Local budgets and care homes quality in England: a duration analysis*

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Abstract

Since 2010 English local authorities have experienced major changes in their public finances which have resulted in more local fiscal constraints. This study examines the effect of changes in local funding on the quality of long term care services. To describe the prevalence of quality inspections and the transition between different qualit ratings over time we fit semi-parametric hazard models on administrative data. Our findings suggest that care homes placed in local authorities with substantial financial constraints are likely to be inspected les frequently. Also, these constraints have a negative effect on the improvement of the rating as well as a positive effect on the deterioration of the quality. The former results imply that more public funding may be not necessarily helpful for preserving good quality specially in care homes with bad management.

Keywords: Care homes, quality, local government, long-term care, England

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1 Introduction

Long term care services are an important policy concern in developed economies. Increasing proportions of ageing populations combined with new family structures, are leading to a greater demand for these services under some sort of paid provision in care homes or with support at home. In England, local governments are responsible for long term care services by supporting in the choice of the care home and purchasing – *commissioning* services on behalf of individuals with long term care needs insufficient financial capacity to afford them. Since 2010 local governments have suffered major changes in their finances as a result of a strategy based on greater localisation of financial resources. The major consequence of this strategy was a reduction of Government funding of about 49.1% in real terms for the period 2010-11 to 2017-18 (National Audit Office, 2018).

Despite the reduction in local budgets, long term care services have been relatively more protected than other services during this period increasing their share within the local governments core spending (Phillips and Sampson, 2018)[1]. Some issues such as the meeting of people's needs and the fees paid by local authorities have, nonetheless, experienced the effects of these constraints. Regarding the extent people's needs are met, several authors have shown an association between local public constraints and the rise in the levels of unmet need since 2011 (Marmot et al., 2014; Vlachantoni et al., 2011). More recently, AGEUK (2017) has estimated in 1.2 million the people who were not receiving suitable support for activities of daily living in 2017[2]. Furthermore, despite increasing their share on local authority spending, social care budgets have reduced. These reductions have produced a downward pressure on the prices paid by local authorities threatening market sustainability and patients outcomes (Allan, 2015).

[1]These authors suggest that long term care has increased its share of local authority service spending from 34% in 2009-10 to 41% in 2017-18.

[2]Some argue that there are other elements that could also explain these figures such the choice of individuals to not acccess to the services (Competition and Markets Authority, 2017)

This paper focuses on an additional element that may be affected by public constraints: The quality of long term care services. Quality is a key element for the organisation of social care and has been a recurring topic in the policy agenda (Malley, 2010). Given its links with other relevant services, such as housing or health, good provision and quality of long term are associated with a good society (Association of Directors of Adult Social Services, 2015). Despite its importance, there is still little understanding on how changes in local public finances may affect the quality of services (Humphries et al., 2016). We aim to shed light on this issue by assessing the effects of local spending power on care homes' probability of improving or deteriorating their quality.

We combine different administrative sources to construct a dataset with information on care homes quality inspections and changes in the spending power of the districts where they are located. The sample analyses all registered care homes in England for the period of 2014-18. To characterise the effects of changes in local spending power on the quality modifications, we fit semi-parametric hazard models and control for the influence of unobserved heterogeneity. Unlike other studies that have analysed the quality of care homes using variables based on health conditions or mortality rates (see for example Grabowski and Castle (2004) or Watkins et al. (2017)), our quality variable is based on a quality rating obtained from the periodic inspections carried out by the Care Quality Commission (CQC), the regulator of health and social care in England. This measure provides a more comprehensive view of the quality in the care homes. Hence, in addition to issues concerning the safety of the services, this rating addresses aspects such as the care received or the management of the premises. To this extent we follow studies as Forder and Allan (2014) and Zhao (2016) or Barron and West (2017) that use similar measures.

To preview our results, we find that care homes located in areas with higher constraints have less propensity to be inspected and are less likely to improve their overall quality rating. Yet, care homes in local authorities with increasing funding capacity do not

necessarily improve their quality. Indeed, we find evidence on quality deterioration as a result of positive changes in the spending power. We perform the analysis by different quality dimensions and find that areas based on staff and management aspects of the care home are important drivers of the former result.

In addition to using a different measure of quality, this study provides further contributions to the literature on care homes quality. We enlarge the set of studies that have analysed the quality of care homes in England by looking at the effect of local public finance on the quality of care homes. Watkins et al. (2017), in a similar exercise, find a positive relationship between local funding constraints and reductions in of long term care quality explained by increases on the mortality rates. Our study departs from the former in two ways. First, instead of aggregate data, our study design is based on a sample of care homes followed over time to study the transition on their quality rating. Furthermore, we aim to identify the effect of changes in spending power by ruling out the effect of potential unobserved factors that may influence this association.

We also fit a duration model in a novel manner. In the health economics literature, duration models have been normally used to model cases of time to death, time to starting using a drug or time to quitting (Jones et al., 2013). For the specific case of long term care, this modelling approach has been used to analyse factors affecting the length of stay in the care home (Liu et al., 1991; Forder and Fernandez, 2011) or the differences in quality by ownership type because of the degree of asymmetric information (Chou, 2002). Fernandez et al. (2018) specify a duration model to examine the integration between health and social care services by studying the effect of hospital and local authorities relationships on the post-operative lengths of stay. Yet, the analysis on the transitions between quality ratings is an issue that remains underexplored.

The remainder of the paper is organised as follows. Section 2 provides background information on the institutional setup and discusses the organisation of local authorities

and long term care in England. Section 3 presents the empirical approach and section 4 describes the different data sources used for the analysis. Finally, section 5 discusses the results section 6 concludes.

2 Institutional background

This section presents several elements associated with the organisation and public finance of local governments in England. Also it outlines the main characteristics of the long term care sector and the core aspects of the quality rating system implemented in October 2014.

2.1 Local governments, organisation and funding

English local authorities are organised on the basis of two levels or *tiers*. The higher level is represented by the county councils and the lower level is represented by the district councils. Each type of the former, has decisional power over different local policies. Thereby, whilst county councils are in charge of issues such as public health, district councils manage issues more locally as for instance planning policies. At the same time, there are unitary authorities which are an alternative administrative structure that combines both tiers in a single level. Counties and districts may be divided according to the population living in an area. These distinctions include metropolitan local authorities that cover a range of population between 1.2 and 2.8 million and non metropolitan or "shire" local authorities which cover smaller populations between 300,000 to 1.4 million.

Local authorities are a big part of the public budget. About a quarter of the public resources in England pays for local needs. The funding structure is complex and combines funds obtained from central grants and business rates, which are operated at national level as well as local resources based on the property tax (council tax). The spending power represents the funding capacity of each local authoritiy to cover its needs. Until

2010, national grants were allocated according to the needs of local authorities and their capacity to obtain revenues. The underlying rationale of this allocation formula was to address the potential inequalities derived from different spending needs and tax bases across the local authorities. This strategy, however, was not exempt of limitations. As Smith et al. (2016) detail, it could lead to a lack of incentives by local authorities for raising their tax bases and/or containing their spending needs. It could also pose risks given that local issues were directly controlled and addressed by the central government. Furthermore, another problem was associated with the likely lack of efficiency in these schemes.

To provide local governments with tools to overcome the potential financial desincentives, since 2010 there has been a trend to *localise* the funds. This strategy, formalised with 2011 Localism Act, intended to give local authorities more discretionary powers in financial issues. Essentially it was articulated in three main reforms. First, a change in the model for the allocation of general grant funds by which there were fixed weights to the blocks of relative resources and needs considered to allocate resources. Thus, the allocation formula could not be adjusted anymore depending on the needs and financial resources and performance of the local authorities.Second, local authorities could retain business rates partially. This change modified the previous model based on a complete retention at national level. The third main reform consisted of the introduction of the New Homes Bonus. Under this scheme, planning authorities received payments for the developing of new houses in return for additional revenue.

The main consequence of these reforms, specially the changes in the allocation of central grants, was a reduction of the spending power. The National Audit Office has estimated this reduction of about 30% in real terms for the period 2010-11 to 2017-18 (National Audit Office, 2018)[3]. As shown in Figure 1, this trend has been generalised

[3]This report also provides further estimates regarding long term care services. Local authorities have

regardless of the type of local authority. The peak in 2014-15 and the subsequent decline in the spending power could be associated with the change in the localisation of the council benefit. This change implied the abolition of the council tax benefit by which the central government paid local governments, total or partially, the council tax corresponding to poorer people. This reform local authorities incentives to reduce their support for other needs (Smith et al., 2016).

2.2 Quality of the long term care in England

There are 152 local authorities operating at the upper - county level that manage and commission formal long term care. This type of care comprises services that entail support on healthcare and activities of daily living in England is mainly provided in residential or nursing care homes. Yet, there are other alternatives for formal care such as paid care at home (e.g. home care). This paper focuses on the care homes market which is composed mainly by private for profit providers (about a 85% - 90% (Forder and Allan, 2011; Jarret, 2018)). Within this group, there are basically two main types of providers namely small providers with a single care home or several care homes and large chains with a number of care homes operating in several parts of the country. The latter account for about a 30% of the whole market in terms of the number of beds (Jarret, 2018)

Care homes are populated with two types of clients according to their payment arrangements. Hence, care homes have self-funded clients who are able to pay for their own care and also have public-funded clients who cannot afford their own care and receive some sort of support on the basis of a means test. Self-funded residents normally pay higher prices compared to public-funded clients for the same service (Forder, 2007) and also have longer stays (Forder and Fernandez, 2011). A key reason to explain this gap in

reduced a 3% their spending on social care in real terms. Moreover, a 10.6% of local authorites with long term care responsibilities would have the equivalent of less than three years' worth reserces left if they continued to use their reserves at the rate of 2016-17.

the fees paid by the two types of clients, consists of the market power by local authorities when negotiating contracts for public-funded residents. Allan et al. (2017) discuss the implications of such power and the reliance of providers on self-funded residents on which they execute certain market power setting higher prices to cross-subsidise the lower fees of public-funded residents[4].

The quality of care homes is assessed by the CQC according to the rating system implemented since October 2014. This system monitors care homes through systematic inspections that are carried out on the basis of key lines of enquiry (KLOEs) structured in sets of 5 key questions. These questions are associated with a number of elements to determine to what extent services are safe, effective, caring, responsive to people's needs and well led. In addition to the assessment of each dimension, the CQC also releases an overall rating. Both the overall rating and each of the other 5 questions are rated according to four possible categories: *outstanding*, *good*, *requires improvement* and *inadequate*.

An important component of the system is that the inspections are carried out without prior announcement. Moreover, the frequency of inspections is determined by the rating obtained. Thus, worse ratings lead to more frequent inspections. Obtaining an "inadequate" rating implies the adoption of special measures, close monitoring and a re-inspection in 6 months (Care Quality Commission, 2015a). The information used to derive the ratings is obtained from different sources that include quantitative measures, the direct observation from the inspectors and the feedback from both patients, relatives and staff working in the care homes (Barron and West, 2017).

These different dimensions are equally important for the computation of the overall rating. The inspections set as a reference the characteristics of a *good* service and set the ratings considering the difference of the service with respect with these good charac-

[4]In areas where the market power of local authorities is high, Allan et al. (2017) estimate a gap of about £40 a week. The quality also has a positive effect on the fees gap although it is small. Hence, in local authorities with a 75% of care homes rated outstanding the fees gap is over £23 higher than in local authorities with only 25% of outstanding care homes.

teristics. In any case, as the CQC states, "the characteristics are not a checklist and are not exhaustive". Rather, they are meant to provide guidance in relationship to the five key questions (Care Quality Commission, 2015b)[5]. There are, however, several general principles referred to the ratings that help to clarify potential combinations of question and ratings that are hard to evaluate[6].

3 Methods

This section presents the empirical framework for examining the impact of the variations in local budgets on the frequency between inspections and the probability of decreasing or increasing the quality rating. For addressing both questions, we will use a semi-parametric hazard model.

We define the hazard rate $\lambda(t)$ as the rate at which the duration in a given state is completed at some time t. The hazard function may be interpreted as the probability of leaving the state conditional on remaining in it - *survive*. Hence, if T is the cumulative distribution function of the spells in a state then the hazard function can be defined as

$$\lambda(t) = \lim_{\triangle t \to 0} \frac{Pr[t \leq T < t + \triangle t | T \geq t]}{\triangle t} \tag{1}$$

If we represent the probability density function of T as f, so that $f(t) = \frac{dT}{dt}$, we can represent the hazard function as $\lambda(t) = \frac{f(t)}{1-F(t)}$ where $1 - F(t)$ is the survival function $S(t) = Pr[T > t]$. To examine the relationship between the survival distribution and some covariates we define a semi-parametric hazard model using the specification proposed

[5] Appendix A presents details on the questions concerning each dimension.

[6] For more information see: http://www.cqc.org.uk/sites/default/files/20150327_asc_residential_provider_handbook_appendices_march_15_update_01.pdf

initially by (Cox, 1972)[7]

$$\lambda_i(t) = \lambda_0(t)exp(X_i\beta) \tag{2}$$

In Equation 2 the hazard function is defined in terms of a base-line hazard function $\lambda_0(t)$ and a set of covariates X that can vary with time or not. Unlike parametric models, the baseline hazard function is not specified. This specification is normally used due to its greater flexibility in comparison to paremetric forms. Furthermore, it easily accomodates time varying variables and explicitly captures the duration (*spell*) between states and the censorship of some spells in the data (Van den Berg, 2001). Applying these considerations to our particular case, we estimate models on the basis of the following general¡¡ Equation

$$\lambda_i(t) = \lambda_0(t)exp(\theta_S P_{lt} + \beta X_{it} + \delta C_{it} + \gamma D_t) \tag{3}$$

where $\lambda_i(t)$ represents the hazard of care home i of experiencing the two main events of interest: being inspected and improve (or deteriorate) its quality rating. SP is a categorical variable that reflects changes in the spending power of local authority l during the period t. X and C are vectors of controls for the local authority and the care home respectively. Furthermore, Equation 3 includies of dummy variables for years and local authorities controls for unobserved trends that can cause potential spurious correlations between the changes in the spending power and the number of inspections[8]

Under the specification in 3, all care homes with the same observable characteristics and located in the same districts are assumed to face the same risk associated with their

[7]The estimates are calculated in R using the *coxph* function of the survival package (Therneau and Lumley, 2017).

[8]These results are estimated using R and the function *plm* of the plm package (Croissant and Millo, 2008)

hazard of being inspected and improving (deteriorating) their quality. Nonetheless there are likely unobserved factors that affect more significantly the hazard rates of particular care homes. For instance, certain care homes may have higher (lower) turnover rates or the higher level of (dis-)satisfaction among the staff that may lead to make them be more likely to improve - or inversely deteriorate their quality in comparison to other care homes in the market. Neglecting these different frailties may lead to select only samples of the care homes whose quality status remains unaltered unaltered and consequently impose bias in the estimation (Abbring and Van Den Berg, 2007; Lancaster, 1992).

In addition to specific characteristics, our data also present some clustered structure. Some care homes share provider with the same business model and/or are located in the same local authority that follows the same procedures to commission sevices. We incorporate these and the former frailties including a random effect, α_j, in 2. This randmon effect imposes homogeneity within the elements in cluster j. Equation 2 is therefore re-specified as a mixed proportional hazard model

$$\lambda_i(t) = \lambda_0(t)exp(X_i\beta + \alpha_j) = exp(\alpha_j)exp(X_j\beta) \tag{4}$$

where the random effect can be considered as a random intercept that modifies the linear predictor (Austin, 2017). An important issue is to determine the distribution of the elements of the shared frailty. A common assumption is to consider that they are distributed as gamma density normally because of its tractability (Abbring and Van Den Berg, 2007)[9]. Heckman and Singer (1984) suggest a method for computing the parameters and the distribution function of the unobservable variables based on non parametric maximum likelihood. This method, which is based on the calculation of mass points,

[9]The estimates considering the gamma distribution are computed using R with the *coxme* function in the coxme package (Therneau, 2015).

although it is more flexible and does not impose a functional form on the distribution it uses a functional form in the hazard baseline function. In addition, given that the mass points are calculated with the uncensored observations, it is not recommended in cases of high level of censorship (Huh and Sickles, 1994). In our sample, around 90% of the observations are censored.

4 Data

We construct our sample of analysis with data from several administrative sources. We analyse care homes over the period between October 2014, month when the quality rating system was implented, and June 2018.

Data referred to care homes' quality are obtained from the CQC ratings dataset. The data are reported on a monthly basis and present information on the latest quality inspection and rating obtained for the whole set of care homes. The dataset also includes information on the location, the dimension of the care home (in number of beds), the provider that owns the location and the local authority responsible for the long term care service. This dataset, however, does not include information regarding the current status of a care home (i.e. whether the care home is active or unactive). Therefore, some quality ratings may be referred to care homes that are deregistered and no longer active in the market. To have a complete idea of the dynamics followed by the care homes, we complement this dataset with the date of deregistration for those care homes that become inactive at some point of the period of analysis. This information is obtained from the directory of de-activated locations also released monthly by the CQC.

Our sample consists of more than 17,265 residential care homes. We remove from the analysis those care homes that display inconsistent information such as different ratings for the same category in the same date. As outlined in the introduction, in addition to the

inspections, we are particularly interested in two main types of transitions from theese inspections namely the deterioration and improvement of quality. A quality deterioration entails a decrease in the rating - moving to "Inadequate" or "Requires Improvement" from "Good" or "Outstanding". Furthemore, we do not consider as quality deterioration those events that comprise a deregistration of a care home and consequently and exit from the market[10].

Figure 3 presents information on several aspects associated with the overall quality of the care homes. More than 60% of the care homes in the sample (10,393 care homes) are inspected more than once. Also, the majority of them have a good rating (about a 65%) that is maintained over sucesive inspections. Furthermore, a 30% obtain an initial bad rating (either "Requires Improvement" or "Inadequate"). These care homes tend to be inspected more than once and about half of them maintain a bad rating systematically. In particular, those care homes that start with an inadequate rating[11].

The duration of the spells also includes time variations for covariates that are relevant for the transitions of inspections and quality ratings respectively. Thus, in addition to the dates of inspection, the spells include the dates when the spending power varies which correspond to the beginning of the initial year. As outlined in section 2, we measure the funding capacity of local authortities over time using annual percentage change in the revenue spending power over the period of study. By using this measure, our paper diverges from other studies that have addressed similar questions but instead have employed some variable associated with the expenditure of the local authorities (see for example Watkins et al. (2017) or Paton and Wright (2017)).

The spending power is a more comprehensive variable. In addition to indicate the expenditures carried out by a local authority, it also shows the potential that a local

[10] Allan and Forder (2015) show that bad quality is a clear determinant of care homes closures. Our sample is consitent with this relationship and a 45% of the 2,340 care homes that exit the market, begin with an Inadequate or Requires Improvement rating.

[11] Appendix B provides similar figures for other quality dimensions.

authority has to obtain different sources of revenue. We obtain the information relative to the spending power from the Government Finance Settlement released annually by the Department of Local Government and Communities. The years considered are the fiscal years (e.g. starting in April). The analyis uses data for fiscal years that include 2013-14 to 2017-18. To consider a significant change, we define positive and negative changes of the spending power in terms of the quintiles in the distribution. A negative change corresponds to the first and a positive chage to the fifth respectively. Considering the former definition, figure 2 plots the percentage change of the spending power over time for the set of English districts. Since 2016 there are more local authorities that have experienced negative changes in their spending power.

We further use a number of controls defined both at the care home and the local authority level. We control for the dimension of the care home by constructing a variable that categorises the size according to the number of beds. Thus, we define several categories: *small*, *medium* and *big* that indicate whether the care home has less than 10, between 10 and 50 or more than 50 beds respectively. We also include an additional variable that determines those care homes that have dementia patients as main users. It has been shown that caring this type of patients is more difficult and is negatively associated with the quality of the services (Barron and West, 2017).

We also control for the composition of the local population. Apart from reflecting the needs of the local authority, the composition of the local population may also proxy the type of payers that can pay for certain quality and level of care. The variables that we consider as indicative of the local population include the share of population older than 65, the share of job seekers and the share of pension credit claimants over the adult population. This data are collected at district level and are provided by the Department of Work and Pensions. We also control for the level deprivation using the average score which is evenly released at district level by the Departmentfor Communities and Local

Government in 2015. A higher score represents a higher level of deprivation. Finally we also control for the type of local authority. The share of growth in the business rates that is retained varies depending on the type of local authority. Metropolitan and unitary authorities retain almost 50% of the growth in the business rates whereas in areas with a two tier structure (e.g. shire), districts retain a 40% and counties up to 10% (Smith et al., 2016). Finally, we control for the deprivation in the district by including a variable with the proportion of LSOA[12] in the 10% most deprived.

Table 1 shows descriptive statistics of our estimation samples. The samples are based on splitted spells that represent time variations for the variables described above and are referred to the overall rating and the alternative quality dimensions also analysed. The quality dimensions that present more spells are the overall and the effective (both with 75,820 spells). In addition, in the lower panel we can see that quality dimension referred to management (e.g. whether services are well-led) is the one with more spells of quality deterioration (1700) whereas the dimension associated with the safety of services is the dimension with more events of quality improvement (3167) followed by the overall (3083).

5 Results

5.1 Local budgets and inspections

We begin analysing the effects of changes in the spending power in the number of quality inspections carried out in the local authority. Table 2 provides estimates of negative changes in the spending power on the frequency of inspections in the district where the care is home located. Columns 1, 2 and 3 correspond to the specifications of the

[12]The Lower Layer Super Output Area (LSOA) is the smallest geographical unit in England with a mean population of 1500

semi-parametric model introduced by Equations 3 and 4 respectively. The specifications in Columns 2 and 3 present mixed models that apply random effects at the level of the provider of the care home and the district. It needs to be clear that all specifications consider the number of inspections carried out in the local authority as the failure of the model regardless of whether the yielded a bad or a good result. Likewise, in all cases, the unit of analysis is the care home.

Table 2 shows that negative changes in the local public spending power reduce the hazard of inspection in the care homes. In particular, negative changes reduce the hazard of being inspected by 10% (exp = 0.9). These results are consistent after correcting for unobserved heterogeneity and even reduce the hazard to 14% (exp = 0.86) in case of the mixed model with random effects at district level. These estimates suggest that negative changes in the spending power are associated with less frequency in the inspections by the CQC. This situation is similar to other community services such as district nursing. In an analysis of the effects of financial pressures in the NHS, Robertson et al. (2017) argue that these services, which work closely with care homes and other providers of long term care, have a limited oversight. This lack of supervision has aggravated the challenges faced by these services including an increasing demand, a block contracting system and rising shortages in the workforce that increase the gap between demand and capacity.

5.2 Local budgets and quality ratings

Table 3 reports the results on the effects of changes in the spending power on deterioration and improvement of the overall quality rating. Positive and negative changes are expressed in terms of substantial changes. Therefore, a negative and a positive change is indicated by the first and last quintile of the spending power distribution. Results are displayed on the basis of two subsamples: Care homes that obtain an initial bad rating and

improve (5,730 care homes) and care homes that begin with a good rating and deteriorate (11,535 care homes).

The upper panel of Table 3 shows the effects of negative changes in the spending power. Results suggest that a negative change in the spending power leads to decreases in the hazard of quality improvement. Concretely, the hazard of the care homes with an initial bad rating is reduced by 9% (exp = 0.91). The value of the estimates is similar for the Cox model and the mixed model with random effects the level of the provider and in both cases are significant at the 5% level of significance. These results suggest that reductions in the spending power would reduce the fees paid by local authorities for long term care services. These reductions would widen the gap between the fees paid by self funded and publicly supported residents.Consequently, providers would not be able to maintain nor increase the levels of quality. For instance,this increase in the gap would deteriorate the conditions of the staff. Poorer job conditions have been shown as an important determinant of quality Allan and Vadean (2017). The negative changes in the spending power also reveal negative hazards in the quality deterioration. This might be indicative of a shift in the care homes activity towards self-funded clients who incentivised to pay for quality. Yet, these results are not statistically significant.

The lower panel of Table 3 displays results of the effect of positive change of the spending power. We also find a significant positive effect of the increases of spending power on the hazard of quality deterioration (about a 24% in all specifications). Several hypotheses could explain this result. First, greater funding power may imply a greater number of publicly funded clients. These may imply increases of demand of long term care services. In this case, the quality of the services may decrease if the capacity – specially staff in care homes, remains constant. In addition, more clients may imply a greater bargaining power from the local authorities when they negotiating contracts with care providers. Local authorities may then negotiate fees below the costs for publicly

supported clients and increase the current gap of prices between private and public clients[13]. These decrease in the price cost margin could be translated into decreases of quality. Given the characteristics of the choice of a care home, some have argued that in cases where there is not enough supply, care homes may not have the incentive to provide a level of quality beyond the minimum standards (Laughlin et al., 2007).

Another explanation may be along the lines that the spending power can be transferred to fund other formal services that would be substitutes of residential care. This could be the case of home care services which have been particularly underfunded over the last decades (Glendinning, 2012). Related to this, there may be an additional explanation is linked to the delays from hospital and health centres occurring in the district. In cases where there is bed blocking in those hospitals, there may be referrals of patients with relatively worse outcomes which could lead to reductions in the quality of care homes in the area. Patients who stay longer in hospitals tend to have worse outcomes and therefore more long term care needs. Over the period of 2013 - 2015 there has been an increase of about 30% in the delayed discharges according to the National Audit Office (National Audit Office, 2016).

A final explanation for the former effect could be associated with the the fact that care homes which are already in a bad situation may not be particularly affected by an increase of the local financial resources. These care homes may have structural problems that difficult their performance regardless of the changes in the budgetary constraints of local authorities where they are located. Bad care homes could struggle to maintain good standards in their quality. We examine the former argument in further detail by looking at the transitions in other quality dimensions. Table 4 reports results of hazard ratios for other quality dimensions in addition to the overall rating considering again positive and negative changes of the spending power. Focusing first on positive changes

[13] Allan et al. (2017) measure this gap and set it in an average £40 a week.

of the spending power (upper panel), we can see that there is a significant decrease in the hazard of quality improvement regardless of the dimension considered. The estimates are significant and equal across all specifications. Also, the estimates are greater in dimensions that involve labour force more intensively (e.g. whether services are caring and effective). In these domains, the hazard of improving the quality is about 20% less. Trigg (2014) suggests that reductions in spending of social care harm not only the recruitment and retention of staff but also training that helps to provide better quality. This is particularly evident in the case of qualified nurses who mainly work in adult residential care homes[14]. With regards to this, Allan and Vadean (2017) find that other factors such as high job vacancies also affect negatively the quality of the services.

The lower panel of Table 4 provides information on positive changes of the spending power. There are two dimensions, (e.g. specially whether services are well led and to less extent whether they are responsive) where positive changes in the spending power increase the hazard of quality deterioration (about a 20% more likely to deteriorate their quality). We can see again that the management dimension is determinant to explain the quality deterioration. In particular, these results suggest that facilities that are managed poorly, deteriorate their quality regardless of financial situation in their local authority. To this extent, this finding is along the lines of similar finding in the literature. For instance, Bloom et al. (2015) show no relationship between further public funding and the management for case of hospitals in the UK.

[14]Considering data from 2016-17, Skills for Care estimated a staff turnover rate in the adult social care of 27.8%. During the period of 2012-13 to 2016-17 the turnover rate increased by a total of 4.7 percentage points. In addition, most of the new starters (about a 66%) were staff who had worked previously within the adult social care (Skills for Care, 2017)

6 Conclusion

The relationship of local funding and quality of care homes is an important policy concern. Specially given the decreasing trend in the spending power of local authorities in real terms. In this paper we examine the influence of changes in the spending power on the frequency of quality inspections as well as on the quality improvement and deterioration of care homes.

Our findings suggest that negative changes in the spending power are negatively associated with the frequency of inspections. Similar to other services providing care, the oversight of care homes is reduced in cases where there is less local funding capacity. We also find, perhaps not surprisingly, that negative changes in the spending power are negatively linked to improvements in quality. Hence, struggling care homes with initial levels of low quality, have less propensity to improve their quality when their local authority reduces its spending power. On the other hand, we find evidence that positive changes not necessarily lead to quality improvements. Indeed, they are related to quality deteriorations. We examine this result in further detail and observe that quality dimensions thatrefer to labour conditions for the staff and particularly the type of management, are the most affected. How a care home is managed seems to play an important role for the provision of quality and it is independent to local financial situation.

Our study presents a limitation with regards to the data used. In particular, the data present a high level of censorship that prevents more the use of non-parametric models as proposed by Heckman and Singer (1984). These models provide more efficient estimations but yet are not recommended when data are highly censored.

The results of this research may contribute to inform which areas of the quality in the services are more critical and may be subject to closer supervision. Also, although it is not the primary purpose of this study, our findings may contribute to inform the debate

associated with the funding of long term care in the forthcoming decades. In particular, how public funding may help to rise the efficiency of services by identifying aspects that provide the best outcomes for the users.

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7 Tables

Table 1: Summary statistics

	mean	sd	min	max
Positive change revenue spending power (£)	0,64	0,48	0	1
Negative change revenue spending power (£)	0,25	0,43	0	1
Population 65+ (%)	0,03	0,01	0,01	0,06
Job seekers (%)	0,01	0,01	0	0,05
Pension credit claimants (%)	0,04	0,01	0,01	0,08
District (london)	0,1	0,3	0	1
District (metropolitan)	0,19	0,39	0	1
District (shire)	0,46	0,5	0	1
District (unitary authority)	0,25	0,43	0	1
Dimension big	0,18	0,39	0	1
Dimension medium	0,55	0,5	0	1
Dimension small	0,26	0,44	0	1
Dementia main user (yes = 1)	0,46	0,5	0	1
Bottom 10% LSOA	0,1	0,11	0	0,49
Care homes	17265			
Local authorities (district level)	325			

Quality dimension		Spells		
		Observations	Quality deterioration	Quality improvement
	Overall	75820	1434	3083
	Care	74442	1156	1343
	Effective	74820	1370	3052
	Responsive	74601	1340	2503
	Safe	75584	1495	3167
	Well-led	75206	1700	2656

Source: CQC, DWP and Census, author's own calculations. Figures from upper panel are based on the sample for overall ratings.

Table 2: Negative changes of spending power on frequency of inspections

	Cox	Mixed provider	Mixed district
Negative change spending power(1 = yes)	-0.106***	-0.107***	-0.147***
	(0.023)	(0.023)	(0.026)
Observations	75820	75820	75820
Spells	14876	14876	14876
Log-lik	-134584.48	-135821.18	-135661.32

Source: CQC, DWP and Census, author's own calculations. Robust standard errors in parentheses. Table provides estimates of the hazard ratio from Equations 2 and 4 where the dependent variable is the hazard of being inspected. Random effects are applied at the level of the provider and the local autority. Controls include local characteristics, number of inspections in the care home, initial rating and fixed year effects. $^{***}p < 0.01$,$^{**}p < 0.05$, $^{*}p < 0.1$.

Table 3: Quality deterioration and improvement on overall dimension

	Quality deterioration			Quality improvement		
	Cox	Mixed provider	Mixed district	Cox	Mixed provider	Mixed district
Negative change spending power (1 = yes)	-0.109	-0.109	-0.101	-0.095**	-0.095**	-0.101
	(0.077)	(0.077)	(0.079)	(0.049)	(0.049)	(0.079)
LogLink	-12243.41	-12242.25	-12235.33	-25576.43	-25576.44	-25576.43
Positive change spending power (1 = yes)	0.217***	0.215***	0.221***	-0.001	-0.001	0.221***
	(0.069)	(0.069)	(0.072)	(0.043)	(0.043)	(0.072)
LogLink	-12239.57	-12238.54	-12231.5	-25578.33	-25578.33	-25578.33
Observations	47456	47456	47456	28364	28364	28364
Spells	1434	1434	1434	3083	3083	3083

Source: CQC, DWP and Census, author's own calculations. Robust standard errors in parentheses. Table provides estimates of the hazard ratio from Equations 2 and 4 where the dependent variable is the hazard of quality deterioration/improvement. Random effects are applied at the level of the provider and the local autority. The modelling of quality deterioration uses a sample with all care homes that obtain an initial *"good"* (e.g. Good or Outstanding) rating. Similarly, the modelling of quality improvement uses a sample with all care homes that obtain an initial *"bad"* (e.g. Inadequate or Requires improvement) rating. Negative and positive change in spending power are indicated by the first and last quintiles of the spending power distribution respectively. Local controls and year fixed effects are included in all regressions. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$.

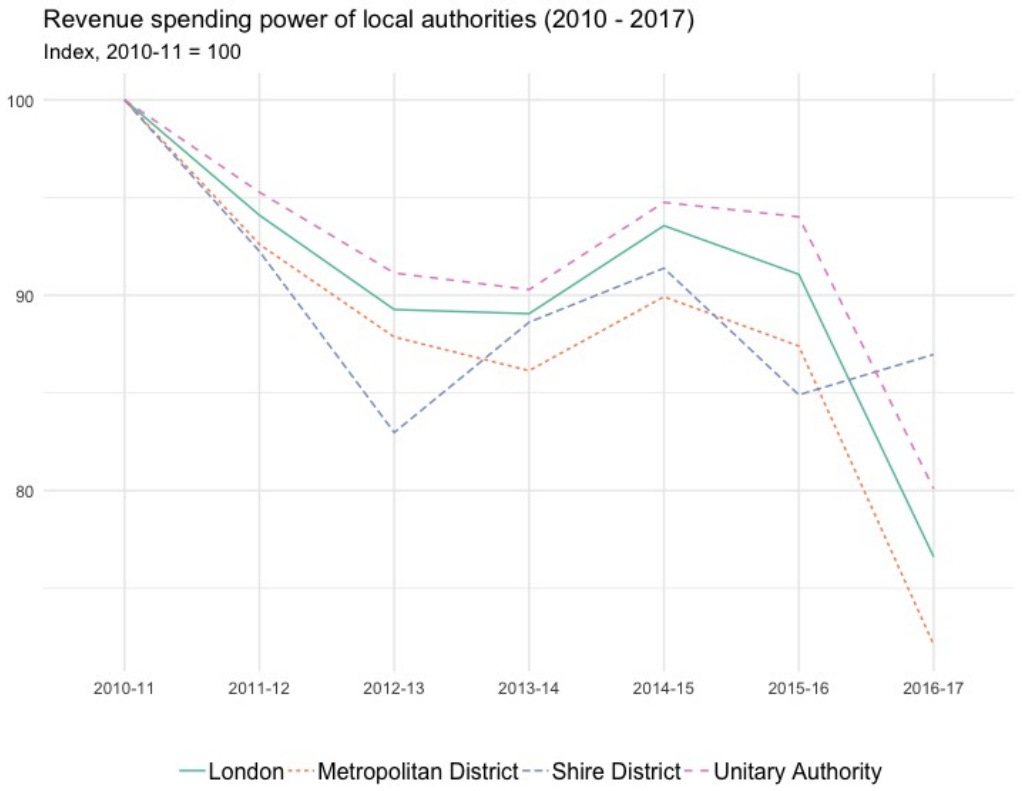
Table 4: Quality deterioration and improvement on other dimensions

		Quality deterioration			Quality improvement		
		Cox	Mixed provider	Mixed district	Cox	Mixed provider	Mixed district
Negative change spending power (1 = yes)							
	Well-led	-0.194**	-0.195**	-0.193**	-0.16***	-0.16***	-0.16***
		(0.074)	(0.07)	(0.071)	(0.057)	(0.053)	(0.053)
	Effective	-0.1	-0.101	-0.097	-0.198***	-0.198***	-0.198***
		(0.083)	(0.076)	(0.078)	(0.051)	(0.05)	(0.05)
	Responsive	-0.083	-0.085	-0.079	-0.163***	-0.163***	-0.163***
		(0.072)	(0.075)	(0.077)	(0.058)	(0.055)	(0.055)
	Care	-0.231**	-0.233***	-0.232**	-0.219***	-0.219***	-0.219***
		(0.083)	(0.082)	(0.085)	(0.073)	(0.074)	(0.074)
	Safe	-0.092	-0.093	-0.097	-0.126**	-0.126**	-0.126**
		(0.078)	(0.073)	(0.076)	(0.051)	(0.049)	(0.049)
Positive change spending power (1 = yes)							
	Well-led	0.201***	0.199***	0.2***	0.026	0.026	0.026
		(0.067)	(0.062)	(0.063)	(0.051)	(0.047)	(0.047)
	Effective	0.215**	0.214***	0.23***	0.001	0.001	0.001
		(0.079)	(0.067)	(0.069)	(0.05)	(0.044)	(0.044)
	Responsive	0.121	0.118*	0.136**	0.011	0.011	0.011
		(0.076)	(0.068)	(0.07)	(0.053)	(0.048)	(0.048)
	Care	0.108	0.105	0.136*	0.064	0.064	0.064
		(0.079)	(0.072)	(0.075)	(0.063)	(0.064)	(0.064)
	Safe	0.154**	0.153**	0.16**	0.008	0.008	0.008
		(0.074)	(0.065)	(0.068)	(0.048)	(0.043)	(0.043)

Source: CQC, DWP and Census, author's own calculations. Robust standard errors in parentheses. Table provides estimates of the hazard ratio from Equations 2 and 4 where the dependent variable is the hazard of quality deterioration/improvement. Random effects are applied at the level of the provider and the local autority. Econometric specifications and samples used for quality deterioration and improvement follow the same rationale as Table 3. $^{***}p < 0.01$,$^{**}p < 0.05$, $^{*}p < 0.1$.

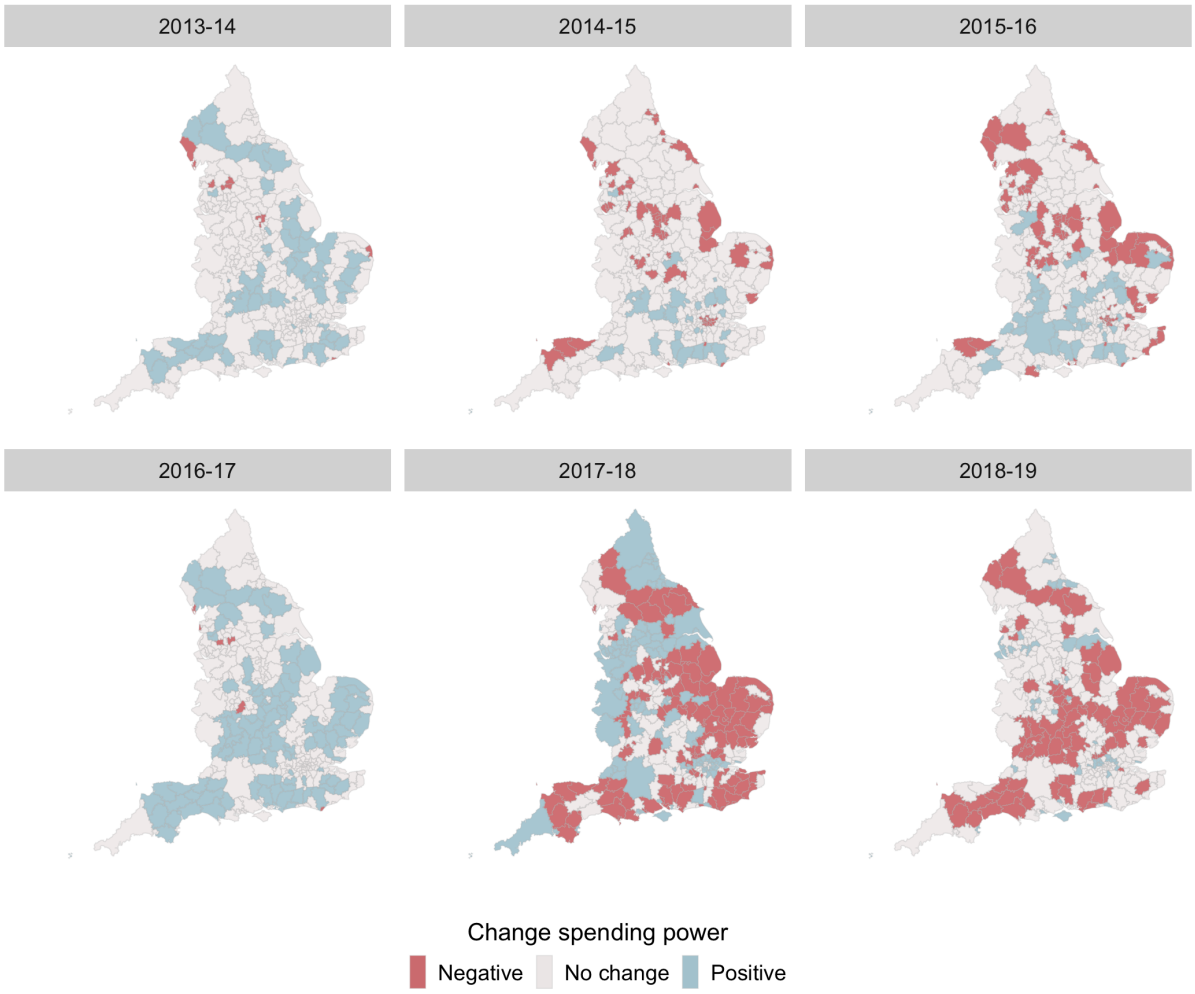
8 Figures

Figure 1: Revenue spending power local authorities, 2010-2017



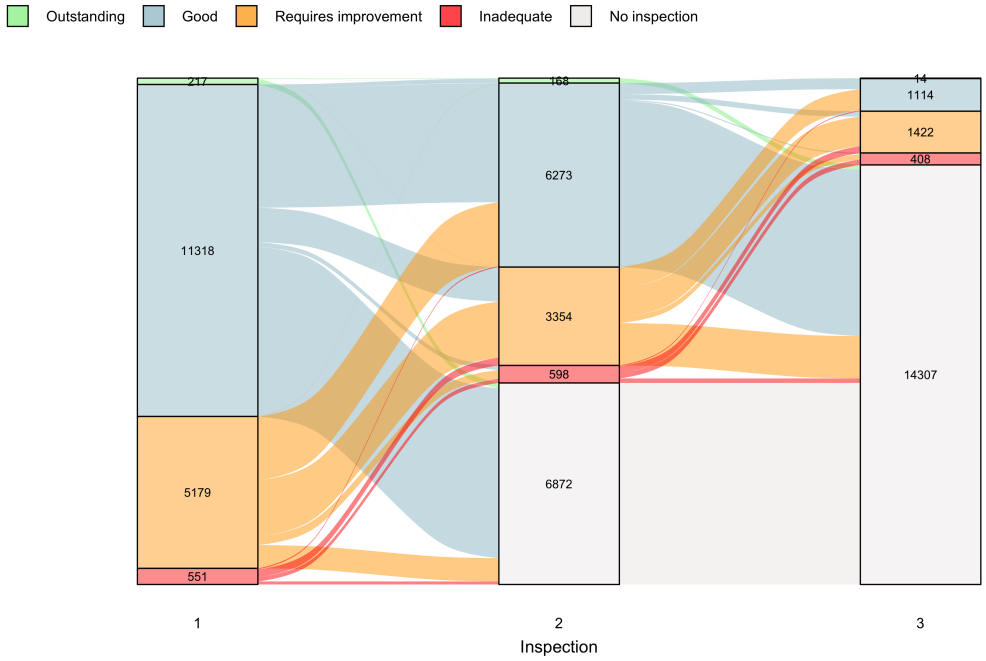
Note: Author's calculations with information from the Local Government Finance Settlement (Department of Local Government and Communities). London includes Inner and Outter boroughts. Year refers to fiscal years (April - March).

Figure 2: Change in core spending power, 2013 - 2018



Note: Author's calculations with information from the Local Government Finance Settlement (Department of Local Government and Communities) and ONS. Figures represent percentage change of core spending power. Negative (red) and positive (blue) changes in the spending power are represented by the first and last quintiles of the distribution respectively.

Figure 3: Transitions of overall quality ratings



Note: Author's own calculation with data from Care Quality Commission. Numbers represent number of care homes in each quality rating.

A Key Lines of Enquiry

Quality ratings are defined according to key lines of enquiry that compose each rated category.

- *Safe*: assesses whether patients are protected from abuse and avoidable harm. The key questions asked are:
  - How do systems, processes and practices keep people safe and safeguarded from abuse?
  - How are risks to people assessed, and their safety monitored and managed so they are supported to stay safe?
  - Do staff have all the information they need to deliver safe care and treatment to people?
  - How does the provider ensure the proper and safe use of medicines, where the service is responsible?
  - What is the track record on safety?
  - Are lessons learned and improvements made when things go wrong?
- *Effective*: assesses whether care, treatment and support achieve good outcomes, promote good quality of life and is based on the best available evidence.
  - Are people's needs assessed and care and treatment delivered in line with current legislation, standards and evidence-based guidance to achieve effective outcomes?
  - How are people's care and treatment outcomes monitored and how do they compare with other similar services?

  - How does the service make sure that staff have the skills, knowledge and experience to deliver effective care, support and treatment?
  - How well do staff, teams and services work together within and across organisations to deliver effective care and treatment?
  - How are people supported to live healthier lives and, where the service is responsible, how does it improve the health of its population?
  - Is consent to care and treatment always sought in line with legislation and guidance?

- *Caring*: assesses whether services involve and treat people with compassion, kindness, dignity and respect.
  - How does the service ensure that people are treated with kindness, respect and compassion, and that they are given emotional support when needed?
  - How does the service support people to express their views and be actively involved in making decisions about their care, treatment and support as far as possible?
  - How are people's privacy and dignity respected and promoted?

- *Responsive*: assesses whether the services meet people's need.
  - How do people receive personalised care that is responsive to their needs?
  - Do services take account of the particular needs and choices of different people?
  - Can people access care and treatment in a timely way?
  - How are people's concerns and complaints listened and responde to and used to improve the quality of care?

- *Well-led*: assesses whether the leadership, management and governance of the organisation assures the delivery of high-quality and person-centred care, supports learning and innovation, and promotes an open and fair culture

  - Is there the leadership capacity and capability to deliver high-quality, sustainable care?
  - Is there a clear vision and credible strategy to deliver high-quality sustainable care to people, and robust plans to deliver?
  - Is there a culture of high-quality, sustainable care?
  - Are there clear responsibilities, roles and systems of accountability to support good governance and management?
  - Are there clear and effective processes for managing risks, issues and performance?
  - Is appropriate and accurate information being effectively processed, challenged and acted on?
  - Are the people who use services, the public, staff and external partners engaged and involved to support high-quality sustainable services?
  - Are there robust systems and processes for learning, continuous improvement and innovation?

B Rating transitions in other quality dimensions

Figure 4: Transitions of overall quality ratings

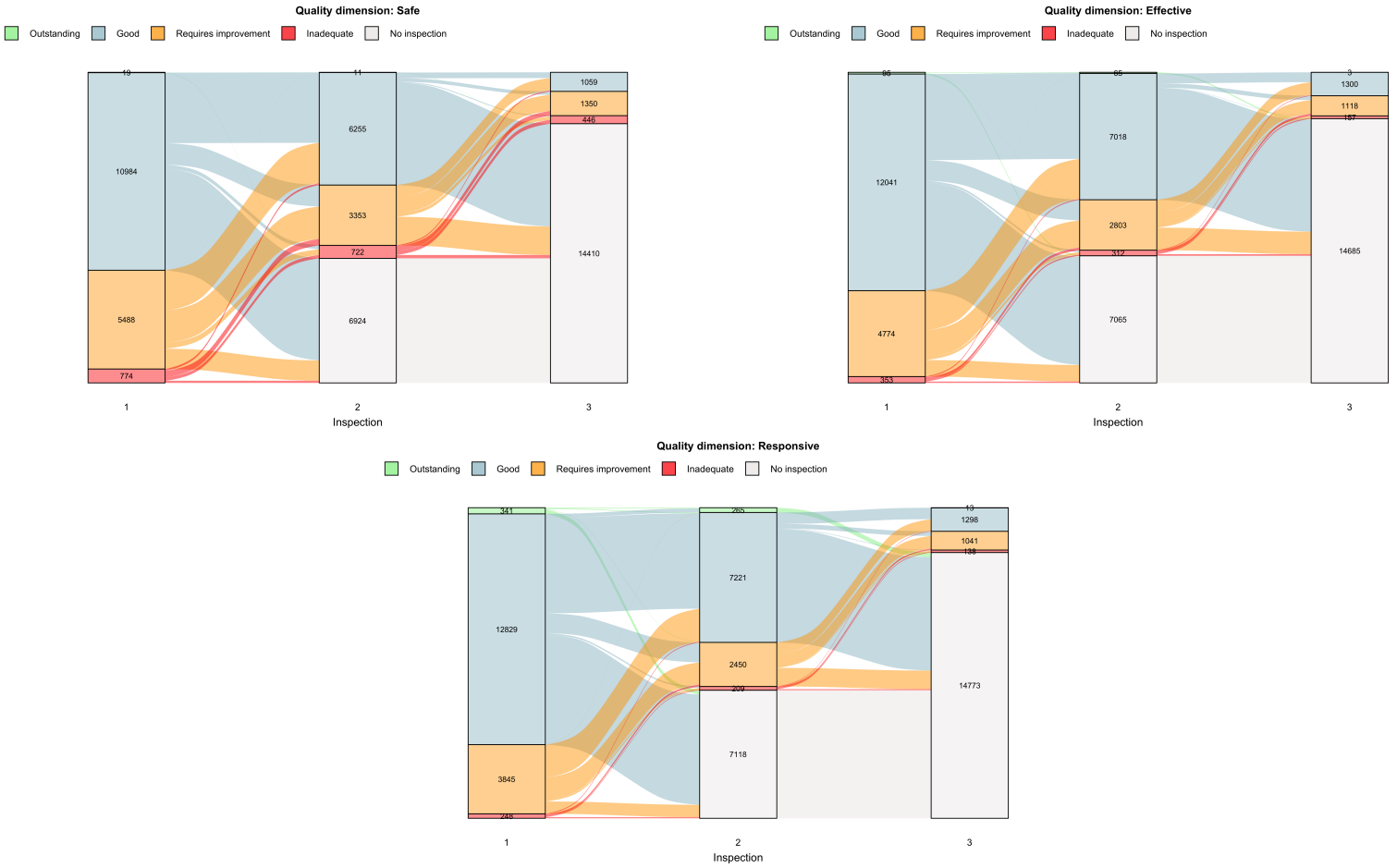
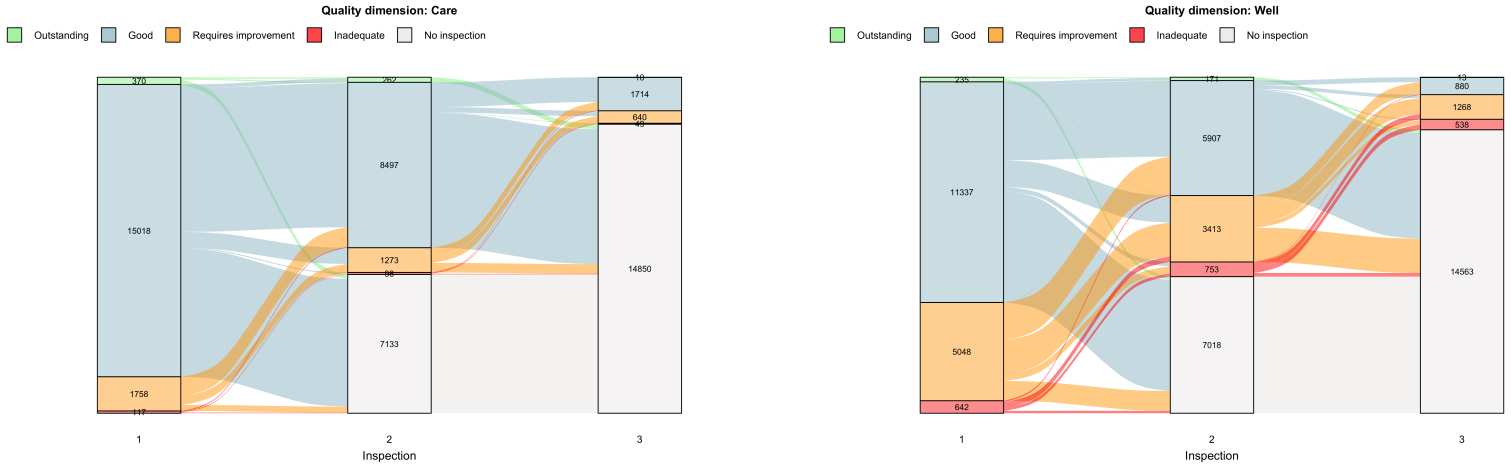


Figure 5: Transitions of overall quality ratings (cont')



Note: Author's own calculation with data from Care Quality Commission. Numbers represent number of care homes in each quality rating.