression. Models estimating Staff education and Up-to-date care plan employ fractional logistic regression (estimates in table shown have been rescaled to its original values). Standard errors, clustered by unit, in parentheses; *** p<0.01 ** p<0.05 * p<0.1.*

TABLE 5B, (RESIDENTIAL ELDERLY CARE QUALITY AND BIDDING COMPETITION AMONG PRIVATE PROVIDERS: AR(1)-ERRORS ASSUMED)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Staff education		Staff: resident ratio		Nurse: resident ratio		Up-to-date care plan		Satisfaction	
	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls
No. bidders, log	0.62	0.20	0.30	1.47**	0.22	0.15	-0.29	-1.84	-3.24***	-2.06
	(1.29)	(1.47)	(0.57)	(0.72)	(0.18)	(0.20)	(0.85)	(1.21)	(1.03)	(1.28)
General		-3.44*		0.27		-0.21		-2.31		-4.64***
		(1.88)		(0.93)		(0.26)		(1.55)		(1.46)
Dementia		1.20		0.31		0.14		0.17		-1.39
		(2.06)		(1.00)		(0.28)		(1.64)		(1.42)
Service		-4.62*		1.53		-0.03		-11.02***		-2.62
		(2.73)		(1.32)		(0.37)		(2.18)		(2.17)
Short-term		4.08*		-0.26		0.17		-6.55***		-2.88**
		(2.15)		(1.04)		(0.31)		(1.77)		(1.46)
Number of places		-0.10		-0.02		-0.04***		0.19**		-0.09
		(0.10)		(0.05)		(0.01)		(0.08)		(0.08)
Number of places^2		0.00		0.00		0.00**		-0.00***		0.00
		(0.00)		(0.00)		(0.00)		(0.00)		(0.00)
Days ad posted		0.07		-0.02		-0.00		-0.08		-0.02
		(0.06)		(0.03)		(0.01)		(0.05)		(0.05)
Unique tender		5.88***		0.89		0.22		-2.68		2.11
		(2.10)		(1.03)		(0.29)		(1.72)		(1.85)
Constant	81.32***	74.02***	27.03***	22.04***	3.91***	3.68***	96.71***	104.50***	76.70***	83.17***
	(2.38)	(8.69)	(1.05)	(4.29)	(0.33)	(1.13)	(1.57)	(6.92)	(1.93)	(7.55)
Municipality FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	570	570	567	567	546	543	582	578	491	475
No. facilities	190	190	191	191	189	189	192	192	167	166
AR(1)	0.168	0.150	0.0995	0.107	0.112	0.158	0.233	0.224	0.246	0.225

*Note: random-effects GLS models, with AR(1) disturbance. Standard errors, clustered by municipality, in parentheses; *** p<0.01 ** p<0.05 * p<0.1.*

TABLE 5C, (RESIDENTIAL ELDERLY CARE QUALITY AND BIDDING COMPETITION AMONG PRIVATE PROVIDERS: ERRORS CLUSTERED AT FACILITY LEVEL)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Staff education		Staff: resident ratio		Nurse: resident ratio		Up-to-date care plan		Satisfaction	
	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls
No. bidders, log	4.45	2.82	0.27	1.50**	0.22	0.07	-3.65	-74.12**	-3.35***	-2.41*
	(9.13)	(10.58)	(0.48)	(0.73)	(0.16)	(0.19)	(20.23)	(37.01)	(0.95)	(1.41)
General		-28.61**		0.32		-0.15		-39.32		-3.72**
		(13.48)		(1.08)		(0.29)		(34.69)		(1.77)
Dementia		4.30		0.78		0.15		19.82		-0.92
		(12.86)		(1.42)		(0.23)		(38.21)		(1.78)
Service		-37.39*		1.25		-0.03		-244.40***		-3.12
		(21.01)		(1.59)		(0.55)		(53.91)		(2.61)
Short-term		26.01*		0.20		0.40		-180.58***		-3.28
		(15.78)		(1.09)		(0.37)		(44.36)		(2.13)
Number of places		-0.47		0.00		-0.05*		0.79		-0.17*
		(0.81)		(0.05)		(0.02)		(1.96)		(0.09)
Number of places^2		0.00		0.00		0.00		-0.01		0.00
		(0.01)		(0.00)		(0.00)		(0.01)		(0.00)
Days ad posted		0.51		-0.02		-0.01		-2.58**		-0.01
		(0.44)		(0.03)		(0.01)		(1.06)		(0.06)
Unique tender		41.46***		0.89		0.13		-115.65*		2.04
		(15.80)		(1.37)		(0.29)		(66.62)		(2.10)
Constant	147.31***	88.21**	27.14***	21.69***	3.91***	3.33***	333.40***	898.99***	76.95***	85.29***
	(17.10)	(36.02)	(0.83)	(2.92)	(0.28)	(0.68)	(37.70)	(148.75)	(1.67)	(5.78)
R-squared			0.00	0.30	0.00	0.37			0.05	0.38
Municipality FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	570	570	567	567	546	543	582	578	491	475
No. facilities	2705	2705	191	191	189	189	2705	2705	167	166

*Note: models estimating Staff: resident ratio, Nurse: resident ratio and Satisfaction index employ linear OLS regression. Models estimating Staff education and Up-to-date care plan employ fractional logistic regression (estimates in table shown have been rescaled to its original values). Standard errors, clustered by unit, in parentheses; *** p<0.01 ** p<0.05 * p<0.1.*

TABLE 5D, (RESIDENTIAL ELDERLY CARE QUALITY AND BIDDING COMPETITION AMONG PRIVATE PROVIDERS: RAW NUMBER OF BIDDERS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Staff education		Staff: resident ratio		Nurse: resident ratio		Up-to-date care plan		Satisfaction	
	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls
No. bidders	0.92	1.00	0.03	0.15	0.03	-0.01	-0.31	-6.61	-0.52**	-0.53**
	(1.71)	(2.37)	(0.07)	(0.18)	(0.03)	(0.03)	(3.53)	(8.82)	(0.22)	(0.25)
Days ad posted		0.51		-0.02		-0.00		-2.55**		-0.01
		(0.56)		(0.03)		(0.01)		(1.04)		(0.06)
Unique tender		41.70***		1.15		0.15		-119.16		1.76
		(12.59)		(1.73)		(0.25)		(83.35)		(1.78)
General		-27.88**		0.37		-0.16		-41.29		-3.99**
		(11.75)		(1.12)		(0.27)		(34.12)		(1.75)
Dementia		5.04		0.67		0.12		23.39		-1.21
		(11.21)		(1.12)		(0.22)		(48.60)		(2.49)
Service		-37.08		1.11		-0.06		-226.45***		-2.93
		(23.26)		(1.48)		(0.50)		(61.32)		(2.75)
Short-term		26.36		0.15		0.38		-173.81***		-3.30*
		(16.83)		(0.99)		(0.32)		(49.14)		(1.95)
Number of places		-0.52		0.01		-0.05*		0.82		-0.16*
		(1.15)		(0.06)		(0.02)		(1.85)		(0.08)
Number of places^2		0.00		0.00		0.00		-0.01		0.00
		(0.01)		(0.00)		(0.00)		(0.01)		(0.00)
Constant	148.87***	86.72**	27.40***	22.96***	4.11***	3.48***	329.11***	790.28***	74.62***	84.99***
	(13.04)	(39.14)	(0.68)	(3.38)	(0.24)	(0.71)	(31.32)	(136.01)	(1.19)	(5.67)
R-squared			0.00	0.30	0.00	0.37			0.04	0.38
Municipality FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	570	570	567	567	546	543	582	578	491	475
No. facilities	289	289	59	59	57	57	289	289	56	56

*Note: models estimating Staff: resident ratio, Nurse: resident ratio and Satisfaction index employ linear OLS regression. Models estimating Staff education and Up-to-date care plan employ fractional logistic regression (estimates in table shown have been rescaled to its original values). Standard errors, clustered by municipality, in parentheses; *** p<0.01 ** p<0.05 * p<0.1.*

TABLE 5E, (RESIDENTIAL ELDERLY CARE QUALITY AND BIDDING COMPETITION AMONG PRIVATE PROVIDERS: SHARE SINGLE BIDDERS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Staff education		Staff: resident ratio		Nurse: resident ratio		Up-to-date care plan		Satisfaction	
	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls	Bivariate	Controls
Single bidder	7.03	-15.30	-0.43	-1.85	-0.34	-0.50***	48.57	208.46***	4.97***	2.85
	(23.83)	(26.11)	(1.33)	(1.33)	(0.41)	(0.16)	(78.32)	(41.08)	(1.69)	(1.91)
Days ad posted		0.52		-0.02		-0.00		-2.75**		-0.02
		(0.56)		(0.03)		(0.01)		(1.08)		(0.06)
Unique tender		41.33***		1.10		0.12		-127.21		1.66
		(12.61)		(1.80)		(0.25)		(90.83)		(1.83)
General		-29.00***		0.24		-0.16		-17.04		-3.59**
		(11.19)		(1.14)		(0.28)		(37.93)		(1.69)
Dementia		4.05		0.52		0.14		36.24		-0.44
		(10.44)		(1.30)		(0.22)		(55.46)		(2.64)
Service		-36.73		1.11		-0.01		-249.51***		-3.11
		(23.43)		(1.52)		(0.49)		(57.89)		(3.45)
Short-term		25.75		0.03		0.39		-183.38***		-3.08*
		(16.97)		(1.01)		(0.33)		(48.80)		(1.83)
Number of places		-0.45		0.02		-0.05**		0.18		-0.19**
		(1.17)		(0.06)		(0.02)		(1.73)		(0.08)
Number of places^2		0.00		0.00		0.00		-0.00		0.00
		(0.01)		(0.00)		(0.00)		(0.01)		(0.00)
Constant	154.82***	93.39**	27.61***	23.93***	4.30***	3.46***	325.52***	786.59***	70.84***	81.39***
	(7.23)	(37.77)	(0.40)	(3.70)	(0.18)	(0.78)	(14.31)	(173.24)	(0.85)	(5.57)
R-squared			0.00	0.30	0.00	0.37			0.01	0.37
Municipality FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Year FEs:	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
No. observations	570	570	567	567	546	543	582	578	491	475
No. facilities	289	289	59	59	57	57	289	289	56	56

*Note: models estimating Staff: resident ratio, Nurse: resident ratio and Satisfaction index employ linear OLS regression. Models estimating Staff education and Up-to-date care plan employ fractional logistic regression (estimates in table shown have been rescaled to its original values). Standard errors, clustered by municipality, in parentheses; *** p<0.01 ** p<0.05 * p<0.1.*

Appendix 6: full results and robustness, H_3

TABLE 6A, (RESIDENTIAL ELDERLY CARE QUALITY IN MUNICIPALITIES WITH AND WITHOUT EXPOSURE TO COMPETITION FROM THE PRIVATE SECTOR: FULL RESULTS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Staff education		Staff: resident ratio		Nurse: resident ratio		Up-to-date care plan		Satisfaction	
	Bivariate	Controls	Bivariate	Controls	Bivariate	Bivariate	Controls	Bivariate	Controls	Bivariate
Private presence	0.71	-0.15	-1.09***	-0.71*	0.37***	0.39**	4.46***	2.10*	-1.06**	-0.42
	(0.76)	(0.82)	(0.36)	(0.41)	(0.13)	(0.15)	(1.11)	(1.22)	(0.49)	(0.51)
General		0.43		-0.24		0.10		-0.85		-0.065
		(0.47)		(0.25)		(0.085)		(0.62)		(0.38)
Dementia		0.58		1.75***		-0.12		0.43		1.29***
		(0.42)		(0.22)		(0.073)		(0.54)		(0.32)
Service		-0.76		-1.82***		-0.27**		-2.09**		0.20
		(0.63)		(0.35)		(0.12)		(0.86)		(0.50)
Short-term		0.36		-0.0022		0.43***		-7.01***		0.36
		(0.45)		(0.26)		(0.098)		(0.66)		(0.42)
Number of places		-0.023		-0.093***		-0.039***		-0.024		-0.13***
		(0.023)		(0.012)		(0.0038)		(0.028)		(0.020)
Number of places^2		0.000026		0.00040***		0.00020***		0.00019		0.00049***
		(0.00018)		(0.000093)		(0.000029)		(0.00022)		(0.00015)
5-10,000		0.76		-0.44		0.39		3.88		1.49
		(2.54)		(1.15)		(0.42)		(3.58)		(1.75)
10-15,000		-1.51		0.83		0.13		4.82		2.35
		(2.60)		(1.17)		(0.43)		(3.67)		(1.76)
15-30,000		-0.44		0.36		0.0041		6.00		1.80
		(2.65)		(1.20)		(0.44)		(3.76)		(1.79)
30-250,000		0.57		0.74		0.22		8.12**		2.05
		(2.86)		(1.29)		(0.48)		(4.07)		(1.89)
>250,000		-0.017		1.48		0.20		1.21		-0.90
		(4.99)		(2.11)		(0.82)		(7.40)		(2.57)
Share w/ higher education		-1.83		-1.69*		-0.039		-1.96		-2.08*
		(2.12)		(0.94)		(0.35)		(3.08)		(1.18)
Municipal election result, Moderates		-0.057		-0.019		-0.0041		-0.077		0.13***
		(0.058)		(0.029)		(0.011)		(0.087)		(0.039)
Municipal election result, Social Democrats		0.0013		-0.045*		-0.0085		-0.23***		-0.025
		(0.049)		(0.025)		(0.0095)		(0.073)		(0.034)
Municipal election result, Center party		-0.20***		-0.057**		0.0058		0.061		0.087**
		(0.060)		(0.029)		(0.011)		(0.088)		(0.040)
Area		-1.36***		0.31		0.061		-0.35		0.036
		(0.50)		(0.22)		(0.082)		(0.73)		(0.28)
Area^2		0.024		-0.0082		-0.0010		-0.051		-0.018
		(0.033)		(0.014)		(0.0053)		(0.047)		(0.018)
Share foreign citizens (log)		-1.89*		-0.77		-0.18		0.77		-0.36
		(1.00)		(0.47)		(0.18)		(1.46)		(0.63)
Share citizens 80+ years		234.3		160.6		-24.6		118.0		363.1***
		(207.8)		(98.9)		(36.9)		(302.4)		(137.2)
Share citizens 80+ years^2		-2208.1		-1140.9		105.1		-2128.6		-2980.2***
		(1676.9)		(797.6)		(297.5)		(2442.0)		(1119.4)
Share citizens 95+ years		1563.1		-1103.1		-200.7		-449.8		1793.1
		(1603.4)		(893.4)		(352.3)		(2451.4)		(1230.4)
Share citizens 95+ years^2		-380287.6		282562.7*		24701.5		252842.3		-321417.8
		(305609.3)		(170721.5)		(67489.6)		(468326.7)		(234519.5)
Economic result		-0.21***		0.013		-0.011		0.21*		0.11*
		(0.074)		(0.043)		(0.018)		(0.11)		(0.063)
Economic result^2		0.0019**		-0.00030		0.000086		-0.00036		-0.0012*
		(0.00074)		(0.00043)		(0.00018)		(0.0011)		(0.00061)
Constant	84.4***	74.4***	30.6***	24.5***	4.17***	5.70***	86.1***	91.3***	74.2***	54.4***
	(0.54)	(8.17)	(0.24)	(3.71)	(0.084)	(1.39)	(0.77)	(11.9)	(0.33)	(4.88)

sd(Municipality)	6.96***	6.29***	2.70***	2.49***	1.03	1.02	10.4***	9.70***	3.27***	2.27***
	(0.39)	(0.38)	(0.18)	(0.18)	(0.059)	(0.058)	(0.55)	(0.53)	(0.27)	(0.28)
sd(Facility)	7.36***	7.35***	3.36***	3.23***	0.51***	0.39***	6.17***	6.02***	6.24***	6.03***
	(0.20)	(0.20)	(0.12)	(0.12)	(0.087)	(0.11)	(0.33)	(0.32)	(0.15)	(0.15)
sd(Residual)	10.5***	10.4***	6.44***	6.12***	2.43***	2.40***	16.6***	16.3***	5.76***	5.77***
	(0.094)	(0.094)	(0.059)	(0.056)	(0.024)	(0.024)	(0.15)	(0.15)	(0.065)	(0.067)
Observations	8389	8388	8346	8345	7737	7703	8613	8537	5669	5519
Year FEs	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Note: 3-level (observations clustered by municipality and unit) random intercept models.

TABLE 6B, (RESIDENTIAL ELDERLY CARE QUALITY IN MUNICIPALITIES WITH AND WITHOUT EXPOSURE TO COMPETITION FROM THE PRIVATE SECTOR: AR(1) ERRORS ASSUMED)

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
	Staff education		**Staff: resident ratio**		**Nurse: resident ratio**		**Up-to-date care plan**		**Satisfaction**	
	Bivariate	**Controls**	**Bivariate**	**Controls**	**Bivariate**	**Bivariate**	**Controls**	**Bivariate**	**Controls**	**Bivariate**
Private presence	0.62	-0.16	-1.10***	-0.71*	0.36***	0.37**	4.37***	1.84	-1.02**	-0.30
	(0.77)	(0.84)	(0.36)	(0.41)	(0.13)	(0.15)	(1.13)	(1.24)	(0.49)	(0.51)
General		0.48		-0.24		0.099		-0.85		-0.095
		(0.47)		(0.25)		(0.086)		(0.62)		(0.38)
Dementia		0.65		1.75***		-0.12*		0.46		1.29***
		(0.42)		(0.22)		(0.073)		(0.53)		(0.32)
Service		-0.81		-1.83***		-0.26**		-2.15**		0.27
		(0.62)		(0.35)		(0.12)		(0.86)		(0.49)
Short-term		0.37		-0.0010		0.44***		-6.94***		0.36
		(0.46)		(0.26)		(0.099)		(0.67)		(0.43)
Number of places		-0.026		-0.093***		-0.039***		-0.024		-0.13***
		(0.024)		(0.012)		(0.0038)		(0.028)		(0.021)
Number of places^2		0.000036		0.00040***		0.00020***		0.00018		0.00053***
		(0.00018)		(0.000093)		(0.000029)		(0.00022)		(0.00015)
5-10,000		0.63		-0.44		0.40		3.98		1.33
		(2.53)		(1.15)		(0.42)		(3.55)		(1.72)
10-15,000		-1.51		0.84		0.14		5.13		2.38
		(2.59)		(1.17)		(0.43)		(3.65)		(1.73)
15-30,000		-0.36		0.38		0.021		6.32*		1.66
		(2.65)		(1.20)		(0.44)		(3.74)		(1.76)
30-250,000		0.50		0.75		0.22		8.86**		2.08
		(2.86)		(1.29)		(0.47)		(4.06)		(1.86)
>250,000		0.12		1.48		0.19		2.09		-0.75
		(4.98)		(2.11)		(0.81)		(7.36)		(2.53)
Share w/ higher education		-1.59		-1.69*		-0.0012		-2.32		-2.19*
		(2.14)		(0.94)		(0.35)		(3.09)		(1.17)
Municipal election result, Moderates		-0.050		-0.019		-0.0038		-0.068		0.13***
		(0.061)		(0.029)		(0.011)		(0.090)		(0.039)
Municipal election result, Social Democrats		0.015		-0.045*		-0.0077		-0.23***		-0.024
		(0.052)		(0.025)		(0.0095)		(0.076)		(0.034)
Municipal election result, Center party		-0.17***		-0.057**		0.0058		0.050		0.098**
		(0.062)		(0.029)		(0.011)		(0.090)		(0.040)
Area		-1.46***		0.31		0.059		-0.38		0.015
		(0.50)		(0.22)		(0.081)		(0.73)		(0.28)
Area^2		0.030		-0.0082		-0.00092		-0.051		-0.016
		(0.033)		(0.014)		(0.0052)		(0.047)		(0.018)
Share foreign citizens (log)		-2.01*		-0.77		-0.16		0.70		-0.47
		(1.03)		(0.47)		(0.18)		(1.49)		(0.64)
Share citizens 80+ years		220.6		160.6		-24.8		81.2		360.2***
		(211.7)		(98.9)		(36.9)		(305.7)		(138.4)
Share citizens 80+ years^2		-2071.5		-1140.1		106.4		-1679.9		-2926.5***
		(1708.3)		(797.8)		(297.5)		(2468.4)		(1130.0)
Share citizens 95+ years		1618.2		-1113.7		-192.6		-196.4		1677.0
		(1661.6)		(895.7)		(355.1)		(2527.9)		(1255.4)
Share citizens 95+ years^2		-380570.4		283582.6*		23538.1		198586.8		-309987.4
		(316286.0)		(171142.7)		(67997.6)		(482438.0)		(238859.6)

Economic result		-0.22***		0.014		-0.013		0.25**		0.065
		(0.074)		(0.043)		(0.018)		(0.11)		(0.062)
Economic result^2		0.0022***		-0.00031		0.00010		-0.00077		-0.00088
		(0.00074)		(0.00043)		(0.00018)		(0.0011)		(0.00059)
Constant	84.4***	73.9***	30.6***	24.5***	4.18***	5.78***	86.2***	90.2***	74.2***	54.0***
	(0.55)	(8.29)	(0.24)	(3.71)	(0.084)	(1.39)	(0.77)	(11.9)	(0.33)	(4.86)
sd(Municipality)	6.96***	6.26***	2.69***	2.48***	1.03	1.01	10.3***	9.62***	3.24***	2.21***
	(0.39)	(0.38)	(0.18)	(0.18)	(0.058)	(0.058)	(0.54)	(0.53)	(0.27)	(0.28)
sd(Facility)	6.25***	6.32***	3.18***	3.19***	0.000080***	0.0000026***	2.63**	2.87***	5.42***	5.14***
	(0.28)	(0.27)	(0.15)	(0.13)	(0.000044)	(0.0000012)	(1.12)	(0.98)	(0.22)	(0.23)
sd(Residual)	11.2***	11.0***	6.53***	6.14***	2.48***	2.44***	17.5***	17.2***	6.55***	6.60***
	(0.14)	(0.14)	(0.071)	(0.064)	(0.021)	(0.020)	(0.21)	(0.21)	(0.15)	(0.15)
rho	0.24***	0.24***	0.054***	0.013	0.080***	0.073***	0.20***	0.19***	0.35***	0.37***
	(0.022)	(0.022)	(0.020)	(0.019)	(0.018)	(0.018)	(0.021)	(0.021)	(0.035)	(0.036)
Observations	8389	8388	8346	8345	7737	7703	8613	8537	5669	5519
Year FEs	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Note. 3-level (observations clustered by municipality and facility) random intercept models. Residuals assume AR1 autocorrelation

Appendix 7: private ownership and facility quality, moderated by the choice system

TABLE 7A, (RESIDENTIAL CARE QUALITY BY PRIVATE OWNERSHIP AND THE FREEDOM OF CHOICE SYSTEM: FULL RESULTS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Staff education		Staff: resident ratio		Nurse: resident ratio		Up-to-date care plan		Satisfaction	
	Bivariate	Controls	Bivariate	Controls	Bivariate	Bivariate	Controls	Bivariate	Controls	Bivariate
Private	-2.0***	-2.2***	-1.4***	-1.1***	-0.05	-0.008	5.6***	4.9***	0.09	0.4
	(0.6)	(0.6)	(0.3)	(0.3)	(0.1)	(0.1)	(0.7)	(0.7)	(0.5)	(0.5)
Choice system	-1.8*	-1.0	-1.7***	-0.3	0.2	-0.1	-0.9	-3.0**	-0.8	0.3
	(1.1)	(1.1)	(0.6)	(0.6)	(0.2)	(0.2)	(1.5)	(1.5)	(0.9)	(0.8)
Private*Choice system	4.8***	4.6***	0.8	0.4	0.6***	0.6***	-0.3	-0.09	0.8	0.5
	(1.2)	(1.2)	(0.7)	(0.6)	(0.2)	(0.2)	(1.4)	(1.4)	(1.0)	(0.9)
General		0.6		-0.2		0.07		-1.0*		-0.6
		(0.4)		(0.2)		(0.08)		(0.5)		(0.4)
Dementia		0.8**		1.6***		-0.1**		0.4		1.0***
		(0.4)		(0.2)		(0.07)		(0.5)		(0.3)
Service		-0.9		-1.5***		-0.2*		-2.5***		-0.09
		(0.6)		(0.3)		(0.1)		(0.7)		(0.5)
Short-term		0.6		-0.2		0.4***		-6.8***		-0.1
		(0.4)		(0.2)		(0.09)		(0.6)		(0.4)
Number of places		-0.02		-0.09***		-0.05***		-0.010		-0.1***
		(0.02)		(0.01)		(0.004)		(0.02)		(0.02)
Number of places^2		0.00002		0.0004***		0.0002***		0.00005		0.0005***
		(0.0002)		(0.00008)		(0.00003)		(0.0002)		(0.0001)
5-10,000		0.6		-0.6		0.5		3.9		1.8
		(2.5)		(1.1)		(0.4)		(3.4)		(1.8)
10-15,000		-1.5		0.8		0.2		5.0		2.6
		(2.6)		(1.1)		(0.4)		(3.5)		(1.8)
15-30,000		0.1		0.1		0.2		6.1*		2.5
		(2.6)		(1.2)		(0.4)		(3.6)		(1.8)
30-250,000		1.0		0.3		0.5		8.1**		2.8
		(2.8)		(1.2)		(0.4)		(3.9)		(1.9)
>250,000		1.6		1.3		0.5		3.3		2.5
		(4.8)		(2.0)		(0.7)		(7.1)		(2.4)
Share w/ higher education		-3.0		-1.3		0.2		-0.2		-3.5***
		(2.0)		(0.9)		(0.3)		(2.8)		(1.1)
Municipal election result, Moderates		-0.06		-0.03		-0.004		-0.09		0.09***
		(0.05)		(0.03)		(0.01)		(0.08)		(0.04)
Municipal election result, Social Democrats		-0.005		-0.04		-0.01		-0.2***		-0.03
		(0.05)		(0.02)		(0.009)		(0.07)		(0.03)
Municipal election result, Center party		-0.2***		-0.05*		0.007		0.04		0.08*
		(0.06)		(0.03)		(0.01)		(0.08)		(0.04)
Area		-1.3***		0.3		0.08		-0.3		0.03
		(0.5)		(0.2)		(0.08)		(0.7)		(0.3)
Area^2		0.02		-0.005		-0.002		-0.06		-0.02
		(0.03)		(0.01)		(0.005)		(0.05)		(0.02)
Share foreign citizens (log)		-2.7***		-0.9**		-0.1		1.2		-0.7
		(0.9)		(0.4)		(0.2)		(1.3)		(0.6)
Share citizens 80+ years		148.0		159.4*		-36.8		220.2		316.0**
		(191.4)		(90.0)		(33.0)		(272.2)		(123.6)
Share citizens 80+ years^2		-1619.9		-1110.6		197.1		-2981.2		-2639.0**
		(1569.3)		(735.9)		(269.7)		(2228.3)		(1027.5)
Share citizens 95+ years		883.1		-1204.3		-189.7		-758.0		1419.0
		(1534.1)		(838.2)		(317.2)		(2195.7)		(1152.3)
Share citizens 95+ years^2		-203975.4		296108.8*		18854.1		337956.2		-236359.8
		(293159.0)		(160548.8)		(60959.1)		(420441.4)		(219720.8)
Economic result		-0.2***		0.009		-0.02		0.2*		0.09
		(0.07)		(0.04)		(0.02)		(0.10)		(0.06)
Economic result^2		0.002***		-0.0002		0.0001		-0.00010		-0.0010*
		(0.0007)		(0.0004)		(0.0002)		(0.001)		(0.0006)
Constant	84.7***	72.4***	30.2***	24.8***	4.3***	7.2***	87.6***	95.4***	73.8***	53.5***

	(0.5)	(7.6)	(0.2)	(3.4)	(0.07)	(1.2)	(0.7)	(10.9)	(0.3)	(4.4)
sd(Municipality)	6.8***	6.1***	2.6***	2.3***	0.9	0.9	10.5***	9.6***	3.0***	2.1***
	(0.4)	(0.4)	(0.2)	(0.2)	(0.06)	(0.06)	(0.5)	(0.5)	(0.3)	(0.3)
sd(Facility	7.6***	7.6***	3.4***	3.4***	1.0	0.8***	5.8***	5.7***	6.5***	6.2***
	(0.2)	(0.2)	(0.1)	(0.1)	(0.05)	(0.05)	(0.3)	(0.3)	(0.1)	(0.1)
sd(Residual)	10.5***	10.5***	6.4***	6.1***	2.3***	2.2***	15.5***	15.2***	5.8***	5.8***
	(0.09)	(0.09)	(0.05)	(0.05)	(0.02)	(0.02)	(0.1)	(0.1)	(0.06)	(0.06)
Observations	10157	10156	10096	10095	9389	9349	10423	10331	7009	6806
Year FEs	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Note. 3-level (observations clustered by municipality & facility) random intercept models. Municipalities with the freedom of choice system in 2013-2017: Danderyd, Halmstad, Lidingö, Nacka, Norrtälje, Simrishamn, Sollentuna, Solna, Staffanstorp, Stockholm, Täby, Upplands Väsby, Uppsala, Uppvidinge, Växjö, and Österåker.

TABLE 7B, (RESIDENTIAL CARE QUALITY BY PRIVATE OWNERSHIP AND THE FREEDOM OF CHOICE SYSTEM, PRIVATE*STOCKHOLM)

	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
	Staff education		**Staff: resident ratio**		**Nurse: resident ratio**		**Up-to-date care plan**		**Satisfaction**	
	Bivariate	**Controls**	**Bivariate**	**Controls**	**Bivariate**	**Bivariate**	**Controls**	**Bivariate**	**Controls**	**Bivariate**
Private	-2.1***	-2.2***	-1.5***	-1.3***	-0.2*	-0.1	5.8***	5.3***	-0.04	0.2
	(0.7)	(0.7)	(0.3)	(0.3)	(0.1)	(0.1)	(0.7)	(0.7)	(0.5)	(0.5)
Choice system	-1.4	-0.4	-0.8	0.2	0.2	-0.04	-2.3	-4.1***	0.6	1.1
	(1.1)	(1.1)	(0.6)	(0.6)	(0.2)	(0.2)	(1.6)	(1.6)	(0.9)	(0.9)
Private*Choice system	4.4***	4.2***	-0.3	-0.4	0.2	0.2	1.4	1.6	-0.5	-0.4
	(1.4)	(1.4)	(0.8)	(0.7)	(0.3)	(0.3)	(1.7)	(1.7)	(1.1)	(1.1)
Stockholm county	-2.2	-4.6**	-2.9***	-1.7*	0.3	0.4	8.5***	4.7	-4.3***	-2.9***
	(1.7)	(2.0)	(0.7)	(0.9)	(0.3)	(0.3)	(2.4)	(2.9)	(1.0)	(1.1)
Stockholm county*Private	0.8	0.9	2.0***	1.5*	0.7***	0.7***	-2.9*	-3.1*	2.9**	2.2*
	(1.5)	(1.5)	(0.8)	(0.8)	(0.3)	(0.3)	(1.7)	(1.7)	(1.2)	(1.2)
General		0.6		-0.2		0.06		-1.0*		-0.6*
		(0.4)		(0.2)		(0.08)		(0.5)		(0.4)
Dementia		0.8**		1.6***		-0.2**		0.5		1.0***
		(0.4)		(0.2)		(0.07)		(0.5)		(0.3)
Service		-0.8		-1.5***		-0.2*		-2.5***		-0.1
		(0.6)		(0.3)		(0.1)		(0.7)		(0.5)
Short-term		0.6		-0.2		0.4***		-6.8***		-0.1
		(0.4)		(0.2)		(0.09)		(0.6)		(0.4)
Number of places		-0.02		-0.09***		-0.05***		-0.010		-0.1***
		(0.02)		(0.01)		(0.004)		(0.02)		(0.02)
Number of places^2		0.00003		0.0004***		0.0002***		0.00004		0.0005***
		(0.0002)		(0.00008)		(0.00003)		(0.0002)		(0.0001)
5-10,000		0.8		-0.5		0.4		3.7		2.0
		(2.5)		(1.1)		(0.4)		(3.4)		(1.8)
10-15,000		-1.4		0.8		0.2		4.9		2.8
		(2.5)		(1.1)		(0.4)		(3.5)		(1.8)
15-30,000		0.3		0.2		0.2		5.9		2.7
		(2.6)		(1.2)		(0.4)		(3.6)		(1.8)
30-250,000		1.3		0.5		0.4		7.8**		3.1*
		(2.8)		(1.2)		(0.4)		(3.9)		(1.9)
>250,000		1.4		1.2		0.5		3.5		2.4
		(4.7)		(2.0)		(0.7)		(7.1)		(2.4)
Share w/ higher education		-2.7		-1.3		0.1		-0.4		-3.7***
		(2.0)		(0.9)		(0.3)		(2.8)		(1.1)
Municipal election result, Moderates		-0.04		-0.02		-0.008		-0.10		0.1***
		(0.06)		(0.03)		(0.01)		(0.08)		(0.04)
Municipal election result, Social Democrats		-0.007		-0.04		-0.01		-0.2***		-0.03
		(0.05)		(0.02)		(0.009)		(0.07)		(0.03)
Municipal election result, Center party		-0.2***		-0.05*		0.005		0.04		0.08**
		(0.06)		(0.03)		(0.01)		(0.08)		(0.04)
Area		-1.4***		0.3		0.09		-0.3		0.02
		(0.5)		(0.2)		(0.08)		(0.7)		(0.3)
Area^2		0.03		-0.005		-0.003		-0.06		-0.02

		(0.03)		(0.01)		(0.005)		(0.05)		(0.02)
Share foreign citizens (log)		-2.1**		-0.7*		-0.2		0.7		-0.4
		(1.0)		(0.4)		(0.2)		(1.4)		(0.6)
Share citizens 80+ years		-42.8		97.1		-7.6		387.6		195.7
		(209.3)		(98.4)		(36.0)		(298.5)		(134.9)
Share citizens 80+ years^2		-224.9		-658.2		-18.7		-4187.0*		-1752.3
		(1684.7)		(791.2)		(289.0)		(2400.0)		(1102.2)
Share citizens 95+ years		925.3		-1217.3		-201.5		-766.7		1317.1
		(1532.3)		(837.1)		(316.4)		(2194.8)		(1152.4)
Share citizens 95+ years^2		-217119.6		295927.1*		21645.3		344245.8		-222421.9
		(292856.4)		(160352.2)		(60809.2)		(420322.2)		(219683.8)
Economic result		-0.2***		0.007		-0.02		0.2*		0.08
		(0.07)		(0.04)		(0.02)		(0.10)		(0.06)
Economic result^2		0.002***		-0.0002		0.0001		-0.0001		-0.0009*
		(0.0007)		(0.0004)		(0.0002)		(0.001)		(0.0006)
Constant	84.8***	80.6***	30.4***	27.3***	4.3***	5.9***	87.0***	88.2***	74.1***	57.8***
	(0.5)	(8.4)	(0.2)	(3.7)	(0.07)	(1.4)	(0.7)	(12.2)	(0.3)	(4.8)
sd(Municipality)	6.7***	6.0***	2.5***	2.3***	0.9	0.9	10.3***	9.5***	2.9***	2.1***
	(0.4)	(0.4)	(0.2)	(0.2)	(0.06)	(0.06)	(0.5)	(0.5)	(0.3)	(0.3)
sd(Facility)	7.6***	7.6***	3.4***	3.4***	1.0	0.8***	5.8***	5.7***	6.5***	6.2***
	(0.2)	(0.2)	(0.1)	(0.1)	(0.05)	(0.05)	(0.3)	(0.3)	(0.1)	(0.1)
sd(Residual)	10.5***	10.5***	6.4***	6.1***	2.3***	2.2***	15.4***	15.2***	5.8***	5.8***
	(0.09)	(0.09)	(0.05)	(0.05)	(0.02)	(0.02)	(0.1)	(0.1)	(0.06)	(0.06)
Observations	10157	10156	10096	10095	9389	9349	10423	10331	7009	6806
Year FEs	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Note: 3-level (observations clustered by municipality and facility) random intercept models.