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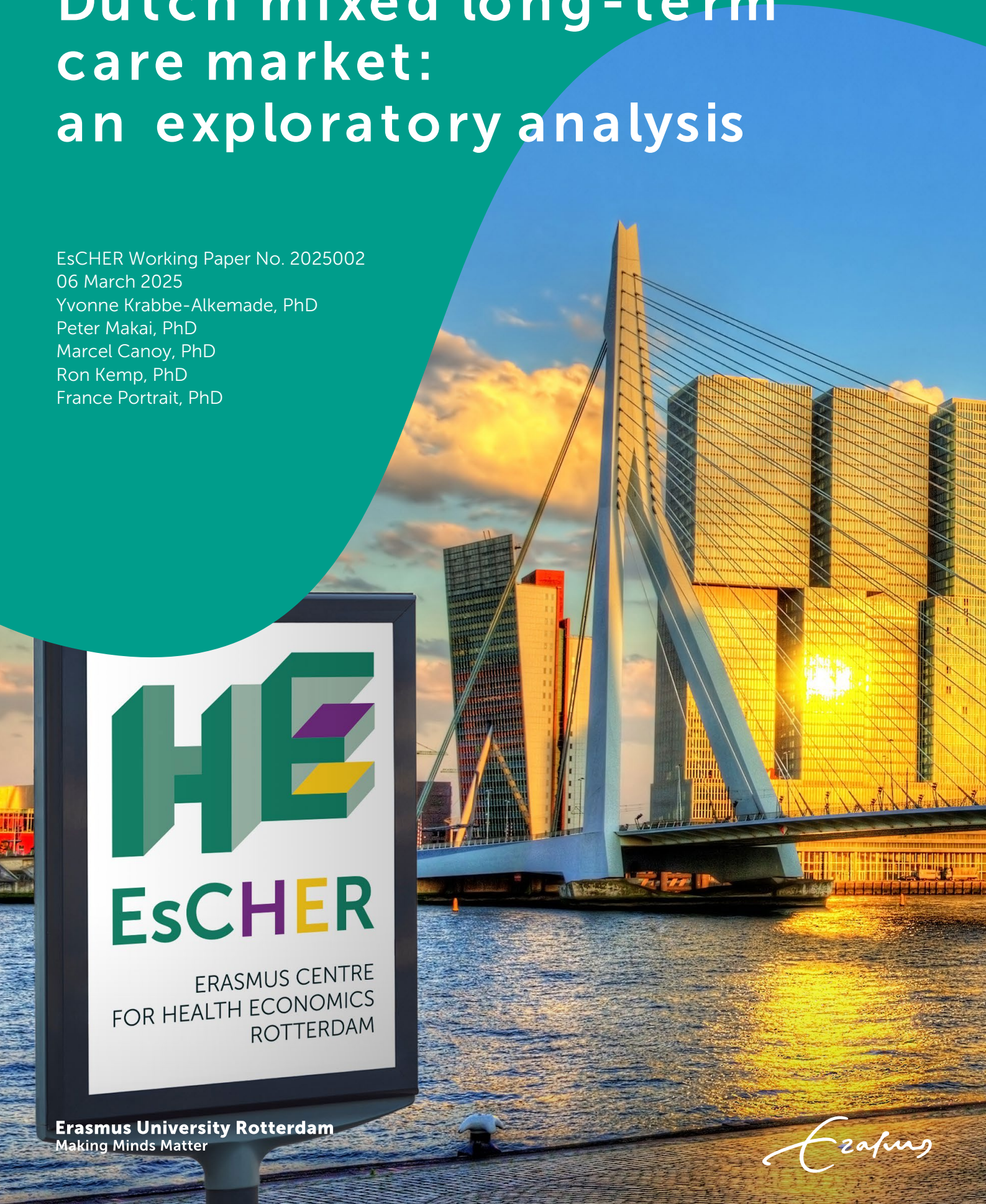

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Title
Exploratory analysis of market distortions in the Dutch mixed long-term care market

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Market distortions in the Dutch mixed long-term care market: an exploratory analysis

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Abstract

Mixed markets can enhance welfare compared to full public or private provision. However, this welfare gain depends on the extent to which market distortions exist. Recent literature demonstrates distortions in mixed long-term care markets worldwide. Our study explores potential distortions in the Dutch institutional market. While all Dutch residential nursing homes are non-profit, for-profit organizations, including private equity firms, have increasingly entered the market, offering round-the-clock care provided in (clustered) home-like settings as an alternative to non-profit residential care.

We analyzed claims data from 2017-2021 for dementia patients aged 70 and older using multinomial logit and Cox Proportional Hazards models. Specifically, we compared risk selection, upgrading, and care quality (measured by avoidable hospitalizations and mortality) between for-profit and non-profit providers.

Our findings do not suggest increased risk selection, higher upgrading, or lower care quality by for-profit providers compared to non-profit providers. Consequently, we did not find evidence of strong market distortions in the Dutch institutional long-term care market. These results contrast with the existing international literature, suggesting that adverse incentives in the Netherlands may be influenced more by the way care is provided (in home-like settings versus residential nursing homes) and by financing structures, rather than ownership type alone.

Keywords: For-profit firms, private equity, market distortions, long-term care, dementia

JEL Classification codes G32, G34, G38, I11, I18

Introduction

In many countries, health care services are delivered through a mix of for-profit and non-profit providers. There are various rationales for having mixed markets. In theory, mixed markets can enhance welfare compared to either full public or full private provision (Le Grand, 1991; Besley and Ghatak, 2007; Barr, 2012; Chalkley and Sussex, 2018). On the one hand, the public or non-profit sector serves as a way of guaranteeing access to a certain minimum quality of care (De Fraja, 2009; Barr, 2012). On the other hand, for-profit parties have an incentive to enhance efficiency since they directly benefit from cost savings. They typically implement changes more rapidly due to their greater willingness to take risks in pursuit of potential profits. In addition, they are likely to be more creative, which increases their chances of offering innovative care options and luxury services. They may also more easily attract motivated workers, allowing them to better address labor market issues (Besley and Ghatak, 2005; Comondore et al. 2009; Chalkley and Sussex, 2018).

However, this welfare gain depends on the extent to which distortions exist. The theoretical literature on mixed markets discusses distortions created by government or non-profit care provision on market outcomes, such as crowding out (De Fraja, 2009). A possible distortion caused by for-profit provision in the care sector is risk selection. For-profit entities might reduce costs by choosing clients based on their health status, commonly referred to as cherry picking (attract relatively healthy, and therefore cheaper individuals) or lemon-dropping (redirect relatively unhealthy individuals to other providers) (Akerlof, 1971; Newhouse, 1996). Other possible distortions are upcoding (assigning patients to higher level of care codes to increase reimbursement rates) or delivering lower quality of care (Silverman and Skinner, 2004; Steinbush et al., 2007).

In institutional long-term care (LTC), mixed markets typically involve a combination of non-profit and for-profit nursing homes. Recent empirical literature reveals distortions in mixed institutional LTC markets worldwide. For instance, Gandhi (2023) found evidence of risk selection in California nursing homes, which disproportionately harmed Medicare patients. Likewise, a study by Winter et al. (2023) in Virginia nursing homes revealed that selective admissions practices were common, with facilities prioritizing residents who were less likely to require antipsychotic medications. Finally, Bach-Mortensen et al. (2024) showed that, since 2011, for-profit nursing homes in England provide on average lower levels of care quality compared to public ones. Distortions can be especially problematic in LTC markets because of some unique characteristics. Individuals in nursing homes are

generally not mobile and often unable or unwilling to move to another facility (Mukamel, 2009). Therefore, voting with your feet is not easy, and the incentives for risk selection or the provision of lower-quality care are difficult for clients to address or correct.

A potential reinforcing factor is that some for-profit nursing homes, often part of large nursing home chains, are owned by private equity (PE) companies. Those PE partners have entered the LTC markets of OECD countries during the last twenty years (Mattingly, 2023). The rationale for this trend is that PE-owned organizations may implement more optimized business strategies than other for-profit nursing homes. These strategies can include adjustments in services offered, governance, diversification, separating property from operations, or expanding locations, all aimed at maximizing profits (Pradhan et al., 2013; Bos and Harrington, 2017; Harrington et al., 2017). Dewatripont and Tirole (2024) showed that if the degree of greed among private parties (e.g. PE companies) is high, problems are more likely to arise. The stronger the drive for profit, the higher the likelihood that all available legal loopholes will be exploited, especially in the absence of intrinsic motivation to restrain such practices (Stevenson and Grabowski, 2008; Dewatripoint and Tirole, 2024; Eghbali, 2023). They also showed that mixed markets can work well under the right circumstances since the benefits of competition might outweigh the potential negative effects. Most of the available empirical research in LTC focusses on the role of PE-owned nursing homes on care quality (Lainoff, 2020). Some studies show no significant differences in quality performance between PE-owned nursing homes and other nursing homes (Winblad et al., 2017; Braun et al., 2020; Hussem et al., 2020; Kruse et al., 2020). However, the profit motive of PE providers by cutting costs to increase revenues may also harm the quality of care (Pradhan et al., 2014; Bos et al., 2020; Hussem et al., 2020; Kruse et al., 2020, Patwardhan et al., 2022). For instance, Gupta et al. (2021) examined the impact of PE buyouts in U.S. nursing homes on short-term mortality. Their findings revealed that frail (Medicare) individuals admitted to a PE-owned nursing home faced an elevated risk of short-term mortality.

Our study examines whether there is evidence of market distortions in the Dutch mixed LTC market for dementia. We focus on institutional care and distinguish between care provided in residential nursing homes and round-the-clock care provided in (clustered) home-like settings as an alternative to traditional residential care. The Dutch institutional LTC market has some distinguishing features, which are i) access to this type of care needs to be approved by a government-run gatekeeping system (Bakx et al., 2021), ii) for those who qualify, the system is typically generous and the care is of

relatively high quality (Bakx et al., 2021); iii) while all residential Dutch nursing homes are non-profit, for-profit and not-profit organisations offer round-the-clock care in (clustered) home-like settings as a substitute for residential care; v) for-profit and not-profit organizations make use of the same public funding; vi) for-profit, including PE-owned organisations, are on the rise (Bos et al., 2020) but the market shares are small relative to e.g. the U.K. and U.S.. As shown in the theoretical and international empirical literature, the introduction of for-profit (PE-owned) entities in the Dutch LTC system may entail some risks for market distortions. Our findings provide no strong evidence of such distortions, and, therefore, no indication that for-profit organizations (including PE-owned ones) exhibit the same level of adversarial behavior as observed in other parts of the world.

Our research focusses on individuals with dementia. This is for several reasons. First, the prevalence of dementia is steadily increasing worldwide due to aging populations, posing significant challenges for LTC systems (WHO, 2019). Second, individuals with dementia have unique and complex needs that go beyond standard medical care, including support with daily activities, behavioral management, and the provision of a safe and stimulating environment. As cognitive decline progresses, these individuals often require specialized, person-centered care that addresses both their physical and emotional well-being (Lee et al., 2022). It is therefore paramount to better understand whether and how this growing demand for tailored LTC services can be effectively addressed by a more diverse range of care arrangements. Third, many PE-owned nursing homes focus on dementia care. One reason for this is that it may be easier to reduce care costs of patients with mild dementia without severe physical impairments, compared to individuals with significant physical disabilities who may require more intensive and specialized care. Moreover, concentrating on a specific type of disability allows for more streamlining of care processes and optimization of resources, possibly leading to increased cost-efficiency and higher profitability.

The next section discusses the contextual background, followed by a section presenting the materials and methods that are needed to conduct our study.

The Dutch long-term dementia care market

In 2015, the Netherlands ranked as the highest spender on LTC among OECD countries while having an average percentage of older individuals (OECD, 2023). The increasing costs and the lack of incentives for efficiency raised concerns about the financial sustainability of the system (Schut and van

den Berg, 2010). As a result, the Dutch LTC system was extensively reformed and the Long-Term Care Act (LTCa) came into force in January 2015. The LTCa covers intensive forms of care for vulnerable people or people with severe mental or physical disabilities who need around-the-clock care and do not include lighter care alternatives such as formal home care through district nursing. Figure 1 shows the various steps that an individual with severe dementia might follow within the Dutch institutional LTC system.

Figure 1 about here

Access to LTCa care is granted or rejected by the Care Needs Assessment Center (CNAC), based on detailed, nationwide, objective criteria. Entitlements for (dementia) LTCa care are expressed using care need packages where, overall, lower numbers stand for lower intensity of care and higher numbers for more intensive forms of care. Actual use of LTCa care is restricted to individuals who have been granted it, and they can only utilize the care outlined in the granted care needs package (Maarse and Jeurissen, 2016).

Individuals with a LTCa entitlement can choose between residential care (care in nursing homes) or continuing living independently (i.e. in their own or rented accommodation) and getting all the support and care they need there. LTCa care in home-like settings can be provided in three ways. First, clients can opt for a “Full home care package”, which is typically provided in a clustered form in a home-like environment such as an apartment or on an estate. Care is then provided by one single provider. Second, clients can opt for a “Modular home care package”, but in this case, care is provided by multiple providers. Those care packages offer the same care individuals would receive if they were living in a residential nursing home. Most importantly, it includes nursing care and treatment and non-medical services like personal care, provision of food and drinks, transportation, cleaning of living space, and sometimes respite care (allowing informal caregivers “respite” from care). The care costs are covered by the LTCa (except for own payments) but the individual remains responsible for his or her housing costs. Individuals can only opt for home care packages (instead of residential nursing home care) when care offices expect that living independently is still feasible and the required care can be provided in an efficient (clustered) way (Bakx et al., 2020; Plaisier and Den Draak, 2019). Third, clients can opt for a “Personal Budget” with which he or she can make his or her own care

arrangements. As explained below, modular home care packages and personal budgets arrangements are excluded from the analyses, and therefore not shown in Figure 1. It is important to note that these three options only include round-the-clock care (i.e. LTCa care).

Monthly out-of-pocket payments are required for each delivery method. The amounts individuals must pay depend on their financial resources (income and wealth), age, partner status and type of received care. In the case of residential care in nursing homes, the monthly co-payment ranges between 0 to 2,887 euros. For those choosing to receive care in their own or rented accommodation, the monthly co-payment is significantly lower, ranging from 29 to 880 euros. Particularly for wealthier older individuals, a ”Full Home Care Package” may be more appealing due to their comparatively lower monthly co-payment (Tenand et al., 2021).

The 2015 reform also created financial opportunities for for-profit providers, gradually transforming the institutional LTC sector into a mixed market. Until 2015, the role of for-profit nursing homes in the Netherlands was minimal. This was largely due to the prevailing belief that the Dutch government was responsible for those in need of LTC, leading to public LTC insurance with extensive coverage since 1968 (Maarse and Jeurissen, 2016). The number of for-profit nursing homes increased from about 120 locations in 2014, to 291 in 2018 and to 550 in 2023. This number remains modest compared to the 2,355 non-profit residential nursing homes locations in 2023, which provide accommodations to approximately 122,000 individuals (Bos et al., 2020; Zorgkaart Nederland, 2024; Actiz, 2024). In recent years, an increasing number of PE-owned companies have shown interest in the healthcare sector, leading to acquisitions of small healthcare providers. Currently, five large PE investors are active in the LTC sector. These investors collectively own 253 for-profit nursing home locations distributed across 10 labels, encompassing approximately 6,000 rooms (Bos et al., 2020). As shown in Figure 1, while residential care is only provided by non-profit organizations, full home care packages are offered by non-profit and for profit (PE-owned) organizations.

In the last decade, individuals entitled to LTCa care have faced increasing waiting times before receiving the care needed due to supply shortages (Actiz, 2024). Therefore, investments from PE or other for-profit organizations might alleviate the escalating demand for residential care and offer more care options, such as the opportunity to live in more upscale apartments in care complexes and receiving round-the-clock care there. Care complexes may operate more efficiently when all clients reside together.

Potential distortions in the Dutch institutional LTC mixed market

The organization and commercialization of the Dutch institutional LTC system also entail some risks. First, profit payments to shareholders are prohibited by law (under the Care Institutions Admission Act). Given the increasing (unmet) demand for institutional care, growing preferences for ageing at home (Tenand et al., 2021) and the relatively generous public coverage, offering LTCa care have become more financially attractive and for-profit organizations have found ways to circumvent the profit ban using home care packages provided in clustered home-like settings. The profit ban holds for the care component, but not for the housing component. Therefore, for-profit nursing homes rent apartments to individuals who have been granted LTCa care and offer them those packages. The living-related components such as rent, property, service costs and catering are paid for by the clients themselves, and the providers may make profit on the housing component (VWS, 2022). In principle, profits are generated from (high) living expenses and service costs but there is some evidence suggesting that profit is also being derived from the care component (Bos et al., 2022).

Second, for-profit and non-profit nursing homes are both eligible for public LTCa funding. They are paid through the same reimbursement system and receive a government-regulated maximum daily rate for each care package provided. The price of a care package also depends on where the care is provided, whether in a residential nursing home or in (clustered) home-like settings (e.g. full home care packages) (Bakx et al., 2020). The reimbursement of a care package is based on a case payment model. The provider receives a fixed price based on average cost of care, which are independent from the actual delivered care. Therefore, some variations are possible within each care package which creates opportunities for risk selection and potential upcoding. The risk selection part comes from the incentive of for-profit players to target individuals within a care package with predictable lower costs. For-profit organizations also have an incentive for transferring patients to a residential nursing home as client's (physical) health deteriorates over time and more extensive care is needed. Sometimes, this is already mentioned in the housing/care contract. This may also be accompanied by a change of entitlement based on the CNAC assessment, which may precede or follow the move. Although the nursing homes cannot influence the result of the CNAC assessment, they can decide when it is initiated. This leads to a potentially complex interplay between "upgrading" an entitlement and moving. On the one hand, there is a financial incentive to upgrade the entitlement,

and keep the client in the nursing home without providing adequately extensive care. On the other hand, as time elapses, this could lead to significantly degraded quality.

Methods

Datasets and study sample

We used two administrative individual-level datasets from Vektis, a business intelligence company for the Dutch healthcare sector that collects all health insurance claims data. The first dataset consists of all claims data for LTC from 2017-2021. Individual health information was derived from a dataset on secondary care use from 2016-2021. Selecting these years enabled us to use the most recent available data at the time of this study and to monitor the expansion of PE providers which started in 2017-2018. We merged the two datasets at the individual level using unique identifiers.

First, we selected all claims related to two specific care packages. These packages are for individuals who need protected living with intensive dementia care. The first package is for individuals receiving care in a residential nursing home and the second one is for individuals with a full home care package. All claims for modular home care packages were excluded as this type of care is mostly provided while waiting for the most preferred care option. We also excluded personal budget claims as no full care information was available for them. Second, individuals have usually more than one claim per care package. Only the first one of each individual was included in our study sample. The first claim was selected in order to have the longest possible follow-up, namely the individuals with their first invoice in 2017 were followed for a maximum of five years and those who started in 2021 for a maximum of one year. Finally, we only included individuals who were 70 years and older at the time of their first claim. The final study sample included 105,444 unique individuals.

The Vektis dataset also contained information about the identity of the nursing home that provides the care but not about its ownership. We determined for each calendar year whether the nursing homes were for-profit or non-profit through a two-steps process. First, we checked the legal form of the organization using the Chamber of Commerce website (kvk-number). Nursing homes that had a “foundation” as a legal form were classified as non-profit institutions. Nursing homes with other legal forms, such as "private limited company" were classified as for-profit institutions. Second, we compared the derived classification with the classification listed on the website “ZorgkaartNederland”. This site divides nursing homes into private residential care centers (for-profit nursing homes) and

public nursing homes. In case of discrepancies between the two websites, we searched the website of the respective nursing homes. For-profit nursing homes that were owned by one of the five PE companies were classified as PE-owned nursing homes.

Individual health information was also derived from the Vektis data. For this, we used data on secondary care use from 2016 to 2021. We explain below how the health variables were constructed. Finally, because the Vektis data does not include information on individual's socio-economic status (SES), we used public data from Statistics Netherlands (CBS) at the postal code level as a proxy (Statistics Netherlands, 2024a). Data from the last postal code registered before nursing home admission were used in our analyses. More details on these variables are also provided below.

Analyses risk selection: Cherry picking

Outcome variable: To examine the extent of cherry picking, a categorical variable with four levels was constructed. This variable was based on the ownership of the nursing home and on the type of care the individual received: (1) non-profit nursing homes providing residential care, (2) non-profit nursing homes providing round-the-clock care in home-like settings (i.e. full home care packages) (3) PE-owned organizations providing full home care packages and (4) other for-profit entities providing full home care packages.

Main independent variables: Two variables were included to assess the extent of cherry picking. The first variable measures the level of comorbidity before admission. We calculated the Charlson comorbidity index for each individual. This index was constructed by identifying the presence of a diagnosis 365 days before the first LTCa claim. The presence of a diagnosis was based on (a selection of) ICD-10 diagnoses using the definition of Bär et al. (2022). The second variable indicates whether the individual visited a hospital during the three months preceding admission in a nursing home (dummy = 1) or not (dummy = 0). No distinction was made between outpatient and inpatient visits.

Other independent variables: Besides age and gender, seven additional variables were used to characterize the client's neighborhood (based on the postal code of residence of the individual before admission). We selected: 1) the share of inhabitants with Dutch background (%) which is defined by the percentage of individuals born to parents, both of whom are natives of the Netherlands; 2) the percentage of owner-occupied homes defined as: number of houses owned by the (future)

occupant(s) or used as a second residence divided by the total number of residences; 3) value homes defined as the average provisional value of all homes with a known property tax assessment; 4) the percentage of residents who receive unemployment benefits, social assistance or related benefits, as well as disability benefits; 5 & 6) the number of households belonging to the 40% lowest and 20% highest income group measured at national level and 7) the degree of urbanization of the municipality of residence, determined by the number of addresses per km2 (from 1-very strongly urban to 5-rural). More details on these variables can be found in Statistics Netherlands (Statistics Netherlands, 2024b). The eighth variable “excess capacity” indicates the difference between the maximum number of beds per institution and the number of filled beds 3 months before admission within a radius of 20 km, as measured from the previous postal code of the individual. This variable was included to some extent control for the likelihood of risk selection: the more excess capacity in the area is, the less likely firms are to select lower risks as they aim to fill all available beds. Our model was also corrected for the size of the nursing home provider: the variable takes the value “0” for nursing home providers with more than 20 clients and “1” otherwise. Finally, a set of four year dummies were included to control for potential contextual changes during the follow-up of our study. Those dummies also partially account for the Covid-19 pandemic.

Statistical analyses: Multinomial logit models were estimated to assess the probability of using a specific type of round-the-clock care (our categorical outcome variable). In the first set of analysis (Model I), we used the full sample and selected non-profit nursing homes providing residential care as the reference category, with parameters estimated for the other three categories.

To better understand the differences in incentives between for-profit and non-profit firms, all analyses were also performed on a sample excluding all individuals receiving residential care (Model II). This is because, in the Dutch context, we cannot compare for-profit and non-profit residential nursing homes as all of them are non-profit. In those analyses, we used the non-profit nursing homes providing full home care packages as a reference category. A significance level of 5% was used in all statistical analyses.

Analyses care trajectories: Lemon dropping and upgrading care entitlement

Outcome variables: Two variables were used to examine differences in care trajectories across care providers. We used times to (1) transfer from one LTC facility to another and (2) change of care needs

entitlement. These variables measure the time between getting the first invoice in a specific facility and the moment that an individual is observed to move to another LTC facility and the change of entitlement, respectively.

Main determinant: Dummies indicating the type of nursing homes were included in the models. In the analyses based on the full sample, we used non-profit residential nursing homes as the reference category, and in the analyses excluding individuals receiving care in residential nursing homes, we used non-profit nursing homes providing full home care packages as the reference category.

Control variables: We used the variables mentioned in 3.2 to control for potential population differences, supplemented by the number of hospital admissions with overnight stay during our follow-up. This may be an indication that the client's health was deteriorating, which might have triggered a forced move.

Statistical analyses: Cox Proportional hazards models were used. Proportional hazards are an underlying assumption of the Cox model. However, the effect of the baseline control variables can change with time. For example, the effect of a previous hospitalization may be very different on the day of admission and a year later. For this reason, we tested the proportional hazards assumption, and it failed in several baseline variables. Therefore, we included time-dependent coefficients when indicated by the proportional hazards test (Zhang et al., 2018; Nahhas, 2023). We also accounted for clustering of individuals within organizations. Hazard ratios, coefficients, standard errors and p-values were reported.

Analyses quality of care: Mortality and avoidable hospitalizations

Outcome variables: We used two dependent variables to assess the relationship between types of nursing home care and quality of care. The first one is (1) mortality. This variable measured the duration between the first invoice in a specific facility and the moment that an individual dies. The second is (2) avoidable hospitalizations which was measured as the duration between the first invoice in a specific facility and all observed avoidable hospitalizations. We followed Bär et al. (2022) to define avoidable hospitalizations, except that we used claims diagnosis and ICD-10 instead of ICD-9. Bär et al. (2022) include rehabilitation as avoidable hospitalizations, and we included this from the LTC database using all claim codes for rehabilitation.

Main determinant and Control variables: Again, we included dummies to indicate the type of care the individuals received and all variables mentioned in 3.3.

Statistical analyses: For the analyses of mortality, the same types of Cox-models were used as for lemon-dropping. For avoidable hospitalizations, which can happen multiple times, the Andersen-Gill model was used (Andersen and Gill, 1982).

Results

Descriptives study sample

Table 1 reports the descriptive statistics of the study sample per type of nursing home care. The first part of Table 1 shows summary statistics of the outcome variables. Appendix A reports the Kaplan-Meier curves of the four duration variables, per type of nursing home care provided.

First, the vast majority of individuals received care in a residential nursing home. Second, few individuals were observed to be transferred to another nursing home or to get a new entitlement. The nursing home transfer rate did not vary a lot between the different ownership-care settings except for other for-profit full home care packages. In this setting the transfer rate was 2.7% and twice as high as in other settings. Furthermore, the descriptives show that both the avoidable hospitalization rates varied more between types of care setting (residential or full home care package) than between ownership categories. The Kaplan-Meier curves in Appendix A show that the durations until obtaining a new care entitlement the time to a first avoidable hospitalization was shorter for those receiving a full home care package.

Table 1 also shows that for the characteristics measured at the level of the individual (female, age at admission, Charlson score, previous hospitalization and hospitalizations during stay), the variation was mainly determined by where the care was provided (residential or in home-like settings). The percentage of females ranged from 61.8% in residential to 72.9% in PE-owned settings. Relatively more females received full home care packages comparing to residential care. The average age varied from 84.5 in residential care to 86.1 to for-profit home-like settings indicating that on average clients receiving round-the-clock care at home were slightly older. The mean Charlson score was comparable across all settings (0.6). The percentage of previous hospitalizations was much higher in residential settings (18.5%) compared to in home setting (ranging from 7.7% for non-profit full home

care to 11.1% for other for-profit full home care). The number of hospitalizations during stay was much larger in home-like settings than in residential care.

Table 1 about here

The descriptives of the postal codes of residence before admission showed that the percentage of inhabitants with Dutch background was a bit higher for clients subsequently admitted to for-profit (PE-owned) settings. For-profit nursing homes also had more residents coming from postal codes with a higher home-ownership rate and fewer residents who received benefits. The percentage of inhabitants receiving social benefits was comparable for clients admitted to for PE-owned and other for-profit nursing homes. The percentage "high income private households" was slightly higher in other for-profit organizations than PE-owned nursing homes. This may be possibly explained by one large PE provider targeting individuals receiving only a basic state pension or a small pension.
Finally, the variable "excess capacity" (namely the average number of free beds per nursing home location within a radius of 20 km) was higher for residential care (3.5) compared to home-like settings (ranging from 1.7 for PE to 2.0 for other for-profit organizations).

Results risk selection: Cherry picking

Table 2 shows the estimation results of the multinominal logit models exploring the extent of cherry picking. In model I, estimated on the full sample, the variable "previous hospitalization" had significant negative coefficients for all types of home-like settings, indicating that individuals with higher levels of frailty were more likely to end up in residential care than others. Note also that the coefficients were less negative for the for-profit full home care-organizations than for the non-profit ones. Furthermore, the coefficient of the Charlson score was slightly higher for the home-like settings than in residential settings, but not significant at the 5%-level (p-values≥0.056). Therefore, the selection of healthier clients seemed to be more related to the financing structure (i.e., the full home care packages versus residential care) and not to the type of ownership, as no strong differences in coefficients were observed between the organizations providing full home care packages. To further test this, we estimated a multinomial logit model on a sample only including individuals receiving full home care packages (Model II, reference category "non-profit full home care packages"). Those analyses

confirmed the absence of significant differences between the for-profit and non-profit organizations providing round-the-clock care in home-like settings. On the contrary, individuals who had been hospitalized three months before admission were slightly more likely to be in PE-owned nursing homes, though the coefficient was only significant at a 10%-significance level (p-value=0.064).

Table 2 about here

Results care trajectory: Nursing home transfer and Change of care entitlement

Table 3 shows the estimation results of a Cox model with time-varying coefficients assessing the relationship between the type of nursing home care at admission and the duration to a transfer to another nursing home setting and to a new care need entitlement.

Table 3 about here

The estimation results on the full sample (Model I) show that, after correction for differences in health status at admission and during follow-up, the coefficients of the time-constant and time-varying components of non-profit and (PE-owned) home-like settings were borderline significant (at 10%-level), implying that the relationship between those variable and nursing home transfers varied over time. Contrarily, the coefficient of other for-profit entities remained constant over time and was positive, suggesting that their clients were more likely to be transferred than those in residential homes. The coefficients of both the non-profit and the PE-owned organizations remained negative during the whole observation period (though slightly increasing). This translates in lower probability of being transferred in those organizations than in residential settings. Model II shows the results of the same analysis on a sample only including full home care packages clients. None of the coefficients were significant, demonstrating the absence of difference in transfers between the three types of firms providing round-the-clock care in home-like settings.

Table 3 also shows the estimation results of Cox models assessing the relationship between the type of nursing home care at admission and the duration to a change of care needs entitlement. For model I, after correction for differences in health status at admission and during follow-up, the time-constant coefficients of all (clustered) full home care settings entities were negative and strongly significant.

Even after taking into account the significant time-varying coefficients, the association remained negative during the full observation period. This suggests that the probability of changing entitlement by (clustered) full home care firms was lower than in residential nursing homes. The estimation results of Model II demonstrated no strong differences in upgrading between non-profit and for-profit firms (coef.>0 & p-values≥0.099) providing round-the-lock dementia care in home-like settings. This also agreed with findings based on Kaplan-Meier curves “Transfer to another organization” and “Change of care need assessment” in Appendix A.

Results quality of care: Avoidable hospitalizations and Mortality

Table 4 shows the estimation results of (time-varying) Cox models assessing the relation between type of nursing home care, avoidable hospitalizations and mortality. In both models, adjustments were made for differences in health status at admission and during follow-up and for neighborhood characteristics.

In model I, avoidable hospitalizations were more likely for both non-profit (coef.: 1.035, p-value=0.000) and PE-owned full home care packages (coef.=1.207, p-value=0.000) than in residential nursing homes. The coefficient over time showed that, though the difference became smaller, this result remained during the whole observation period. For-profit full home care packages showed no significant relationships. Analyses in model II demonstrated a decreased probability of having avoidable hospitalizations in for-profit firms compared to non-profit firms. This was also consistent with findings based on the Kaplan-Meier curve “Avoidable hospitalizations” in Appendix A. Regarding mortality, in model I, individuals were much less likely to die soon than in residential nursing homes. In model II, individuals in other for-profit firms faced higher mortality rates than in non-profit firms (p-value = 0.001).

Table 4 about here

Discussion

The introduction of for-profit (PE-owned) entities in LTC systems has the potential to enhance efficiency, reduce bureaucracy, and offer more choices for consumers. However, there is a risk of market distortions. The literature on for-profit nursing homes is dominated by experiences in the U.S.

and the U.K. and demonstrates on average distortions in mixed LTC markets (Pradhan et al., 2014; Bos et al., 2020; Hussem et al., 2020; Kruse et al., 2020; Gupta et al., 2021; Patwardhan et al., 2022). The Netherlands has a system of organising and financing LTC that is substantially different from the ones in the U.S. and U.K.. Care provision for severely disabled individuals aligns closely with the principles of universal health care, the quality of and access to institutional LTC are highly regulated, and financing is largely public with maximum prices and relatively low out-of-pockets payments (Maarse and Jeurissen, 2016; Bos et al., 2020; Bakx et al., 2021). This may imply that the potential for gaming is more limited compared to other countries.

Our paper suggests no significant market distortions in the Dutch institutional LTC care market. More specifically, we did not find any evidence of risk selection by for-profit (PE-owned) firms. First, there was no association between ownership and Charlson score. Second, individuals hospitalized in the past three months were more likely to be admitted to a residential facility. This was possibly due to the urgency following hospitalization and the availability of crisis spots in these facilities. Similar results hold with regards to other behavioural aspects. In all analyses, we found no evidence of increased probability of nursing home transfers by for-profit (PE-owned) organizations. This finding contradicts the hypothesis that for-profits firms are more likely to discharge unhealthier individuals compared to their (non-profit) counterparts. However, this result should be considered with some caution. First, Dutch nursing home care often involves long waiting lists, making it difficult to transfer to another facility (i.e. the observed number of transfers is low). Second, for the group we studied, the challenge is even greater, as relocation can be particularly stressful for individuals with dementia.

Furthermore, we did not find evidence of more frequent upgrading by for-profit (PE-owned) organizations. The occurrence of upgrading seems to be driven more by the financing structure (i.e., the full home care packages versus residential care) than by whether the organization is for-profit or non-profit. This finding may partly be explained by the centralized assessment process of the CNAC, which makes it difficult to obtain a higher care entitlement. Finally, our results showed lower rates of avoidable hospitalizations in residential care. However, within those providing care in home-like settings, smaller rates of avoidable hospitalizations were observed among (PE) for-profit firms than non-profit firms.

The question is why we find results that seem at odds with what other authors find (in other countries) (Ghandi, 2023; Winter et al., 2023). There are several possible explanations. First, only individuals

with an entitlement of the gatekeeper, namely the CNAC, have access to nationally-insured institutional LTC. As a result, the pool of potential clients is likely to be much smaller and more homogeneous than in other countries. Therefore, the profit margin on the care component may be relatively smaller than in other countries. This does not rule out the possibility that for-profit organizations employ better strategies e.g. to substitute formal care with informal care compared to non-profit organizations, and as such make the provided care cheaper. Second, the market share of for-profits is (much) lower than elsewhere, reducing the scope for (abuse of) market power. Third, the Dutch LTC system is relatively generous and the quality of residential nursing homes is high, making it difficult for for-profit firms to engage in dubious behavior, since they would run them out of business.

There are several limitations to our research. First, it is challenging to draw a clear distinction between risk selection and self-selection. While the business strategies of for-profit (PE-owned) nursing homes might be aimed at attracting affluent (healthier) older individuals, only individuals who are expected to have lower levels of care costs are allowed by law to receive care in home-like settings. In addition, some facilities may attract different clients and some may be prepared to wait until their most preferred option become available. Second, all analyses were performed at the corporate level. For larger chains, particularly those operating within the non-profit nursing home sector and PE-owned nursing homes, there may be unobserved variation in results of the different locations within individual corporations. Third, though we had access to a rich database, we had no access to all potentially relevant outcomes or covariates, like more detailed measures of quality of care, clients' experience, use of informal care or emotional health. Some of our results may be affected by unmeasured differences in health or frailty. Finally, we refrained from examining differences in curative care (e.g. general practitioners (GP) care) between non-profit and for-profit facilities. Notably, the geriatrician employed at the nursing home often serves as the primary care provider within residential settings. Conversely, there are evidence that clients receiving full care home packages more heavily rely on GP, clinical geriatric care, or more physiotherapy care and hospital care. This type of care is not financed by the LTCa but through the Health Insurance Act. For future research, it is crucial to ascertain the extent to which clients with full home care packages engage with these services in order to evaluate the implications for overall care quality and care expenditures.

Whilst our results sketch a fairly rosy picture on the current behaviour of for-profit organisations in the LTC market in the Netherlands, there is a word of caution. If scarcity increases and market shares

and/or local market power increase, the adversarial incentives may materialize. Examples in various countries as well as other sectors within the Netherlands have shown that one cannot be too careful about this risk. To prevent provider misconduct, several measures can be implemented. These include adjusting financing to protect residential nursing homes from disadvantages in the face of risk selection, direct payments in case of transfers to the non-profit sector, or a code of conduct for the for-profit sector. By taking these steps, the benefits of private provision can be harmonized with public interests, thus preventing potential harm.

References

ActiZ. "Hoe Staat Het Met de Wachtlijsten voor Verpleeghuizen." Accessed April 25, 2024. Available at: https://www.actiz.nl/hoe-staat-het-met-de-wachtlijsten-voor-verpleeghuizen.

Akerlof, George A. "The Market for 'Lemons': Quality Uncertainty and the Market Mechanism." The Quarterly Journal of Economics 84, no. 3 (1971): 488–500.

Andersen, P. K., and R. D. Gill. "Cox's Regression Model for Counting Processes: A Large Sample Study." The Annals of Statistics (1982). https://www.jstor.org/stable/2240714. https://www.jstor.org/stable/23047542.

Bach-Mortensen, Amalie M., Ben Goodair, and Maria D. Esposti. "Involuntary Closures of For-Profit Care Homes in England by the Care Quality Commission." The Lancet Healthy Longevity 5, no. 4 (2024): e297–e302.

Barr, Nicholas A. The Economics of the Welfare State. 5th ed. Oxford: Oxford University Press, 2012.

Bär, M., P. Bakx, B. Wouterse, and E. Van Doorslaer. "Estimating the Health Value Added by Nursing Homes." Journal of Economic Behavior & Organization (2022). https://doi.org/10.1016/j.jebo.2022.08.028.

Bakx, P., B. Wouterse, E. Van Doorslaer, and A. Wong. "Better Off at Home? Effects of Nursing Home Eligibility on Costs, Hospitalizations, and Survival." Journal of Health Economics (2020). https://doi.org/10.1016/j.jhealeco.2020.102354.

Bakx, P., E. Schut, and B. Wouterse. "Case Study Netherlands." WKC Policy Series on Long-Term Care No. 6 (2021). https://wkc.who.int/resources/publications/m/item/netherlands-case-study-2021.

Bernstein, D.N., C. Reitblat, V.A. Van de Graaf, E.M.D. O'Donnell, L.L. Philpotts, C.B. Terwee, R.W. Poolman. "Is There an Association Between Bundled Payments and Cherry Picking and Lemon

Dropping in Orthopaedic Surgery? A Systematic Review." Clinical Orthopaedics and Related Research (2021). https://doi.org/10.1097/CORR.0000000000001792.

Besley, Timothy, and Maitreesh Ghatak. "Competition and Incentives with Motivated Agents." American Economic Review 95, no. 3 (2005): 616–636.

Besley, Timothy, and Ghatak M. "Retailing Public Goods: The Economics of Corporate Social Responsibility." Journal of Public Economics (2007). https://doi.org/10.1016/j.jpubeco.2007.07.006.

Braun, R. T., H. Yun, L. P. Casalino, Z. Myslinski, F. M. Kuwonza, H. Y. Jung, and M. A. Unruh. "Comparative Performance of Private Equity–Owned US Nursing Homes During the COVID-19 Pandemic." Journal of the American Medical Association Network Open (2020). https://doi.org/10.1001/jamanetworkopen.2020.26702.

Bos, A., F. M. Kruse, and P. P. T. Jeurissen. "For-Profit Nursing Homes in the Netherlands: What Factors Explain Their Rise?" International Journal of Health Services (2020). https://doi.org/10.1177/0020731420915658.

Bos, A., and H. Harrington. "What Happens to a Nursing Home Chain When Private Equity Takes Over? A Longitudinal Case Study." Inquiry (2017). https://doi.org/10.1177/0046958017742761.

Chalkley, Martin, and James Sussex. "Private Provision of Publicly Funded Health Care: The Economics of Ownership." OHE Briefing. London: Office of Health Economics, 2018. https://www.ohe.org/publications/private-provision-publicly-funded-health-care-economics-ownership.

Comondore, V.R., P.J. Devereaux, Q. Zhou, S.B. Stone, J.W. Busse, N.C. Ravindran, K.E. Burns, T. Haines, B. Stringer, D.J. Cook, S.D. Walter, T. Sullivan, O. Berwanger, M. Bhandari, S. Banglawala, J.N. Lavis, B. Petrisor, H. Schünemann, K. Walsh, N. Bhatnagar, and G.H. Guyatt. "Quality of Care in For-Profit and Non-profit Nursing Homes: Systematic Review and Meta-Analysis." BMJ (2009). https://doi.org/10.1136/bmj.b2732.

De Fraja, Gianni. "Mixed Oligopoly: Old and New." (2009). https://api.semanticscholar.org/CorpusID:152821460.

Dewatripont, M., and J. Tirole. "The Morality of Markets." Journal of Political Economy 132, no. 8 (2024): 2655–2694. https://doi.org/10.1086/729445.

Eghbali, M., Equity-Investment Accelerators Are Cherry Pickers (2023). Available at SSRN: https://ssrn.com/abstract=4798936 or http://dx.doi.org/10.2139/ssrn.4798936

Gandhi, Anmol. "Picking Your Patients: Selective Admissions in the Nursing Home Industry." (2023) http://dx.doi.org/10.2139/ssrn.3613950.

Geruso, Michael, and Timothy Layton. "Upcoding: Evidence from Medicare on Squishy Risk Adjustment." Journal of Political Economy (2020). https://doi.org/10.1086/704756.

Goodair, Ben, and Adam Reeves. "Outsourcing Health-Care Services to the Private Sector and Treatable Mortality Rates in England, 2013–20: An Observational Study of NHS Privatization." The Lancet Public Health 7, no. 7 (2022): e638–e646.

Gupta, A., S. T. Howell, C. Yannelis, and A. Gupta. "Does Private Equity Investment in Healthcare Benefit Patients? Evidence from Nursing Homes." NBER Working Paper Series (2021). Available at: http://www.nber.org/papers/w28474.

Harrington, C., F.F. Jacobsen, J. Panos, A. Pollock, S. Sutaria, and M. Szebehely. "Marketization in Long-Term Care: A Cross-Country Comparison of Large For-Profit Nursing Home Chains." Health Services Insights 10 (2017): 1-23. https://doi.org/10.1177/1178632917710533.

Huang, S. S., and J. R. Bowblis. "Private Equity Ownership and Nursing Home Quality: An Instrumental Variables Approach." International Journal of Health Economics and Management (2019). https://doi.org/10.1007/s10754-018-9254-z.

Hussem, A., M. Tenand, and P. Bakx. "Publieke Middelen voor Particuliere Ouderenzorg." Netspar Design Paper 143 (2020). https://pure.eur.nl/ws/portalfiles/portal/46215884/P20200423_Netspar_Design_Paper_143_WEB.pdf.

Kruse, F. M., W. M. R. Ligtenberg, A. J. M. Oerlemans, S. Groenewoud, and P. P. T. Jeurissen. "How the Logics of the Market, Bureaucracy, Professionalism, and Care Are Reconciled in Practice: An Empirical Ethics Approach." BMC Health Services Research (2020). https://doi.org/10.1186/s12913-020-05870-7.

Lainoff, M. B. "Leveraging the Future of Healthcare: Private Equity's Changing Role in Healthcare Delivery, Performance, and Quality." Journal of Health Care Finance (2020). https://healthfinancejournal.com/index.php/johcf/article/view/212/214.

Lee, K. H., J. Y. Lee, and B. Kim. "Person-Centered Care in Persons Living with Dementia: A Systematic Review and Meta-Analysis." The Gerontologist (2022). https://doi.org/10.1093/geront/gnaa207.

Le Grand, Julian. "Quasi-Markets and Social Policy." The Economic Journal 101, no. 408 (1991): 1256-1267.

Maarse, J., and P. Jeurissen. "The Policy and Politics of the 2015 Long-Term Care Reform in the Netherlands." Health Policy (2016). https://doi.org/10.1016/j.healthpol.2016.01.014.

Mattingly, Thomas J. "Who Owns This Nursing Home? The Role of Private Equity in Long-Term Care." Public Policy & Aging Report (2023). https://doi.org/10.1093/ppar/prad007.

Ministerie van Volksgezondheid Welzijn en Sport. Het Verschil in Zorgkosten Tussen Zorg met en Zonder Verblijf in de Wlz. 2022. The Hague: Ministerie van Volksgezondheid Welzijn en Sport.

Mukamel, Dana B., H. Ladd, D.L. Weimer, W.D. Spector, and J.S. Zinn. "Is There Evidence of Cream Skimming Among Nursing Homes Following the Publication of the Nursing Home Compare Report Card?" The Gerontologist (2009). https://doi.org/10.1093/geront/gnp062.

Nahhas, R. W. "Introduction to Regression Methods for Public Health Using R." (2024). Available online at https://bookdown.org/rwnahhas/RMPH/.

Newhouse, Joseph P. "Reimbursing Health Plans and Health Providers: Efficiency in Production vs. Selection." Journal of Economic Literature 34, no. 3 (1996): 1236–1263.

OECD. "Health at a Glance." (2023). https://doi.org/10.1787/7a7afb35-en.

Pani-Harreman, K. E., J. M. A. van Duren, G. I. J. M. Kempen, and G. J. J. W. Bours. "The Conceptualisation of Vital Communities Related to Ageing in Place: A Scoping Review." European Journal of Ageing (2022). https://doi.org/10.1007/s10433-021-00622-w.

Patwardhan, S., M. Sutton, and M. Morciano. "Effects of Chain Ownership and Private Equity Financing on Quality in the English Care Home Sector: Retrospective Observational Study." Age and Ageing (2022). https://doi.org/10.1093/ageing/afac222.

Plaisier, I., and M. Den Draak. "Wonen Met Zorg: Verkenning van Particuliere Woonzorg voor Ouderen." Sociaal en Cultureel Planbureau (2019). https://www.scp.nl/publicaties/publicaties/2019/07/02/wonen-met-zorg.

Pradhan, R., R. Weech-Maldonado, J. S. Harman, A. Laberge, and K. Hyer. "Private Equity Ownership and Nursing Home Financial Performance." Health Care Management Review 38, no. 3 (2013): 224–233.

Pradhan, R., R. Weech-Maldonado, J. S. Harman, M. Al-Amin, and K. Hyer. "Private Equity Ownership of Nursing Homes: Implications for Quality." Journal of Health Care Finance 42, no. 2 (2014).

Schut, F. T., and B. Van den Berg. "Sustainability of Comprehensive Universal Long-Term Care Insurance in the Netherlands." Social Policy & Administration (2010). https://doi.org/10.1111/j.1467-9515.2010.00721.x.

Silverman, Eliot, and Jonathan Skinner. "Medicare Upcoding and Hospital Ownership." Journal of Health Economics (2004). https://doi.org/10.1016/j.jhealeco.2003.09.007.

Statistics Netherlands. "Statistische Gegevens per Vierkant en Postcode 2022-2021-2020-2019." (2024). https://www.cbs.nl/nl-nl/longread/diversen/2023/statistische-gegevens-per-vierkant-en-postcode-2022-2021-2020-2019?onepage=true.

Statistics Netherlands. "Sociaal-Economische Status; Scores Per Wijk en Buurt, Regio-Indeling 2021." (2024). Available at: https://www.cbs.nl/nl-nl/cijfers/detail/85163NED.

Steinbusch, Peter J., J.B. Oostenbrink, J.J. Zuurbier, and F.J. Schaepkens. "The Risk of Upcoding in Casemix Systems: A Comparative Study." Health Policy (2007). https://doi.org/10.1016/j.healthpol.2006.06.002.

Stevenson, D., and C. Grabowski. "Private Equity Investment and Nursing Home Care: Is It a Big Deal?" Health Affairs (2008). https://doi.org/10.1377/hlthaff.27.5.1399.

Tenand, M., P. Bakx, and B. Wouterse. "The Impact of Co-Payments for Nursing Home Care on Use, Health, and Welfare." CPB Discussion Paper (2021). https://doi.org/10.34932/GDWF-PP65.

Winblad, U., P. Blomqvist, and A. Karlsson. "Do Public Nursing Home Care Providers Deliver Higher Quality than Private Providers? Evidence from Sweden." BMC Health Services Research 17 (2017): 487. https://doi.org/10.1186/s12913-017-2403-0.

Winter, J., J. Kerns, R. Etz, K. Winter, and S. Reves. "Selective Admission Decisions and Quality-Measure Scores in Desirable, Highly Resourced Nursing Homes." Annals of Family Medicine (2023). https://doi.org/10.1370/afm.21.s1.3942

World Health Organization. "WHO Dementia." (2019). https://www.who.int/health-topics/dementia#tab=tab_2.

Zhang, Z., J. Reinikainen, K. A. Adeleke, M. E. Pieterse, and C. G. M. Groothuis-Oudshoorn. "Time-Varying Covariates and Coefficients in Cox Regression Models." Annals of Translational Medicine (2018). https://doi.org/10.21037/atm.2018.02.12.

Zorgkaart Nederland. "609 Particuliere Woonzorgcentra in Nederland." (2024). https://www.zorgkaartnederland.nl/particulier-woonzorgcentrum.

Tables and Figures

Table 1. Descriptives study sample per type of round-the-clock care at admission.

Variables	Non-profit residential care	Non-profit full home care packages**	Private equity full home care packages**	Other for-profit full home care packages**
OUTCOME VARIABLES				
Type nursing homes at admission (%, #)	90.3 (95,216)	5.6 (5.905)	2.6 (2,741)	1.5 (1,582)
Nursing home transfer rate (%)	1.4	1.7	1.5	2.7
Change of care needs entitlement (%)	8.8	1.2	2.0	1.8
Mortality rate (%)	42.2	29.3	28.6	31.3
Avoidable hospitalization (%)	11.0	17.7	15.5	13.8
INDIVIDUAL CHARACTERISTICS				
Female (%)	61.8	69.0	72.9	71.2
Age at admission (mean, s.d.)	84.5 (6.3)	85.5 (6.0)	85.3 (6.1)	86.1 (6.1)
Charlson score (mean, s.d.)*	0.6 (0.9)	0.6 (0.9)	0.6 (0.9)	0.6 (0.9)
Previous hospitalization 3 months before admission (%)	18.5	7.7	8.6	11.1
Hospital admissions during stay (%)	12.5	24.8	15.1	17.0
Characteristics postal code of residence before admission				
Individuals with Dutch background (%)	78.2	78.9	79.9	79.5
Owner occupied homes (%)	58.0	59.3	60.1	59.7
Assessed property value (mean in €)	248,537	251,158	265,226	285,609
40% private households with lowest income (%)	40.6	40.4	40.0	39.0
20% private households with highest income (%)	19.4	19.1	19.9	21.1
Urbanicity (mean; 1: strongly urban to 5: rural)	2.8 (1.3)	2.8 (1.3)	2.9 (1.2)	2.8 (1.3)
Social benefits recipients (%)	8.7	8.9	8.5	8.3
Excess capacity (Average number of available nursing home beds in a radius of 20 km)	3.5 (3.5)	1.8 (1.8)	1.7 (1.6)	2.0 (2.0)
Size nursing home providers (0: ≥ 20 clients, 1: <20 clients) (%)	5.2	12.5	8.1	56.9
TOTAL NUMBER OF INDIVIDUALS	**105,444**			

* Defined as Bär et al. (30), except based on claims diagnosis and ICD-10 instead of ICD-9. ** Round-the-clock care provided in home-like settings as an alternative to traditional residential care.

Table 2. Estimation results multinomial logit model Risk selection (excerpt)

	Non-profit full home care packages		**Private equity full home care packages**		**Other for-profit full home care packages**	
Variables	**Coef. (Std.se)**	**p-value**	**Coef. (Std.se)**	**p-value**	**Coef. (Std.se)**	**p-value**
MODEL I[*,**]						
Charlson score	0.031 (0.016)	0.056	0.033 (0.023)	0.147	0.055 (0.031)	0.075
Previous hospitalization 3 months before admission	-0.844 (0.053)	0.000	-0.677 (0.072)	0.000	-0.318 (0.087)	0.000
MODEL II[*,***]						
Charlson score	/	/	-0.002 (0.026)	0.945	0.013 (0.036)	0.712
Previous hospitalization 3 months before admission	/	/	0.159 (0.086)	0.064	0.406 (0.107)	0.712

* Corrected for differences in age, gender, characteristics of postal code of residence (including excess capacity of nursing home beds), the size of the nursing home provider and four year dummies. Estimation results not shown for the sake of brevity.
** Reference category: non-profit residential care.
*** Reference category: non-profit full home care package.

Table 3 Estimation results Time-varying Cox models Changes in care trajectories (excerpt)

	NURSING HOME TRANSFER			CHANGE OF CARE NEED ENTITLEMENT		
Variables*	**HR**	**Coef. (Std.se)**	**p-value**	**HR**	**Coef. (Std.se)**	**p-value**
MODEL I*,**						
Non-profit full home care packages	0.350	-1.048 (0.583)	0.090	0.004	-5.436 (1.230)	0.007
Private equity full home care packages	0.198	-1.618 (0.895)	0.003	0.195	-1.637 (0.132)	0.000
Other for-profit full home care packages	1.522	0.420 (0.158)	0.059	0.256	-1.364 (0.182)	0.000
tt(Non-profit full home care packages)	1.215	0.195 (0.107)	0.078	1.708	0.535 (0.187)	0.055
tt(Private equity full home care packages)	1.320	0.278 (0.162)	0.018	0.990	-0.010 (0.003)	0.004
tt(Other for-profit full home care packages)	1.001	0.001 (0.005)	0.919			
MODEL II*,***						
Private equity Full home care packages	1.014	0.014 (0.398)	0.972	1.456	0.376 (0.401)	0.349
Other for-profit Full home care packages	1.323	0.280 (0.252)	0.266	2.028	0.707 (0.428)	0.099

* Corrected for differences in age, gender, characteristics of postal code of residence (including excess capacity of nursing home beds), the size of the nursing home provider, the observed total number of hospital admissions and four year dummies.
Estimation results not shown for the sake of brevity.
** Reference category: non-profit residential care.
*** Reference category: non-profit full home care package.

Table 4 Estimation results Time-varying Cox models Quality of care (excerpt)

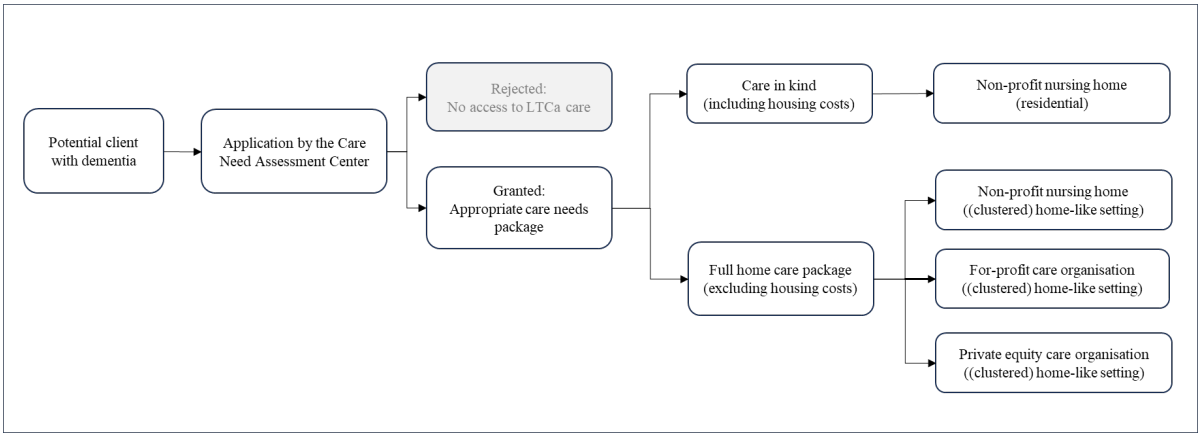
	AVOIDABLE HOSPITALIZATIONS			MORTALITY		
Variables*	**HR**	**Coef. (Std.se)**	**p-value**	**HR**	**Coef. (Std.se)**	**p-value**
MODEL I*,**						
Non-profit full home care packages*	2.814	1.035 (0.182)	0.000	0.302	-1.196 (0.119)	0.000
Private equity full home care packages	3.343	1.207 (0.273)	0.000	0.420	-0.869 (0.148)	0.000
Other for profit full home care packages	0.596	-0.518 (0.459)	0.330	0.853	-0.159 (0.056)	0.004
tt(Non-profit full home care packages)	0.913	-0.091 (0.030)	0.009	1.163	0.151 (0.020)	0.000
tt(Private equity full home care packages)	0.860	-0.151 (0.045)	0.000	1.104	0.099 (0.020)	0.000
tt(Other for-profit full home care packages)	1.147	0.137 (0.075)	0.107	/	/	/
MODEL II*,***						
Private equity full home care packages	0.852	-0.160 (0.059)	0.007	1.079	0.076 (0.050)	0.126
Other for-profit full home care packages	0.001	-7.483 (2.891)	0.010	106.1	4.665 (1.346)	0.001
tt(Private equity full home care packages)	/	/	/	0.768	-0.263 (0.081)	0.001
tt(Other for-profit full home care packages)	2,654	0.976 (0.387)	0.012	0.525	-0.644 (0.189)	0.001

* Corrected for differences in age, gender, characteristics of postal code of residence (including excess capacity of nursing home beds), the size of the nursing home provider, the observed total number of hospital admissions and four year dummies. Estimation results not shown for the sake of brevity.

** Reference category: non-profit residential care.

*** Reference category: non-profit full home care package.

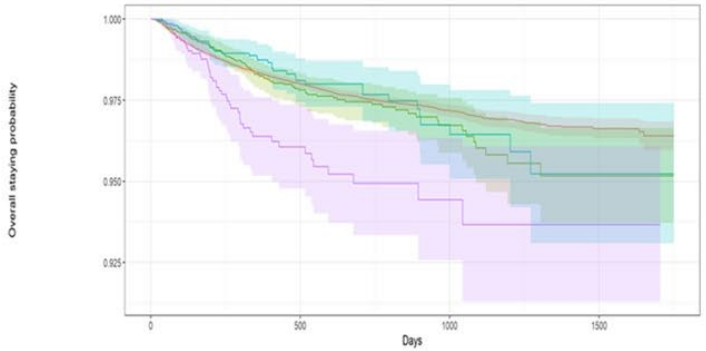
Figure 1. Potential care pathway for a dementia patient in the Dutch institutional LTC system*



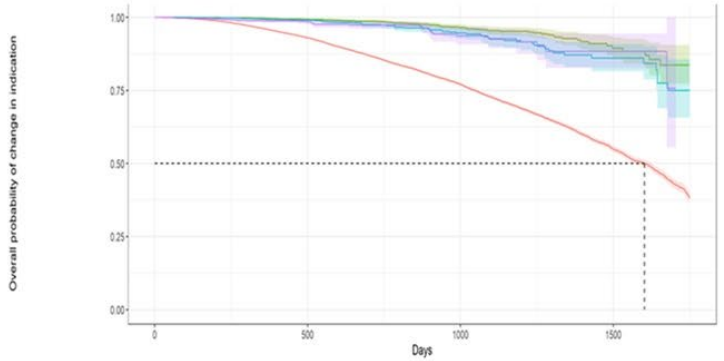
*Modular home care packages and personal budgets are not shown here, as they are excluded from our analyses.

Appendix A:

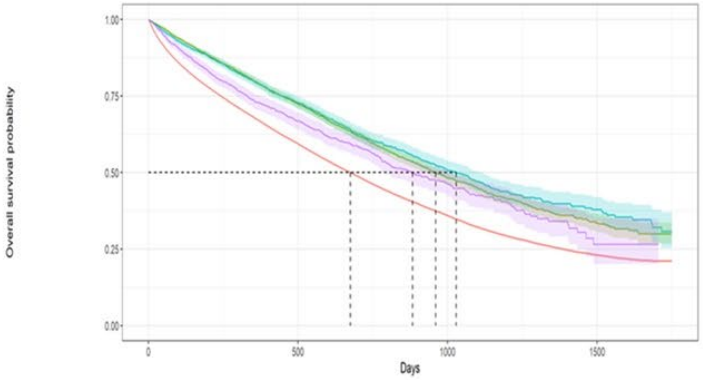
Transfer to another organisation:



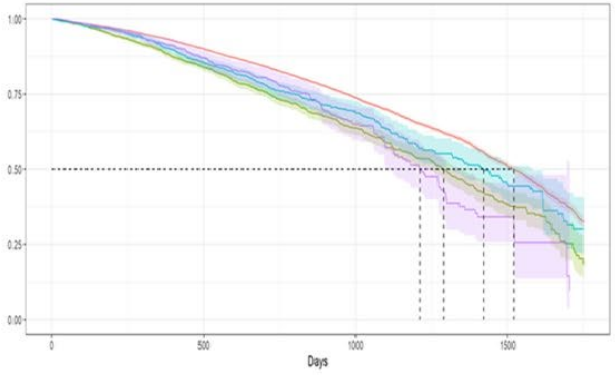
Change of care need entitlements:



Overall survival:



Avoidable hospitalizations:



Non-profit residential Non-profit Full home care packages Private-Equity owned Full home care packages For-profit Full home care packages

Appendix B: Table B1. Estimation results multinomial logit model Cherry picking

	Non-profit Full home care packages*		Private equity Full home care packages		Other for-profit Full home care packages	
Variables	**Coef. (Std.se)**	**p-value**	**Coef. (Std.se)**	**p-value**	**Coef. (Std.se)**	**p-value**
Intercept	-0.787 (0.265)	0.003	-1.046 (0.378)	0.006	-4.491 (0.507)	0.000
Individual characteristics						
Female	0.225 (0.032)	0.000	0.448 (0.047)	0.000	0.279 (0.061)	0.000
Age	0.022 (0.002)	0.000	0.012 (0.003)	0.000	0.027 (0.005)	0.000
Previous hospitalization 3 months before admission	-0.844 (0.053)	0.000	-0.677 (0.072)	0.000	-0.318 (0.087)	0.000
Charlson score	0.031 (0.016)	0.056	0.033 (0.023)	0.147	0.055 (0.031)	0.075
Characteristics postal code residence before admission						
% Inhabitants with Dutch background	-0.013 (0.002)	0.000	-0.003 (0.002)	0.178	-0.011 (0.003)	0.001
% Owner occupied homes	0.011 (0.002)	0.000	-0.001 (0.003)	0.603	0.000 (0.004)	0.942
Assessed property value (in €)	0.002 (0.000)	0.000	0.002 (0.000)	0.001	0.003 (0.001)	0.000
% Social benefits recipients	0.000 (0.000)	0.056	0.000 (0.000)	0.038	0.000 (0.000)	0.290
40% private households with lowest income	-0.006 (0.006)	0.309	0.028 (0.007)	0.000	0.015 (0.007)	0.036
20% private households with highest income	0.002 (0.004)	0.654	0.014 (0.006)	0.023	-0.002 (0.008)	0.799
Urbanicity (1: strongly urban to 5: rural)	-0.196 (0.017)	0.000	-0.213 (0.024)	0.000	-0.216 (0.030)	0.000
Characteristics local supply of nursing homes						
Excess capacity (Average numbers of available nursing home beds in a radius of 20km)	-1.424 (0.017)	0.000	-1.696 (0.025)	0.000	-1.179 (0.030)	0.000
Size care providers (0: ≥20 clients, 1: <20 clients)	0.767 (0.049)	0.000	0.272 (0.078)	0.001	3.115 (0.058)	0.000
Year 2018**	-0.103 (0.056)	0.066	-0.096 (0.089)	0.281	0.657 (0.125)	0.000
Year 2019	-0.215 (0.056)	0.000	-0.110 (0.087)	0.203	0.599 (0.123)	0.000
Year 2020	0.378 (0.153)	0.013	-0.235 (0.191)	0.219	0.513 (0.220)	0.020
Year 2021	0.391 (0.149)	0.009	0.055 (0.184)	0.765	0.827 (0.212)	0.000

Table B2. Estimation results Time-varying Cox model Lemon-dropping: Nursing home transfer

	NURSING HOME TRANSFER		
Variables	**HR**	**Coef. (Std.se)**	**p-value**
*Type of nursing home care**			
Non-profit full home care packages	0.350	-1.048 (0.583)	0.090
Private equity full home care packages	0.198	-1.618 (0.895)	0.003
Other for-profit full home care packages	1.522	0.420 (0.158)	0.059
Individual characteristics			
Female	0.675	-0.394 (0.050)	0.000
Age (in years)	1.022	0.022 (0.020)	0.296
Charlson score	1.078	0.075 (0.025)	0.011
Previous hospitalization 3 months before admission	3.618	1.286 (0.308)	0.000
# Hospitalizations during stay	0.088	-2.427 (0.371)	0.000
Characteristics postal code residence before admission			
% Inhabitants with Dutch background	1.001	0.001 (0.003)	0.889
% Owner occupied homes	0.998	-0.002 (0.004)	0.679
Assessed property value (in €)	1.004	0.004 (0.002)	0.036
40% private households with lowest income	0.998	-0.002 (0.002)	0.573
20% private households with highest income	1.004	0.004 (0.024)	0.903
Urbanicity (1: strongly urban to 5: rural)	0.973	-0.027 (0.027)	0.416
% Social benefits recipients	1.000	0.000 (0.000)	0.825
Characteristics local supply of nursing homes			
Excess capacity (Average numbers of available nursing home beds in a radius of 20 km)	1.211	0.191 (0.051)	0.000
Size care providers (0:≥20 clients, 1:<20 clients)	0.752	-0.285 (0.422)	0.527
Time-to care setting			
tt(Non-profit full home care packages)	1.215	0.195 (0.107)	0.078
tt(Private equity full home care packages)	1.320	0.278 (0.162)	0.018
tt(Other for-profit full home care packages)	1.001	0.001 (0.005)	0.919
Time-to individual characteristics			
tt(Previous hospitalization 3 months before admission)	0.808	-0.213 (0.062)	0.001
tt(Hospitalization during stay)	1.545	0.435 (0.064)	0.000
Time-to postal code characteristics			
tt(Owner occupied homes)	0.947	-0.055 (0.011)	0.000
tt(Assessed property value (in €))	0.999	-0.001 (0.000)	0.063
tt(40% private households with lowest income)	1.000	0.000 (0.000)	0.543
tt(20% private households with highest income)	0.947	-0.055 (0.000)	0.000
Time-to local supply characteristics			
tt(Excess capacity (Average numbers of available nursing home beds in a radius of 20km)	0.948	-0.055 (0.013)	0.000
tt(Size nursing home (1= > 20 clients, 0= <= 20 clients))	1.149	0.139 (0.091)	0.095

Table B3. Estimation results Time-varying Cox model Upcoding: Change of care need entitlement

	CHANGE OF CARE NEED ENTITLEMENT		
Variables	**HR**	**Coef. (Std.se)**	**p-value**
*Type of nursing home care**			
Non-profit full home care packages	0.004	-5.436 (1.230)	0.007
Private equity full home care packages	0.195	-1.637 (0.132)	0.000
For profit full home care packages	0.256	-1.364 (0.182)	0.000
Individual characteristics			
Female	0.149	-1.903 (0.187)	0.000
Age (in years)	0.893	-0.113 (0.015)	0.000
Charlson score	1.004	0.004 (0.011)	0.769
Previous hospitalization 3 months before admission	0.933	-0.070 (0.032)	0.059
# Hospitalizations during stay	0.898	-0.107 (0.028)	0.001
Characteristics postal code residence before admission			
% Inhabitants with Dutch background	0.999	-0.001 (0.001)	0.784
40% private households with lowest income	0.902	-0.103 (0.011)	0.000
20% private households with highest income	1.045	0.044 (0.020)	0.057
% Owner occupied homes	1.003	0.003 (0.001)	0.232
Assessed property value (in €)	1.005	0.005 (0.030)	0.862
Urbanicity (1: strongly urban to 5: rural)	1.003	0.003 (0.011)	0.830
% Social benefits recipients	1.000	0.000 (0.000)	0.491
Characteristics local supply of nursing homes			
Available local nursing home capacity	0.982	-0.018 (0.009)	0.041
Size care providers (0: ≥20 clients, 1: <20 clients)	0.746	-0.292 (0.098)	0.003
Time-to-care setting			
tt(Non-profit full home care packages)	1.708	0.535 (0.187)	0.055
tt(Private equity full home care packages)	0.990	-0.010 (0.003)	0.004
Time-to individual characteristics			
tt(Gender (1 = female, 0 = other))	1.247	0.221 (0.030)	0.000
tt(Charlson score)	1.026	0.026 (0.002)	0.000
tt(Previous hospitalization)	1.011	0.011 (0.002)	0.000
tt(Hospital admissions during stay)	1.001	0.001 (0.000)	0.002
Time-to postal code characteristics			
tt(Owner occupied homes)	1.000	0.000 (0.000)	0.354
tt(Assessed property value)	1.000	0.000 (0.000)	0.354

* Reference category: non-profit residential care

Table B4. Estimation results Time-varying Cox model Quality of care: Avoidable hospitalizations

	MORTALITY			AVOIDABLE HOSPITALIZATIONS		
Variables	**HR**	**Coef. (Std.se)**	**p-value**	**HR**	**Coef. (Std.se)**	**p-value**
Type of nursing home care						
Non-profit full home care packages*	0.302	-1.196 (0.119)	0.000	2.814	1.035 (0.182)	0.000
Private equity full home care packages	0.420	-0.869 (0.148)	0.000	3.343	1.207 (0.273)	0.000
Other for profit full home care packages	0.853	-0.159 (0.056)	0.004	0.596	-0.518 (0.459)	0.330
Individual characteristics						
Charlson score	1.256	0.228 (0.017)	0.000	1.212	0.192 (0.052)	0.000
Female	0.520	-0.654 (0.043)	0.000	0.456	-0.785 (0.108)	0.000
Age	1.040	0.039 (0.001)	0.000	1.014	0.014 (0.001)	0.000
Previous hospitalization 3 months before admission	6.000	1.792 (0.045)	0.000	4.178	1.430 (0.119)	0.000
# Hospitalizations during stay	0.472	-0.751 (0.061)	0.000	1.123	0.116 (0.198)	0.604
Characteristics postal code residence before admission						
Inhabitants with Dutch background	0.999	-0.001 (0.001)	0.024	0.992	-0.008 (0.001)	0.000
Owner occupied homes	0.998	-0.002 (0.002)	0.396	0.998	-0.002 (0.001)	0.127
Assessed property value (in €)	1.000	0.000 (0.000)	0.638	0.998	-0.002 (0.001)	0.098
40% private households with lowest income	1.006	0.006 (0.002)	0.002	0.915	-0.089 (0.006)	0.000
20% private households with highest income	1.002	0.001 (0.005)	0.742	1.039	0.039 (0.011)	0.003
Urbanicity (1: strongly urban to 5: rural)	1.009	0.009 (0.022)	0.687	0.991	-0.009 (0.009)	0.476
% Social benefits recipients	1.000	0.000 (0.000)	0.135	1.000	0.000 (0.000)	0.225
Size care providers (0: ≥20 clients, 1: <20 clients)	0.704	-0.351 (0.103)	0.001	1.123	0.116 (0.198)	0.604
Available local nursing home capacity	0.999	-0.001 (0.010)	0.976	1.018	0.018 (0.004)	0.001
Time-to type nursing home care						
tt(Non-profit full home care packages)	1.163	0.151 (0.020)	0.000	0.913	-0.091 (0.030)	0.009
tt(Private equity full home care packages)	1.104	0.099 (0.020)	0.000	0.860	-0.151 (0.045)	0.000
tt(Other for-profit full home care packages)				1.147	0.137 (0.075)	0.107
Time-to individual characteristics						
tt(Sex)	1.027	0.027 (0.008)	0.001	1.140	0.131 (0.018)	0.000
tt(Charlson score)	0.974	-0.027 (0.003)	0.000	0.984	-0.016 (0.009)	0.080
tt(Previous hospitalization 3 months before admission)	0.764	-0.269 (0.009)	0.000	0.844	-0.170 (0.020)	0.000
tt(Hospital admissions during stay)	1.149	0.139 (0.010)	0.000	0.994	-0.006 (0.002)	0.005
Time-to postal code characteristics						

tt(Owner occupied homes)	0.995	-0.005 (0.000)	0.687	1.021	0.020 (0.001)	0.000
tt(Assessed property value (in €))	1.001	0.001 (0.000)	0.122	0.996	-0.004 (0.003)	0.184
tt(40% private households with lowest income)	1.000	0.000 (0)	0.018	1.000	0.000 (0.000)	0.205
tt(20% private households with highest income)	1.000	0.001 (0.001)	0.426	0.992	-0.008 (0.032)	0.812
tt(Urbanicity)	1.000	0.001 (0.00)	0.611	0.999	-0.001 (0.001)	0.205
tt(Benefits recipients)	1.000	0.000 (0.000)	0.786	1.000	0.000 (0.000)	0.205
tt(Size care providers (0: ≥20 clients, 1: <20 clients))	1.046	0.045 (0.018)	0.013			
tt(Available local nursing home capacity)	1.001	0.001 (0.002)	0.761			

* Reference category: non-profit residential care