

An observational study of disparities in the supply of adult social care for older people in England

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DISCLAIMER

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Executive summary

What was the research question and why?

1. This study addresses the geographic distribution of Adult Social Care (ASC) supply in England. While evidence to date has shown some disparities in supply geographically, this study adds to research by assessing the role of local population ethnic composition and income deprivation in supply differences.
2. This is important because the Marmot Review evidenced the inequalities that exist in health. Yet there is only very little evidence on inequalities in ASC. Evidence is required to support national and local policy decisions, particularly given legislation requiring the elimination of discrimination and ensuring that a variety of high-quality ASC services are available to all. Any evidence of disparity in the supply of ASC may have implications for national funding and local market shaping and commissioning decisions.

Methods

3. We performed an observational study of ASC supply data for England in 2024. We analysed supply at national census area-level, i.e. middle layer super output area (MSOA).
4. We measured supply of care homes using beds per 1,000 over-65 population and number of care homes. Supply of home care was measured as the number of registered home care locations.
5. We examined higher quality supply using the above measures of supply when restricted to providers with an overall CQC quality rating of 'Good' or 'Outstanding'. Lower quality (i.e., providers with a rating of 'Inadequate' or 'Requires improvement') and not yet rated supply provision were included as control variables in these models.
6. Ethnicity of the local population was measured using the percentage share of the non-White over 65 population from the 2021 Census. Income deprivation was measured using a percentile rank of the 2019 Income Deprivation Affecting Older People Index (IDAOPI).
7. We controlled for other channels of association that could be linked to ethnicity and income deprivation that could affect supply, including: health, age of population, level of unpaid care, housing wealth, competition, and urban/rural/costal location.

Findings

8. We found evidence that there is inequality in the supply of ASC across the country based on ethnic composition and level of income.

9. Key findings are that the supply of care home beds is lower and the supply of home care higher for areas with greater ethnic non-White minority populations.
10. For income, there is greater care home and less home care supply in areas with lower income deprivation.

Care home bed supply

11. We found that local areas with higher non-White ethnic minority populations have lower availability of care home bed supply: a ten-percentage point increase in the share of non-White ethnic groups was associated with a 5.8 per cent lower supply of care home beds and a 5.3 per cent lower supply of higher-quality care home beds.
12. There is variation by ethnic group, with the Black ethnic group as a whole experiencing the lowest supply of care home beds (-13.7 per cent, for a ten percent increase in Black ethnic group share) compared to the White population.
13. There is lower availability of care home bed supply for local areas with higher income deprivation: an increase in income deprivation of ten percentage points (e.g., moving from 50th percentile to 40th percentile on the normalised IDAOPI rank scale) would be associated with a decrease in bed supply of 1.33 beds per 1,000 over 65 population.
14. However, we only find limited evidence that higher quality bed supply is positively associated with higher income. Moreover, there was no significant association between number of care homes and income deprivation.
15. Models of bed supply including the interaction of income deprivation and ethnic minority population highlighted the importance of affluence. In particular, the negative association between ethnic minority population share and care home supply is significant only for those areas with the highest levels of income deprivation, and is growing in size as deprivation rises.

Home care supply

16. For home care, we found the opposite findings to care homes, i.e., evidence of a pro-ethnic minority and pro-poor supply: a ten-percentage point increase in the non-White ethnic minority population is associated with 11.8 per cent more supply of home care overall and 7.8 per cent more supply of higher quality home care.
17. This positive association was found for all high-level minority ethnic groups when compared to the White population in a local area, the size of association being smallest for the Asian ethnic group.

18. There was a significant pro-poor supply of home care agency services, with similar findings for higher quality supply: a ten-percentage point increase in income deprivation is associated with a 4.7 per cent increase in home care agency supply.
19. Models of home care agency supply including the interaction of income deprivation and ethnic minority population found that the positive association of ethnic minority population share was weakest at the highest levels of income deprivation and grew in size with increases in local area affluence.

Drivers of the observed disparities

20. There are likely to be four potential drivers to the observed disparities in ASC supply across the country: 1) Historic supply (policy) and population change; 2) demand-side preferences and variation in population characteristics; 3) supply-side factors; and 4) current policy.

Historic supply (policy) and population change

21. Historically, care home supply has been concentrated in the south of England, and particularly coastal towns. Changes in supply have largely been linked with changes to policy and new regulations, and there has been only a small decrease in supply over the last two decades.
22. Home care provision has been increasing in line with policies encouraging care at home since the 1990s. The number of home care providers has almost doubled since 2011.
23. Over the same period, the share of ethnic minority population has been increasing, while the White population fell by more than 4 per cent between 2011 and 2021. It is therefore home care supply which has grown to meet the demands of a growing ethnic minority population.

Demand-side preferences and variation in population characteristics

24. Ethnic minority populations have higher needs, lower life expectancy, and lower levels of income and wealth. Preferences for different amenities and neighbourhood configuration may vary in location decisions.
25. There may also be variation in demand characteristics and preferences within and between ethnicities, e.g. there is emerging evidence of variation in deprivation between ethnicities living in the same area. Moreover, unpaid care provision and attitudes towards formal care also vary by ethnicity. These may all lead to differences in demand for formal ASC services by ethnicity.

Supply-side factors

26. There will be variation in supply-side factors across the country, which will determine the number of viable suppliers that can provide care sustainably, e.g. costs (land, travel, staff, etc.) and demand for care.

Current policy

27. Where commissioning practices affect the number of providers in a local area, supply-side factors will be linked to policy as well.
28. Policy may also influence demand preferences, e.g. (any) information asymmetries between ethnic groups could be reduced.
29. Policy has continually promoted home care as a (relatively) more affordable form of ASC, driven also by individual preferences for living at home for as long as possible. This has coincided with the population becoming more ethnically diverse.

Limitations

30. A limitation to the home care analysis is that we have only been able to measure supply at the extensive level, i.e. number of providers. Future research could look to improve on this.
31. We have not controlled for price in the analysis, but have looked at variation in supply of higher quality care, which will be positively influenced by price.
32. We cannot assert about what variation in supply by care setting means for both access to care and care utilisation. We might infer from the findings that there is less (more) access to a care home bed (home care provision) for ethnic minority populations, but this will also depend on the availability of supply at each point-in-time and information levels (knowledge) of the market and providers. Supply availability to one person in a local area compared to another may also vary based on price. There is emerging evidence of inequalities in care utilisation, but as discussed these could be due to differences in individual/group preferences.

Policy implications of the research

33. This analysis finds evidence of disparities in the supply of ASC across the country, which varies for different ethnicities and by income.
34. The extent to which there is inequity of ASC supply depends on the extent to which policy amenable factors are potential drivers of the findings. We cannot make any inference on this, since many of the drivers are so closely interlinked.
35. For example, current policy on market shaping and commissioning decisions will be at least partially based on current local demand- and supply-side considerations.

36. Policy should consider how to improve equality of ASC supply. For example, there could be increased local and national policy focus on expanding the self-funding market for home care. Future reforms to national funding allocation from central government to local authorities could also mean changes to local care markets and market shaping policies.
37. The appropriate number of care homes or home care agencies that an individual should be able to choose from when making decisions on their care is ultimately a subjective decision. Overall, policymakers should consider how to balance improving equality of choice on the one hand and local market conditions on the other.

Introduction

Adult social care (ASC) is a large service sector: during 2024/25 nearly 800,000 people aged 65 and over received either short-term or long-term Local Authority (LA) funded social care support (DHSC, 2025). The majority of these older people (about 61%) received care in the community, while the rest were supported in a care home (with or without nursing). The ASC sector also supports a large number of people self-funding their care, with official estimates of nearly half of all residents in care homes for older people (ONS, 2023a) and 30% of older people receiving community-based care (ONS, 2023b).

On the supply-side, over 11,000 care homes are registered to support both those living with dementia and those over the age of 65. A similar number of home care providers also support older people and there are also estimated to be around 104,000 Personal Assistants directly employed by care recipients using either a social care personal budget (i.e., direct payment from their LA) or their own funds (Skills for Care, 2025). Local markets for ASC will depend on national policy, such as the Fair Funding Review (Ogden and Phillips, 2025), local authority market shaping policy and commissioning decisions (Needham et al., 2023), population demand preferences and supply conditions. Yet, despite the size of these markets, little is known about the geographic variation in ASC supply across the country, and particularly whether local ASC supply varies by local population characteristics, such as their ethnicity and income levels.

From a policy perspective, any inequalities in supply based on population characteristics would have particular importance. Legislation in health and social care gives LAs the responsibility of ensuring a variety of high-quality social care provision that is available to all (Care Act 2014), and health services need to reduce inequalities in access and outcomes (Health and Social Care Act 2012). Further, legislation requires public authorities to eliminate discrimination and promote equal opportunities for all (Equalities Act 2010). It is therefore of policy interest to understand if there are differences in the supply of social care based on population characteristics such as ethnicity and income deprivation.

The Marmot review (Marmot et al., 2010) and subsequent ‘ten years on’ report (Marmot et al., 2020) outlined the broad level of health inequalities that exist in England. Those in the poorest neighbourhood would have an average life expectancy seven years shorter than those in the richest (Marmot et al., 2010). Across the country there was a ‘social gradient in health’, where the very worst off are likeliest to have the highest health needs. This hadn’t improved by 2020, with differences in life expectancy and quality of life by ethnicity (Marmot et al., 2020). As

outlined in both reports, ASC will play a crucial role in these inequalities, and in addressing them. ASC expenditure (as well as government expenditure overall) fell dramatically over the 2010s, fewer people were supported, and this was felt more in the most deprived LAs (Fernandez et al., 2013; Marmot et al., 2020). But, overall, ASC is crucial for supporting communities, helping to manage, reduce and prevent need.

What do we know?

There are several studies exploring the disparities of health care supply in England and the UK more broadly (Gravelle and Sutton, 2001; Goddard et al., 2010; Asaria et al., 2015; Blane et al., 2015; Jo et al., 2021; Nussbaum et al., 2021). The inequalities in ASC supply for England are less researched, but evidence is increasing. Changes in the supply of care home (Ford and Smith, 2008; Allan and Nizalova, 2020) and home care services (Allan, 2021) have been assessed. The former research has generally found a good level of geographical dispersion of care homes. The latter finds that there are large differences in the number of home care agencies by LA, but most local areas within these have availability to at least 3 providers within a ten-minute drive.

The above studies, whilst describing differences by geography, have not explicitly assessed for inequalities by local population characteristics. Allan and Nizalova (2020) did find some evidence of a relationship between care home bed supply and LA adult social care expenditure, which is dependent on both (high) underlying care needs and (low) income. Similarly, Allan (2021) found that Pension Credit uptake, an inverse measure of income, was positively associated with the number of homecare agencies in a local area. There is also pre-pandemic evidence of how demand factors affect competition and closure likelihood in both the care home and home care sectors (Forder and Allan, 2014; Allan and Forder, 2015; Allan, 2024). Forder and Allan (2014) found measures of (higher) income to be positively associated with price and quality of care services, but no evidence has been found of differences in closure likelihood based on local area income levels for care homes (Allan and Forder, 2015) and home care agencies (Allan, 2024). On the demand side, there is evidence on (in)equalities of utilisation (Hu et al, 2024; Arabadzhyan et al., 2025).

For the US, there is a growing literature on the availability of both forms of ASC services (Wang, Leifheit-Limson et al., 2017; Wang, Spatz et al., 2017; Joynt Maddox et al. 2018; Wang et al., 2019; Chen et al., 2020; Fashaw-Walters et al., 2022). Studies on home care, for example, found differences in supply and quality based on local areas' ethnicity and income composition (Wang Leifheit-Limson et al., 2017, Wang, Spatz et al., 2017). Moreover, use of high-quality home care has been found to vary both between and within neighbourhoods, based on ethnicity and level

of income (Fashaw-Walters et al., 2022). Indeed, individuals who were from the Black ethnic group or living in low-income neighbourhoods were more likely to have adverse outcomes from their home care support (Joynt Maddox et al., 2018).

Study aims

The aim of this study was to analyse the supply of ASC in the care home and home care sectors in England and assess the association between supply and local neighbourhood population characteristics, in particular ethnicity and income deprivation. Ethnic differences in local populations have been found to be a significant factor in ASC supply in the US. Moreover, income levels are of particular interest given the financial means test of the LA-funded ASC system in England (see below). In assessing how ASC supply varies by local population ethnicity and income deprivation, this analysis furthers the existing research evidence on geographic variation in ASC supply for England, which have generally sought to control for income, but have not included measures of ethnicity. Also, most evidence on ASC supply for England is pre-Covid-19. It is likely that the pandemic may have altered the market conditions which may have impacted on ASC supply. As such, an additional benefit of this research is on exploring care home and home care supply and how it changed since 2020. We used post-pandemic data for all care homes and home care providers registered with the Care Quality Commission (CQC), the health and social care regulator for England.

Conceptual model

Adult social care demand and funding in England

Demand for formal ASC services in England will be dependent on underlying care needs, availability of unpaid/informal care, wealth and other local demand factors such as population size and age. People requiring support can either fund their own care (self-funding) or, subject to needs and financial means tests and availability of unpaid/informal care, they can be supported by local authorities (LAs). The financial means test assesses how much a person will have to contribute towards paying for their own care, based on their wealth. Care that is funded by LAs is either provided in-house, arranged by care recipients (using a direct payment from the LA) or commissioned by LAs from independent providers. LA commissioning can be on a case-by-case basis, (i.e. a 'spot' contract), or with larger longer-term agreement (i.e., a 'block' contract). The commissioning of ASC services has implications for suppliers in terms of number, quality and viability (Baxter, 2018; Atkinson and Crozier, 2020; James et al., 2022).

Adult social care supply in England

Most people are supported by CQC regulated providers. In October 2025, there were 14,600 CQC registered home care establishments and 14,700 CQC registered care homes in England, of which 93% and 77%, respectively, were registered to provide services to older people aged over 65 and/or people living with dementia (CQC, 2025a).¹ Most providers of ASC are SMEs, with over one third of organisations having 4 or fewer employees, while large ASC provider groups (with more than 250 employees) make only 2% of the total but employ 46% of the total ASC workforce (Skills for Care, 2025). All providers of ASC are rated as to their quality by the CQC. Providers can be rated as 'Inadequate', 'Requires improvement', 'Good' or 'Outstanding'.² Overall ratings are based on key lines of enquiry establishing if the home is Safe, Caring, Responsive, Effective and Well-led (CQC, 2025b). Any ASC provider rated as 'Inadequate' will be placed into special measures and have six months to significantly improve. If improvement is not made, further enforcement action will be taken, which can include variation of registration and withdrawal of registration, i.e. closure (CQC, 2015).

In the analysis that follows, we model ASC supply (N). In doing so, we estimate models of supply using care home and home care supply separately, but we discuss the possibility of estimating an overall ASC supply measure. We also model higher quality supply (N^{hq}), which is taken to be care homes or home care agencies that have a CQC rating of 'Good' or 'Outstanding'.

Association between income/wealth and ASC supply

Given the means-tested nature of publicly funded demand for ASC, there will be opposite effects of wealth (I) on public (negative effect) and self-funded demand (positive effect). We would therefore expect similar effects on supply. The theoretical association between wealth and ASC supply is therefore indeterminate, *a priori*. We can speculate, though, that in making long-term investment decisions providers may prefer to locate where there is higher demand for self-funded ASC, as a) they could charge higher prices (Houghton, 2023), b) there is past and continuing pressures on public funding for ASC (Forder and Allan, 2014; Allan et al., 2021) and c) self-funded individuals can demand ASC at levels of need below the test threshold for public

¹ A large proportion of these care locations will also provide services to a mix of age groups and care needs. For example, more than three in five care homes registered to support older people and/or those living with dementia are also registered to support adults under the age of 65, whilst one in five are registered to support people living with learning disabilities.

² Some new providers will not have had a CQC quality rating since their registration.

support. If this is the case, we might tentatively expect a positive association. Evidence from England has generally supported this (see above).

Quality of ASC supply is likely to be more sensitive to income levels, where we can assume that LAs are not (much) interested in levels of quality beyond some acceptable minimum level (Forder and Allan, 2014). However, third party top-ups, where family members can pay above the LA budget to support a relative, offer a route to higher quality, more expensive care. Further, most care providers cater to a mix of self-funded and publicly supported clients, and as such quality levels between funding source are more difficult to ascertain at care provider level, even if there may be differences between the services provided to different clients (e.g., room size or timing and length of care visit). Nonetheless, there are a minority of care providers that will predominantly cater towards the self-funding part of the market, and, overall, we would expect the association between higher quality ASC supply and income to be positive.

Channels of association between ethnicity and ASC supply

We would not expect ethnicity (*E*) to impact on supply of care – much like sex, it is unlikely that the (average) care provider will distinguish between potential clients to support.³ Nonetheless, ethnicity could be linked to ASC supply and higher quality supply through various ‘channels’ of association. Factors such as needs and age of the population will vary by ethnicity. Ethnic minority populations often have higher needs and lower life expectancy (Bécares, 2015; Marmot et al., 2020; Hu et al., 2022; Hayanga et al., 2024). Further, whilst geographic segregation of ethnicities is declining, ethnic minorities are often located in specific geographic areas (Catney et al., 2023) and will have lower levels of income and wealth (Jivraj and Khan, 2015; Marmot et al., 2020). Previous studies have also found differences in unpaid/informal caregiving by ethnicity, with some ethnic groups other than White (e.g., Bangladeshi, Black African and Pakistani) being up to twice as likely to care for someone in their household, and also more likely to provide 20+ hours of care per week (Wells et al., 2024).

We control for these potential channels of association in the analysis. In not doing so, the potential would be to identify a false (positive or negative) association where one does not exist or to vastly overestimate (any) association.

Supply-side

³ Religion, though, could play an important role for specific care providers and can be closely related with ethnicity. We assess this further channel of association in robustness checks.

ASC supply will also be affected by cost-related factors, such as the price of land or cost of renting office space for home care providers as well as workforce related factors (e.g., local labour supply and wages). There will be other local supply factors that could influence supply, such as geographical location (i.e., urban or rural), which will impact, for example, on travel time between clients for home care. This will also affect local and national government policy.

Hypotheses

Given LAs are required to ensure that every person has access to a diverse range of supply and quality of care, we test the following hypotheses:

$$(1) \frac{dN}{dI} = 0$$

$$(2) \frac{\partial N}{\partial E} = 0$$

From the conceptual model above, we do not expect to find any association between ethnicity and ASC supply. Any income/wealth association is difficult to determine because of the opposite effects of public and private demand. We expect the relationship between higher quality (hq) ASC services and income to be positive, i.e. $\frac{dN^{hq}}{dI} > 0$.

Data

We used the CQC register of health and social care providers for October 2024. It is a legal requirement for ASC providers to be registered with CQC.⁴ We analysed ASC supply for care homes and home care in October 2024. There were 11,054 care homes and 12,990 providers of home care registered with the CQC to provide regulated personal and/or nursing care for those over the age of 65 and/or those living with dementia.⁵ We excluded care home providers with no registered beds ($n=2$) and any provider i) not primarily focussed on ASC, or ii) not being inspected primarily for the respective form of supply ($n=42$ for care homes and $n=233$ for home care). Finally, a number of providers were also registered as being dormant ($n=71$ for care homes and $n=1,685$ for home care), i.e., they were not supplying regulated care at the time. The

⁴ Generally, any firm employing people to care for others will be required to register. However, personal assistants employed directly by those requiring care or self-employed individuals are not required to register.

⁵ To avoid double counting, we only included one observation per provider where a provider was dual registered, i.e. where the same provider (location) was listed twice in the register due to two separate organisations being registered as the owner.

final sample includes 10,939 care homes and 11,072 home care agencies in England that were providing care.

ASC supply

We examined supply of ASC at the local area level using geographical location data for 6,854 Middle-layer Super Output Areas (MSOAs) in England. MSOAs are developed and used by ONS for statistical purposes and fit within the geographic boundaries of local authorities. Broadly, they identify areas having a usually resident population between 5,000 and 15,000 persons and between 2,000 and 6,000 households. We excluded two MSOAs, for Isles of Scilly and City of London, respectively, from the analysis given their unique (geographical) properties.

Weighting of beds by population

In addition to care home beds, we weighted beds by population, as per the literature. Specifically, we measured MSOA bed supply as care home beds per 1,000 over 65 population. Thirdly, we also used a gravity-based measure of beds as developed for the Relative Need Formulae revision (Teo et al., 2025). This measure was constructed as follows. The straight-line distance from each MSOA centroid to each care home was measured. Then, for every MSOA-care home pair, we defined a weighting term, $g_i = (Pop_i / (d_{i,j})^2)$, where Pop_i is population 65 and over in MSOA i , and $(d_{i,j})^2$ is the squared-distance between each MSOA i and care home j . Beds were then apportioned from each care home j to each MSOA i based on a share equal to $\theta_{i,j} = g_i / \sum_i g_{i,j}$ of their beds. From this, we defined gravity-weighted care home beds supply for MSOA i to be equal to the sum of the share of beds from each care home j : $\sum_j \theta_{i,j} \times Beds_j$.

Explanatory variables

The primary focus of the analysis was to assess if ethnicity and income/wealth of the local population influenced ASC supply. Ethnicity of the local neighbourhood population was available from 2021 Census data. We measured ethnic minority population as the percentage of the over 65 population in the neighbourhood that were in all other ethnic groups combined except White. We further broke down ethnicity of local populations into high-level ethnicity groups as a whole (i.e., Asian, Black, and combined Mixed and Other into a single group). In a further robustness check, we included a quintile measure of the population that were in all other ethnic groups combined based on the distribution of neighbourhoods by ethnic minority (excluding white minorities) population share.

Several alternative measures of income and wealth were available. The primary measure utilised was the Income Deprivation Affecting Older People Index (IDAOPI) ranking from 2019.

The index measures the proportion of people aged 60 and over that have low income, defined as those claiming some form of means-tested benefit (McLennan et al., 2019). Each local area (MSOA) was ranked (n=6,856), with the area ranked 1st having the highest level of older people income deprivation. We created a percentile measure (i.e., 1 to 100) based on the distribution of IDAOPI ranks across neighbourhoods, with the same inverse form for measuring income deprivation (i.e., the index is a measure of affluence). We describe the percentile measure as an affluence index. We further assessed the robustness of the findings using two alternative measures. First, a further percentile measure of the neighbourhood ranking of deprivation, but as assessed by the Index of Multiple Deprivation (IMD) from 2019 (ONS, 2019). Second, we used Pension Credit uptake benefits data for 2024. This is a benefit available to those over the age of 65 who are on low income below a certain threshold and was used to allow for any potential changes to deprivation in neighbourhoods between 2019 and 2024. As a further robustness check, we also interacted ethnicity and income deprivation/affluence to assess if the size of association found for ethnicity varied by income of older people.

Control variables

We controlled for important supply and demand factors that have been used in previous literature. In particular, we included controls for competition as well as fixed (i.e., building price, measured using median house price) and variable costs (i.e. urban/rural location) on the supply-side, and needs and local population size on the demand side. Following the literature, we estimated local competition to be ASC supply that was within a 10km radius of each local area. We also further controlled for informal care. This has been included in previous analyses of ASC supply, but generally as a specification check. National census data from 2021 on the percent of people providing informal care in the population was included.

We note that many of the control variables could influence ASC supply through different mechanisms, e.g., urban/rural location could influence through costs or be indicative of demand considerations and local house price will also indicate higher wealth in addition to costs. Whilst we have indicated our expectation of the direction of associations above, we do not look to explicitly model these factors and determine how (any) association with ASC supply is caused.

Methods

Descriptive assessment of ASC supply in England

We assessed MSOA care home bed supply disparity descriptively with the three measures described above, i.e. unweighted, population-weighted and gravity-weighted care home beds. We concentrated on the relative disparity in care home bed supply between locations given care home placement choice by an individual is based on, amongst other factors, location, i.e. proximity to previous home, friends and family, usually within a three to ten mile radius (CMA, 2017).⁶ In particular, we assessed the distribution of care home beds across the country within MSOAs using Lorenz curves, Gini indices, Robin Hood indices, concentration curves and concentration indices. Lorenz curves provide graphical representation of the level of inequality of care home beds according to their distribution when put in comparison with a situation where all beds are equally spread across MSOAs, i.e., a 45-degree line representing that any percentage of care home beds are located in the same percentage of MSOAs. The Gini index was calculated from this, which measures the level of inequality, from 0, indicating no inequality, to 1, complete inequality. We bootstrapped standard errors (200 repetitions) to provide a confidence interval on the Gini index. We further used Lorenz curves to assess the distribution of care home beds by the urban or rural classification of MSOAs. The Robin Hood index measures inequality in percentage terms, i.e., how much redistribution of beds there would need to be from MSOAs with bed supply above the mean of the distribution to those MSOAs with beds below the mean of the distribution. Concentration curves measure the distribution of beds supply for MSOAs according to the distribution by rank of MSOAs for another variable. We assessed concentration curves for income deprivation/affluence and ethnicity. A concentration index of 0 represents equality, with a negative index score (limit of -1) representing unequal bed distribution to the lower part of the other variable's distribution (i.e., higher deprivation or lower ethnic minority (excluding white minorities) population) and a positive index score (up to 1) representing more unequal bed distribution to the higher part of the other variable's distribution (i.e., lower levels of deprivation or higher ethnic minority (excluding white minorities) population).

Regression analysis of ASC supply

The descriptive analysis only provides an initial indication of any inequality. We therefore looked to control for the other factors likely to influence any association between ASC supply and local area population ethnic composition and income levels with regression analysis. The dependent variable in the models of supply estimated was a (separate) measure of care home and home

⁶ For home care, the delivery of care is not as strongly linked to provider location and so we do not assess this using these measures of inequality.

care supply. For care homes, we looked at both number of beds and number of homes. We also assessed residential and nursing home supply separately. For home care, we counted the number of providers as the measure of supply (i.e., at the extensive margin), as data on intensity of supply was not available. In all cases, the primary models had the dependent variable weighted per 1,000 over 65 population, but unweighted models were also estimated (with over 65 population as an explanatory variable).

We further modelled supply of higher quality ASC in local areas. This used the same measures of ASC supply already described, but only counting supply of those providers that had a CQC rating of ‘Good’ or ‘Outstanding’. In these models, we also further included lower quality and not yet rated supply as dependent variables.

Econometric methods

Figure 1 shows the kernel density estimates for care home beds (left) and beds when weighted by per 1000 over-65 population (right). As expected, this shows a highly leptokurtic distribution, skewed by a large percentage of neighbourhoods with no bed supply. In addition to estimating a OLS model of supply, we looked to take account of this in the econometric specification of the model. In particular, we first considered a Tobit model to deal with the censoring in supply at zero. This presumes that the care home bed supply (N) in local area i can be defined with the following structural equation:

$$N_i^* = X_i\beta + \varepsilon_i \quad (1)$$

Here, N_i^* is the latent supply level in local area i based on the ability of providers to make long-term profits, subject to a minimum quality level (Allan and Forder, 2015), X_i is a vector of the relevant supply and demand characteristics influencing the supply level discussed above and ε_i is an error term. The relationship between actual observed supply, N , and latent supply (N^*) is left censored:

$$N_i = \begin{cases} N_i^* & \text{if } N_i^* > 0 \\ 0 & \text{if } N_i^* \leq 0 \end{cases}$$

For care homes and care home beds, we also estimated a two-stage censored data (i.e. Heckman) model. Here, there is some probability that a local area i does not have censored data based on a latent process (i.e., unobserved). We model this process as:

$$Z_i^* = W_i\gamma + \mu_i$$

Where:

$$Z_i = \begin{cases} Z_i^* & \text{if } Z_i^* > 0 \\ 0 & \text{if } Z_i^* \leq 0 \end{cases}$$

Then, for the local areas with positive (i.e., observed) bed supply we can estimate the following model:

$$N_i = X_i\beta + \beta_\lambda \lambda_i(\alpha_\mu) + v_i \quad (2)$$

Where $\alpha_\mu = -W_i'\gamma/\sigma_\mu$ and $\lambda_i(\alpha_\mu) = \frac{\phi(W_i'\gamma/\sigma_\mu)}{\Phi(W_i'\gamma/\sigma_\mu)}$ (Greene, 2003).⁷

Both of these estimation methods assumed normality of the supply distribution, when, in reality, these data are counts of ASC supply (beds, homes or agencies). We therefore also estimated a Poisson model with the unweighted measures of supply as the dependent variable which allowed for the count nature of the data. In particular, we estimated the following model of ASC supply:

$$N_i = e^{X_i\beta + \varepsilon_i} \quad (3)$$

We estimated equations (1), (2) and (3) to assess the factors associated with ASC supply.

Instrumental variables

Previous UK analyses of ASC supply have not considered the endogenous nature of the relationship between informal care receipt and the dependent variable. Any supply of informal care may be dependent on what supply of formal ASC there is in a local area. In this study, we utilised instrumental variables (IVs) to specifically address this. IVs are variables that are related to the independent variable (receipt of informal care) but are not a factor in determining the dependent variable (ASC supply). In particular, we used national census data on the percent of households with two people residing and the percent of the population that was male. We anticipated that the first instrument would have a positive relationship with informal care given spousal relationships, whilst the second would have a negative relationship (controlling for the former) given informal care (outside of spousal relationships) is more often provided by women (Dahlberg et al., 2007; Pickard et al., 2007; Verbakel et al., 2017; Wells et al., 2024). We assumed that the percent of the population that was male did not have any relationship with ASC supply given age of the population was included in the model. We would expect that ASC suppliers would have no consideration of sex in supplying services, after controlling for the

⁷ Ideally, this process would be at a provider level. In terms of a decision on whether to start a business or not, this is analogous to a model determining the reasons for adult social care provider closure. Existing studies have found that some local demand factors, such as (low) population care needs, are significantly related to the likelihood of closure (Allan and Forder, 2015; Allan, 2024).

higher life expectancy of women. This assumption was assessed using relevant overidentification tests.

We also instrumented for competition in local areas using standard spatial lag measures utilised previously in the literature (e.g., Forder and Allan, 2014). Specifically, we included the local authority district (LAD, $n=322$) measures of the percentage of the over 65 population that was aged over 85 and percentage of MSOAs that were in a rural location, each considered without the MSA in question, i.e., a leave one out measure (Teo et al., 2025). For home care, we used the local authority district percentage of the over 65 population that claims Personal Independence Payment, Disability Living Allowance or Attendance Allowance benefit and the percentage of MSOAs that were in the bottom income deprivation quintile within the local authority district.

The supply of ASC in local neighbourhoods was estimated using `ivreg2`, `ivtobit`, `heckman` and `ivpoisson gmm` in Stata 19. The first stage model of competition to generate predicted values including the instrument variables were estimated manually in all cases using OLS, whilst the same method was used for informal care when estimating the Heckman model.

Results

The geographic distribution of ASC supply in England

Figure 2 presents the Lorenz curves for the distribution of beds for the population of MSOAs when measured as a) (unweighted) beds, b) beds per 1,000 over 65 population and c) gravity-weighted beds, respectively. Unsurprisingly given the large number of MSOAs with no care home beds located therein, there is a high level of inequality in care home beds, indicated by the Lorenz curve in Figure 2a being far away from the 45-degree line which would represent equality of bed supply. The corresponding Gini index for unweighted beds is 0.575 (95% CI: 0.568-0.581). There is little difference in inequality when beds are weighted by over 65 population (Gini index = 0.581; 95% CI: 0.574-0.587). When beds are gravity-weighted (i.e., smoothed across the population of MSOAs based on their over 65 population and distance to care home beds) the inequality is reduced, with a Lorenz curve closer to the 45-degree line and a Gini index of 0.362 (95% CI: 0.356-0.368). The Robin Hood index is 42.9%, 43.2% and 26.2% for the three measures of bed supply, respectively. In the former case, this suggests that 42.9% of all care home beds in England would have to be redistributed from MSOAs with bed supply above the mean level to MSOAs with bed supply below the national mean. Even when bed

supply is smoothed across MSOAs using the gravity-weighted measure, there would still be required a large redistribution of beds (i.e., 110,000 beds) for there to be equality in the distribution in care home bed supply.

We also assessed Lorenz curves for subpopulations of MSOAs, based on their urban or rural classification (Figure 3). We used the two weighted measures of bed supply in these instances. The difference in the weighting of bed supply is apparent when assessing inequality in care home bed supply by urban or rural classification in Figure 3. When weighted by over 65 population, rural MSOAs have a Lorenz dominant distribution of beds compared to urban MSOAs, i.e., a more equal distribution of care home bed supply, indicated by the curve being closer to the 45-degree line across all MSOAs. The finding switches when looking at gravity-weighted beds, however. This is because urban MSOAs will be closer to each other, thereby drawing a larger 'share' of beds from each care home compared to a rural MSOA with the same over 65 population size. Given the greater distances, there is less smoothing from gravity-weighting bed supply of the rural MSOA bed distribution when compared to the urban MSOA bed distribution.

We assessed how the distribution of bed supply related to ethnicity and income deprivation/affluence using concentration curves, presented in Figures 4 and 5, respectively. For ethnicity, we ranked MSOAs according to their percentage of over 65 population that was from all other ethnic groups combined except White (low to high); for income deprivation/affluence we used the original ranking of IDAOPI which ranked MSOAs by their IDAOPI score, i.e., higher rankings indicate greater affluence. With ethnicity (Figure 4), there is evidence of a distribution of beds in favour of those MSOAs with low ethnic minority population (i.e., a pro-White ethnic group distribution). This is shown clearly for unweighted bed supply (A) and gravity-weighted beds (C). For beds supply weighted by older population, there is also evidence of a small pro-White ethnic group distribution for those MSOAs in the top third of the distribution of ethnic minority older population. The concentration index scores for each respective measure of bed supply are -0.114 ($p < 0.0000$), 0.001 ($p = 0.88$) and -0.086 ($p < 0.0000$). The concentration index for population-weighted beds is suggestive of a fair distribution of care home beds by ethnic minority older population, whilst for the other two measures their index scores suggest a pro-White ethnic group distribution.

For income deprivation (Figure 5), there is evidence of a pro-rich distribution of beds when supply of beds is unweighted (concentration index = 0.069, $p < 0.0000$) or gravity-weighted (concentration index = 0.044, $p < 0.0000$). When supply is weighted by population over 65, there

is a pro-poor distribution (concentration index = -0.054, $p < 0.0000$), i.e., beds per 1,000 over 65 population are distributed to the benefit of those MSOAs with higher older people income deprivation.

Regression analysis of ASC supply

Descriptive statistics of the data included in the models of adult social care supply are presented in Table 1. The average local area (i.e., MSA) had 61 care home beds, of which almost 46 were of higher quality (i.e., rated 'Good' or 'Outstanding'), and had 1.6 home care agencies, one of which was of higher quality. The results from the regression models of care home bed supply (i.e., equations (1), (2) and (3)) are presented in Tables 2 and 3 for ethnicity and income deprivation/affluence, respectively.⁸ For the censored regression models (i.e., Tobit and Heckman), marginal effects are reported for the observed care home supply (i.e., marginal effect conditional on having care home bed supply in the local area).⁹ The findings are generally robust to type of model utilised, so we concentrate on reporting the results from the Tobit models using various measures of care home bed supply. Generally, we find a significant negative association between care home bed supply and levels of both ethnic minority (excluding white minorities) population and income deprivation of older people (the latter noting the inverse nature of the measure for income deprivation). For overall care home bed supply, a ten percentage point increase in all other ethnic groups combined population would decrease care home bed supply by more than three beds per 1,000 over-65 population, equivalent to 5.8 per cent of supply for the average local area with care homes. For income deprivation, an increase of ten percentage points, e.g. moving from 50th percentile to 40th percentile on the normalised IDAOPI rank scale, would be associated with a decrease in bed supply of 1.33 beds per 1,000 over-65 population, equivalent to 2.4 per cent of average bed supply for local areas with care homes. The negative association for a ten percentage point increase in ethnic minority (excluding white minorities) population (income deprivation) ranges from 3.8 to 11.0 (1.8 to 4.2) per cent across the four models. Overall, we reject the hypotheses of no association between care home bed supply and both ethnic minority (excluding white minorities) population and older people income on care home bed supply.

When looking at alternative measures of bed supply, the sizes of association tend to be smaller but generally still significant for ethnic minority (excluding white minorities) population. For

⁸ Full results can be found in Appendix, Tables A1 (care home beds) and A2 (care homes).

⁹ The marginal effects of ethnic minority population and income deprivation on the underlying latent supply are larger in (absolute) size, with no change in significance levels to those reported.

income deprivation of older people, only for nursing home beds is there a significant association with care home bed supply, although there is also weak support in one model of the hypothesis that higher quality bed supply was positively linked to older people affluence. The marginal effects from the Tobit model reported in Table 2 suggest that for a ten percentage point increase in all other ethnic groups combined population share in a local area there would be a decrease of 3.9, 3.7 and 5.3 per cent in residential care beds, nursing beds and higher quality beds, respectively. Similarly, from Table 3, for affluence of older people, a ten percentage point increase in deprivation for a local area would decrease nursing home bed supply by 3.1 per cent.

We also report findings when supply is measured using number of care homes; see bottom rows of Table 2 and Table 3. For ethnic minority (excluding white minorities) population, we generally find the same significant negative associations reported for bed supply, with a ten percentage point increase in the share of all other ethnic groups combined population related to a care home per 1,000 older population supply decrease of between 4.1 and 6.7 per cent. We find, however, no significant association between number of care homes and income deprivation.

The Heckman selection models show evidence of a significant negative association between care home bed supply and both ethnic minority (excluding white minorities) population share and income deprivation of older people. These significant negative associations are also found in the first stage model of bed supply, i.e. the location decision (See Appendix, Table A3).

However, for the models of supply based on number of care homes, there is no significant association between the presence of care homes in a neighbourhood and both ethnic minority (excluding white minorities) population share (weakly significant at 10 per cent level) and income levels of older people (i.e., the first stage model, see Appendix, Table A3).

Robustness checks

The findings of the other control variables included in the models of care home supply are in line with previous research and as expected *a priori*, which provides some evidence to the robustness of our main findings. Nonetheless, we looked to provide some further evidence of robustness through additional analysis. First, we interacted our measures of ethnicity and income deprivation. A higher ethnic minority population share and income deprivation can go hand-in-hand in some areas (Jivraj and Khan, 2015), but levels of deprivation may also differ by ethnic group within areas (Lloyd et al., 2023). Findings of the marginal effect on all other ethnic groups combined population share when interacted with the older people affluence index are

presented in Table 4. These show that the negative association with ethnic minority (excluding white minorities) population is only found in the local areas that are in the top half of the income deprivation distribution (n.b. inverse measure), with the size of the association gradually decreasing as levels of income deprivation reduce. For some models, there is a positive association of bed supply with ethnic minority (excluding white minorities) population share for the areas with the highest levels of affluence. Conversely, there is a significant negative association of income deprivation on care home bed supply across the ethnic minority (excluding white minorities) population distribution of small areas, with the size of association greater as the share of all other ethnic groups except White population increases (see appendix, Table A4).

Second, we looked at ethnic minority (excluding white minorities) population by high-level ethnic groups, i.e. Asian, Black and Mixed/Other. These results are presented in Table 5. We found that it is the size of the population in the Black ethnic group as a whole which has the strongest significant negative association with care home bed supply when compared to the White ethnic group as a whole. From the Tobit model, a ten percentage point increase in the Black ethnic group as a whole population compared to the White group as a whole would decrease care home bed supply by 7.7 beds per 1,000 over 65 population in a local area, equivalent to 13.7 per cent of average bed supply in local areas with care homes. In comparison, Asian ethnic group as a whole population was only found to have a significant negative association in one model, whilst there was no significant association between the combined Mixed and Other ethnic groups as a whole population and care home bed supply.

Third, we explored alternative measures of ethnic minority (excluding white minorities) population and income deprivation. Specifically, we put small areas into quintiles according to their placement in the distribution of ethnic minority (excluding white minorities) population and older people income deprivation, respectively. There was little indication of differences in bed supply by all other ethnic groups combined population share in these estimations; only for the highest all other ethnic groups combined population quintile was there a significant negative association with bed supply when compared to the lowest quintile in the OLS and Poisson models of bed supply. The size of association by income quintile was significantly positive and increasing in size as affluence increased in all models. We also utilised an alternative measure of income used in previous research, pension credit uptake, which is a proxy for low income. We found the same significant negative association between bed supply and low income as in the main model (not reported). Finally, we found no significant association between bed supply and overall deprivation measured using the index of multiple deprivation.

Fourth, religion may also influence care home bed supply. Many care home providers are intrinsically linked with religions, e.g. Methodist Homes (MHA), Jewish Care and Nightingale Hammerson. This creates a potential endogeneity in the relationship between religious affiliation and care home supply. We could expect a positive bias if religious groups provide care home beds where supply is lacking compared to demand in their local population.

Nonetheless, ethnic groups and religion are interrelated; a (much) larger percentage of the ethnic minority population reported identifying with a religion in the 2021 Census. There is some potential concern therefore that the ethnic minority (excluding white minorities) population association finding is affected in some way by religious affiliation.¹⁰ We might consider the association to be underestimated if religion groups have a positive bias on supply. Inclusion of religious groups by percentage that responded ‘other religions’, ‘no religion’ or did not answer were compared with the percentage in the local area that were Christian. We found that the higher the percentage of the population in other religions or not answering the question in the Census had higher care home bed supply in comparison to the Christian population. In terms of ethnic minority (excluding white minorities) population, after controlling for religion, the negative association with care home beds supply in the local area was stronger.

Fifth, we explored potential geographical biases to the findings. The Tobit models of care home bed supply were robust to clustering at local authority district level, potentially mitigating any differences in LA policy which might affect supply and its relationship with both ethnicity and income. However, we also included LA fixed effects as a final robustness check, with results showing the same significant association between ethnic minority (excluding white minorities) population and care home bed (see Table 6). There was a weak significant positive association between older people affluence and bed supply in two of the three models. There could also be concern that the findings are being skewed by the high ethnic minority population in London, which is also an area with low care home bed supply due to high housing prices/land costs. We, therefore, also ran the Tobit model when excluding local areas that are in London. The results of this model are presented in Table 7 and show the same significant associations as in the main findings.

Home care agency supply

¹⁰ We might suppose that policymakers would be satisfied that religious groups providing social care supply is the market meeting demand, where required. If so, the association between ethnic minority population and care home bed supply found in the main analysis would be the association needed to be identified for policy, i.e. taking religious groups supplying care home beds as given.

The results of estimating models of home care agency supply are presented in Tables 8 and 9 for all other ethnic groups' population share and level of income deprivation/affluence, respectively. For the Tobit censored regression models, we report the marginal effects for the observed care supply (i.e., the marginal effect conditional on having home care agencies in the local area). For robustness, we also run an OLS specification and a model where the dependent variable was the log of agencies per 1,000 over 65 population.¹¹ The findings were robust to the estimator used, so we focus on reporting results from the Tobit model using the various measures of home care supply. In the home care supply models, we find a positive association between the measures of ethnic minority (excluding white minorities) population and income deprivation of older people and home care supply. With respect to the number of home care agencies weighed by population, we find that a ten percentage point increase in ethnic minority (excluding white minorities) population would be associated with 0.3 more agencies per 1,000 over-65 population in the local area (a 11.8 per cent increase for the average local area). For income deprivation, a local area with a decrease of ten percentage points on the older people affluence index would be associated with an increase of 0.12 more agencies per 1000 over-65 population, equivalent to a 4.7 per cent increase. When looking at the supply of higher quality home care agencies, we still find a positive association between the measures of all other ethnic groups combined population and income deprivation, albeit of smaller size. A ten percentage point increase in all other ethnic groups combined population would be associated with 0.14 more higher quality agencies per 1,000 over-65 population in the local area (or 7.8 per cent increase). Moreover, a ten percentage point decrease on the older people affluence index would be associated with 0.08 more higher quality agencies per 1,000 over-65 population in the local area (or 4.5 per cent increase).

We also report findings when supply is measured as the total number of home care agencies, unweighted by population. Again, we used both a Poisson and an OLS estimator for robustness. Due to the count nature of the data, we focus on reporting the results from the Poisson model, as the results appear to be robust to the model specification. We find that a ten percentage point increase in all other ethnic groups combined population would be associated with 0.21 more home care agencies and 0.12 more higher quality agencies in the local area respectively, corresponding to a 13.6 per cent in the total number of home care agencies and 13.7 per cent increase in the number of higher quality agencies. A ten percentage point increase in income deprivation would be associated with an increase of 0.17 more home care agencies and 0.11 more higher quality agencies in the local

¹¹ The log-dependent Tobit model estimates are reported to also understand the percentage change in home care supply.

area respectively, corresponding to a 11per cent in total home care supply and 12.6 per cent increase in high quality home care supply.

The full set of results of the home care supply models are provided in the Appendix (Tables A5 and A6). The other control variables included in the home care supply models, such as the availability of informal care, the level of local needs and the level of competition in the local area have the expected signs and significance, providing some reassurance as to the robustness of our findings.

As with care home supply, we conducted additional analysis. First, we interacted all other ethnic groups combined population share and income deprivation. Findings of the marginal effect of ethnic minority (excluding white minorities) population on home care supply when interacted with income deprivation are presented in Table 10. We find that the association between all other ethnic groups combined population share and home care supply is positive and significant across the income deprivation distribution. Moreover, the less deprived a neighbourhood is, the larger the association.

Second, we looked at ethnic minority population by high-level ethnic group, measured as the percentage of Asian, Black and Mixed/Other ethnic group populations in the over-65 population in the local area. These results are presented in Table 11 and show a positive association between high level ethnic group population share and home care supply. There were significant positive differences in home care supply when comparing all three high-level ethnic minority groups to the White ethnic group, with Black and Mixed/Other ethnic groups as whole having the strongest association.

Discussion

This study addresses the geographic distribution of ASC supply in England. While evidence to date has shown disparities in supply geographically, this study extends this by assessing the role of local population ethnic composition and income deprivation in supply differences. Performing an observational study of 2024 ASC supply data for England, we have found evidence of disparities in supply based on ethnic composition and level of income. We found that local areas with higher ethnic minority (excluding white minorities) populations have lower availability of care home bed supply, with a ten percentage point increase in the share of all other ethnic groups combined other than White population being associated with a 5.8 per cent lower supply of care home beds and 5.3 per cent lower supply of higher-quality care home beds. Some ethnic groups in the population, such as the Black ethnic group as a whole, experience the lowest supply of care home beds compared to the White population: a ten percentage point increase in the share of Black ethnic group as a whole population being related to a 13.7 per

cent lower supply of care home beds for a local area. For home care, we found the opposite, i.e., evidence of a pro-ethnic minority supply: a ten percentage point increase in the ethnic minority (excluding white minorities) population would be associated with 11.8 per cent more supply of home care overall and 7.8 per cent more supply of higher quality home care. This (positive) association was found for all high-level minority ethnic groups when compared to the White population in a local area, the size of association being smallest for the Asian ethnic group as a whole.

We also found evidence of a pro-rich supply of care home beds and pro-poor for home care. Some of this difference, in addition to the further drivers we outline below, will likely be caused by there being a larger self-funding section of the care homes market compared to home care. This is itself because of variation in the means testing element of public-funding support, with housing wealth disregarded for home care support. Further, on top of the opportunity to buy more care support, self-funding home care recipients could also receive other services, such as shopping, cleaning and home adaptations/improvements. However, these services need not be provided by a regulated home care provider, weakening the link between higher income and (regulated) home care supply. Overall, this will largely explain why the (negative) income effect from the public-funded section of the market is stronger than the (positive) effect from the self-funded section for home care supply.

Overall, the evidence tentatively points to affluence being the stronger factor in explaining ASC supply as opposed to ethnicity. This is because the association of all other ethnic groups combined population share with ASC supply was dependent on income levels. For care home services, the negative association of ethnic minority (excluding white minorities) population share with bed supply was mediated by (greater) income. For home care supply, the significant positive association with ethnic minority (excluding white minorities) population was lowest in magnitude for local areas with higher income deprivation. The likelihood that (higher) income is an important factor in ASC supply is also supported to an extent by the first stage findings of selection models for care home beds where higher wealth (and lower all other ethnic groups combined population share) had a significant positive association with care home beds' location. On the other hand, we found no evidence of either factor being strongly related to care home location, rather alternative demand factors such as very old population share (i.e., 85 and over) and coastal location were important factors associated with home location.

The analysis has also not specifically considered price in the models of ASC supply. This could be important in terms of the level of supply that is realistically available to some of the population. For example, the greater supply of care home beds in areas with higher affluence

may not be potentially available to all, with some care homes (beds) out of price range. This would be a natural consequence of market conditions, with the self-funding side of the market generally having much more choice. There is corresponding evidence to this from the US, where higher quality care utilisation varies both between and within neighbourhoods (Fashaw et al., 2022). There is also evidence for England that there are varying levels of deprivation within neighbourhoods, which would support the notion that even within areas the level of ASC supply available may vary by population characteristics, particularly income (Lloyd et al., 2023). However, in terms of our analysis, we would expect that quality reflects variation in price across the country (Forder and Allan, 2014), and we found only weak evidence of any relationship between affluence and higher quality care home beds.

Potential drivers

The findings of a disparity in ASC supply based on ethnic minority (excluding white minorities) population share and income of the local population could be due to a number of factors, including: historic supply and population change, individual preferences on the demand side, supply-side factors, and (current) policy decisions. First, these findings fit with a historical perspective of ASC supply given population change. There has been a continued growth in ethnic minority (excluding white minorities) population; the White population in England and Wales has remained stable from 2011 to 2021 (48.2m to 48.7m) but has fallen by more than four percentage points (86.0% to 81.7%) as a proportion of the rising population (ONS, 2022). This continues a long history of increasing ethnic diversity in England and Wales (Catney, 2016). ASC supply may, therefore, need to adjust to the growing ethnic diversity in the population.

Historically, the supply of care homes is greater in the South of England, and in coastal towns, in particular. In the 1980s, there was a large growth in for-profit homes in this region, due in large part to government policy (Means et al., 2008). Two decades later, there was a large reduction in supply in the early 2000s, with some care home providers being driven out of business due to the costs associated with meeting new regulations (Means et al., 2008). Care home supply has been relatively stagnant in the last 20 years, often with small reductions in number of beds available each year. Therefore, it is unlikely that changes in supply in the care homes market have adapted to increasing ethnic minority populations. This fits with the evidence found in the analysis with a pro-rich and pro-White supply of care homes. On the other hand, since the 1990s, policy has consistently been focussed on increasing care at home or in the community. This has driven the growth of home care provision, which almost doubled from 5,894 agencies

in 2011 (CQC, 2011) to more than 11,000 today. It is likely, therefore, that home care supply has been able to meet the changes to populations, including decreases in ethnic group segregation.

Second, one can also look at availability of social care supply from the demand perspective.

Variation in demand for adult social care may be because of variation in population characteristics. For example, ethnic minority populations have higher levels of need and lower life expectancy (Bécares, 2015; Marmot et al., 2020; Hu et al., 2022; Hayanga et al., 2024), as well as lower levels of income and wealth (Jivraj and Khan, 2015; Marmot et al., 2020). The latter would further limit self-funding demand in areas with higher ethnic minority population. These complexities in the relationship between ethnicity and other population characteristics could be driving the observed findings for adult social care supply. We have controlled for various local population characteristics, including proxies for needs levels, but there remains the possibility that there is omitted variation not captured in the analysis.

Even with a given level of needs and income (and other measurable population characteristics), there may be further differences in individual preferences for formal care based on ethnicity. For example, when moving home, individuals make location decisions based on several factors, including level of affluence, local services and ethnic minority population (Coulter and Clark, 2019). Here, evidence suggests that people are more concerned about moving into better neighbourhoods and less concerned with ethnic makeup of the population. However, despite this, ethnic minorities tend to move into less affluent areas with greater levels of ethnic minority population (Coulter and Clark, 2019). This raises the question as to what extent our findings are based on individual decisions, trading off advantages and disadvantages to living or moving to a less affluent neighbourhood. Movers from an Ethnic minority background may favour continuing local community and cultural ties over a lack of (social care) services, which is tied to the historical social disadvantage ethnic minority groups have and continue to face. As such, there may be differences in the value attached to ASC availability by ethnic group. There are certainly differences in informal caregiving and attitudes towards formal care by ethnicity (Wells et al., 2024; Hirsch et al., 2011, cited in Barnard & Turner, 2011). Ethnic minorities may, therefore, have a lower demand for formal care services. However, we controlled for informal care receipt in the analysis and there can also be other potential reasons for lower uptake of formal services. For instance, lack of cultural sensitivity in services and lack of access based on information asymmetries and networks may also explain differences in formal care uptake (Hirsch et al., 2011, cited in Barnard & Turner, 2011).

Even so, differences in the utility gained by individuals from availability of ASC services may explain differences in the supply of ASC faced by different ethnic groups. It may also explain differences *within* ethnic groups. Ethnicity is an intricate, subjective construct and there will be differences within the Census high-level ethnic groups that have been utilised in the analysis. For instance, there is recent evidence that there are differences in deprivation between ethnic groups *within* a local area (Lloyd et al., 2023). The limited evidence on how socioeconomic status and ethnicity interact in determining health outcomes, suggests some links with mortality, and that the potential leading driver is patients' affluence (Coates et al., 2024). There may be scope for further analysis in this area. Overall, as ethnic group segregation continues to decrease (Catney et al., 2023) and multi-ethnic areas remain stable (Catney et al., 2021) this may generate expectation that differences in ASC supply by ethnic group may further diminish.

Third, we must consider the supply side of the market and its makeup. The viability of ASC providers has been a consistent issue due to concerns over underfunding of LA supported social care. This is mainly related to rising costs, particularly wages from national minimum wage increases (Vadean and Allan, 2021). Variation in costs across the country (e.g., higher cost of living in London and greater travel costs in rural areas) added to the size of the local market, means that the number of providers that would be viable in each market will differ (e.g., Allan, 2021). Certain areas having greater costs for one form of ASC over another (e.g., fewer care homes in London due to land costs), will naturally lead to a negative association between supply and all other ethnic groups combined population. The extent to which this is the case and impacted on the findings is open to question. Nonetheless, the models of supply controlled for cost factors. Moreover, the results did not change when we excluded local areas in London from the analysis.

However, some of these supply issues are also intrinsically linked to national and local government policy. Commissioning practices will differ across LAs (Bennett et al., 2018), which will necessarily lead to differences in the number of providers. This will be particularly so for home care, where LA commissioning practices (e.g., tendering each care package vs. a lead provider model) may lead to a different number of providers supplying home care in any one area. Market shaping policy in a LA may affect care home provision as well, e.g. encourage or discourage the building of a new care home. Overall, the balance of market power between LA and providers is also important, which would depend on market factors, like private demand (wealth) and commissioning decisions (Means et al., 2008; Allan et al., 2021).

Policy implications

Whilst the reasons outlined above may explain at least some of the ASC supply differences across the country, which includes historical government policy, more recent policy decisions will also be an important factor. The shift towards more care being provided in the community has been a recurring commitment since the NHS and Community Care Act (1990). This continued policy preference is due to both attempts to lower cost to the government purse and population preference for personalisation, which includes continuing to live in one's own home for as long as possible (HM Government, 2010; Glasby et al., 2021; Walbaum et al., 2024). As described above, ASC supply is strongly reactive to government policy. Therefore, the demand for care from the growing, ethnically diverse, population of England has been met by increased home care supply. The results found in this analysis support this, with some evidence of a pro-poor and pro-ethnic minority supply of home care, whilst the opposite is found for care homes.

As previously mentioned, commissioning decisions play a large role in supply, particularly in home care (Bennett et al., 2018; Baxter, 2018). That some LAs choose to commission care from only a few providers whilst others commission many providers means that there will be differences in availability of supply. Some of this will link to the supply considerations and individual demand decisions discussed above. For example, it may only be possible for a few providers to serve a local area given economies of scale, e.g., rurality.

Overall, the evidence provided in this study shows that there is an inequality of ASC supply for different populations across the country. The extent to which there is an inequity of supply will depend largely on which reasons for the associations dominate, i.e. demand and supply factors vs policy amenable factors, such as market shaping policies (Needham et al., 2023). For example, how do commissioning practices impact on the number (and quality) of home care providers available in different areas? That policy amenable factors will also be driven by demand and supply factors further makes assessment difficult and more research is required. Nonetheless, policy should consider how to improve equality of ASC supply. For example, given the continued policy focus on care in the community and at home, there is scope for both local and national policy to further address the development of the self-funded sector of the home care market, improving supply for more affluent areas. Upcoming reforms to national funding allocation from central government to local authorities could also mean changes to local care markets and market shaping policies (Ogden and Phillips, 2025).

The findings are indicative that there may be an inequality in *choice* for certain populations, but more evidence would be required to confirm this given potential variation in local supply availability (e.g., care homes with no vacancies). However, the appropriate number of care

homes or home care agencies that an individual should be able to choose from when making decisions on their care is ultimately a subjective decision. These findings also do not provide any indication of inequality in care utilisation. Research to date on demand for social care in England does find some inequalities in ASC support. There is a pro-rich distribution of formal ASC receipt when controlling for care needs (Hu et al., 2024). Further, for home care, ethnic minorities, when compared to the White population, had a higher likelihood of both a reduction in care receipt during the Covid-19 pandemic as well as reporting unmet needs. These unmet needs also increased to a greater degree as a result of the pandemic (Arabadzhyan et al., 2025). More evidence is required in this area.

Limitations

The inequalities found depend on the quality of the models estimated and there are several limitations to this study. In the discussion, we have outlined some potential explanations that are difficult to control for in the analysis, including historic policy and particularly individual demand decisions. There may be differences between ethnic groups in the utility they gain from the availability of different ASC services. There may further be differences in other forms of support within a local area, e.g., voluntary and community sector organisations. The analysis has not been able to perfectly control for these factors. However, the inclusion of LA fixed effects did not alter the main results, which mitigates concerns that these may be affecting the findings.

We have also been able to show differences in access to care services by ethnic group for different levels of affluence, finding that the low supply of care home beds to neighbourhoods with high ethnic minority (excluding white minorities) populations is only found in those neighbourhoods with higher income deprivation. This aligns with previous evidence for England suggesting that levels of deprivation within neighbourhoods vary by ethnicity (Lloyd et al., 2023). Nonetheless, further investigation is required in this area. Utilising the new measure of income deprivation developed by Lloyd and colleagues that draws out differences in deprivation between ethnicities within areas may be a useful method to further draw out the evidence on ASC supply for different ethnic groups and levels of deprivation.

There are potential data limitations to note. First, we could only look at the extensive margin for home care, i.e., number of agencies. This is a valid measure of supply and is highly correlated with workforce and government expenditure on ASC at local authority level (Allan, 2021). However, future analysis using number of people supported, for example, would be able to extend the evidence base. Second, there are potential issues with CQC quality ratings, with a

long backlog in inspections and concerns over how overall ratings are calculated (Dash, 2024). This may affect the findings for the supply of higher-quality services, but generally these findings are as expected and in line with the findings from the overall supply models. Third, personal characteristics of supported people are not available in care provider data for England. This information would provide more certainty about differences in utilisation of ASC services both between and within neighbourhoods based on the ethnicity and wealth of the population. There is increasing policy interest in the development of a Minimum Data Set (MDS) for care homes and home care (Gordon et al., 2025; Healey et al., 2024), which would enable analyses of this kind.

The analysis used cross-sectional data from 2024 and as such provides evidence of an association between forms of ASC supply and both the share of ethnically non-white population and affluence. The analysis has controlled for a multitude of factors that could channel an ethnic minority (excluding white minorities) effect on ASC supply and shown that the findings hold when controlling for local authority district fixed effects. Even so, further work is required to assess any causation. This is more difficult to achieve for ethnicity, given data at small area level is only available from Census data. We will explore the potential to identify causal effects from analysing changes to local markets, e.g. closures.

We also cannot make any inferences about inequality in supply availability for ASC overall in England. In future work, we could look to create an ‘exchange rate’ from which a combined level of care homes and home care services could be developed to use as a measure of total ASC supply. This could utilise, for example, number of people supported in each form of ASC or staffing measures, to assess inequality in overall ASC supply. A benefit of using a staffing measure is that it could include other forms of social care as well, e.g., personal assistants. Nonetheless, ASC support is mainly provided by home care agencies and care homes. Care in one’s own home or in a care home are only going to be substitutes at the margin and the level of care required can be vastly different.¹² As such, assessing their supply separately as in this analysis is still of great policy interest.

¹² On the supply-side, there is little evidence of home care and care homes being substitutes (Allan, 2022).

Conclusion

This study has found disparities in ASC supply across England, with inequalities in geographic supply of care home placements for ethnic minority and low-income populations, but pro-ethnic minority and pro-poor availability of home care agencies. These findings are of relevance to ASC sector stakeholders when considering funding, market shaping and care commissioning, and how to balance improving equality of choice on the one hand and local market conditions on the other.

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Figure 1: Kernel density estimates of care home beds distribution at MSOA-level

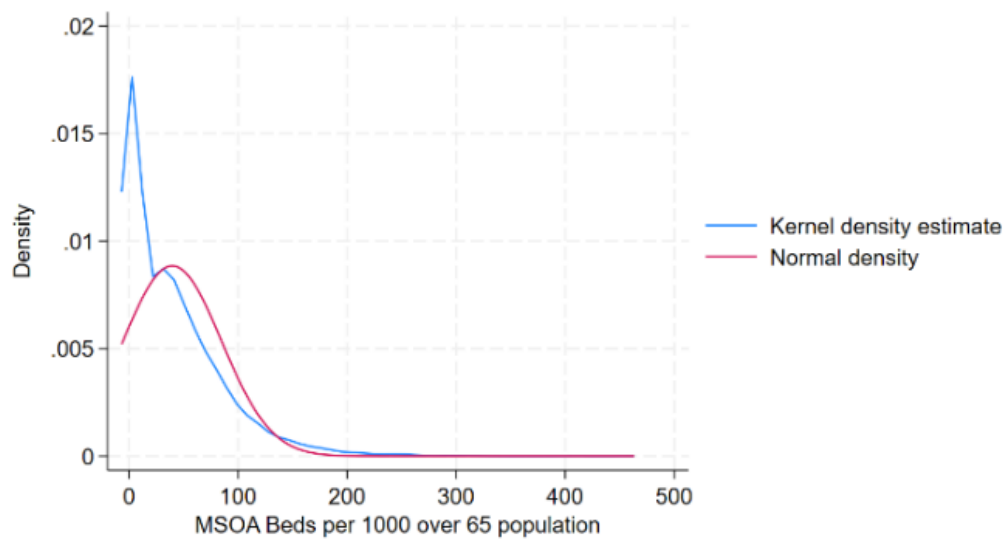
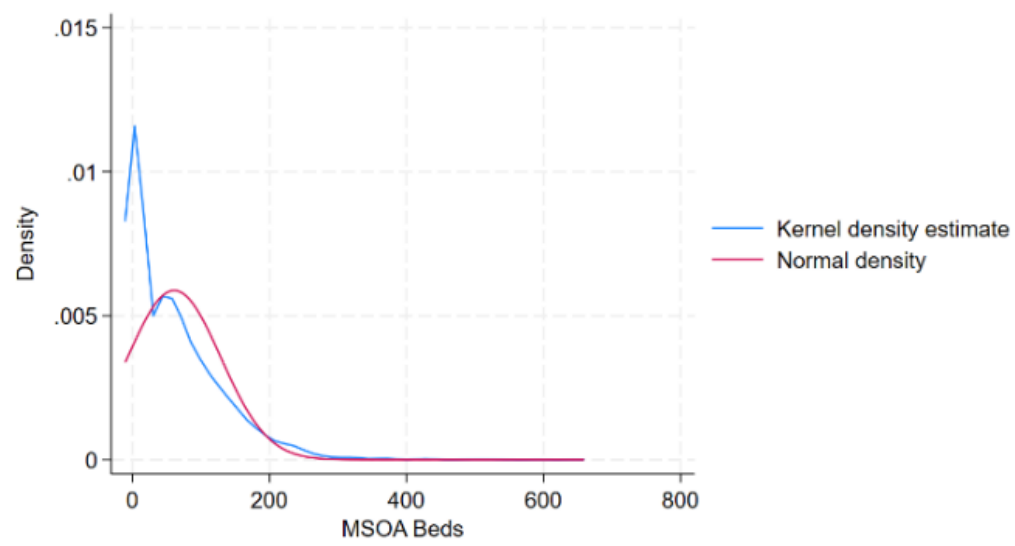
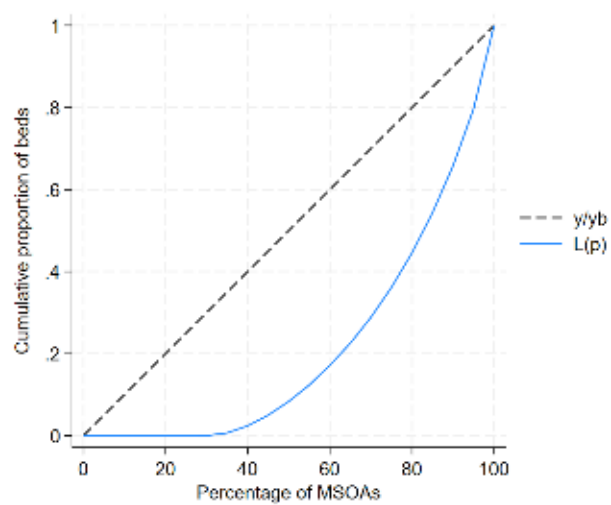
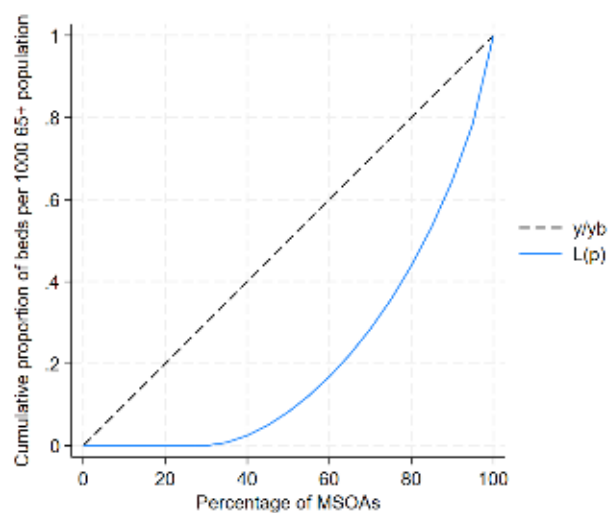


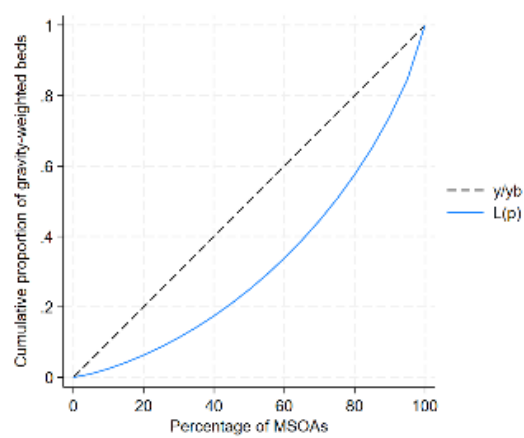
Figure 2: Lorenz curves for MSOA bed supply



A) MSOA beds

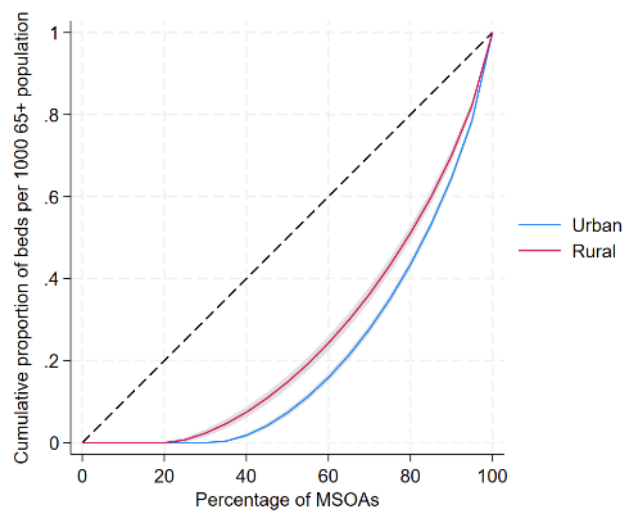


B) MSOA beds per 1,000 people aged 65+

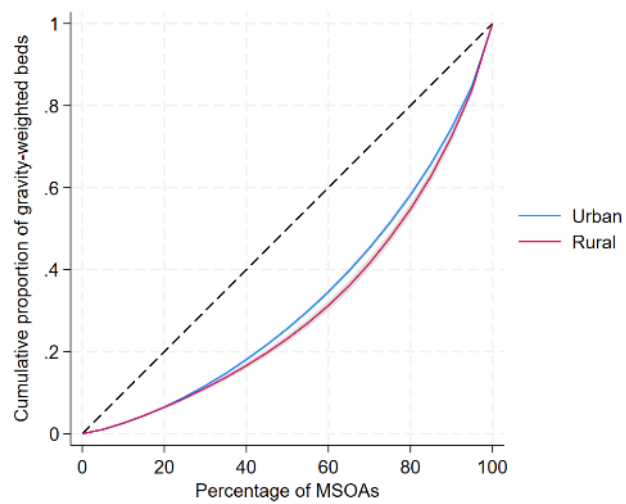


C) Gravity-weighted MSOA beds

Figure 3: Lorenz curves for MSOA bed supply, by urban or rural classification

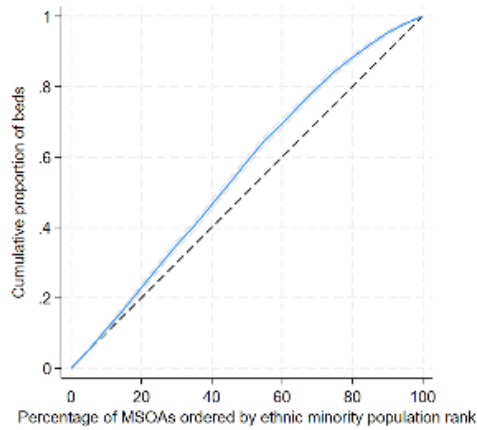


A) MSOA beds per 1,000 people aged 65+

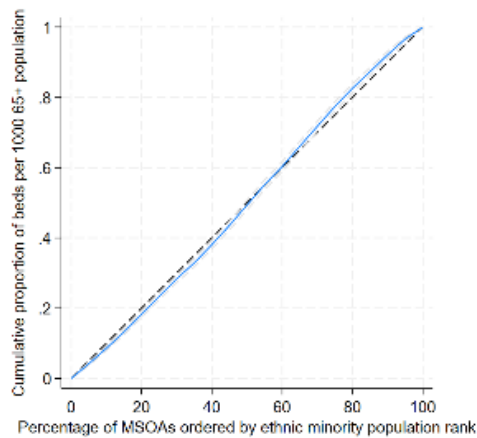


B) Gravity-weighted MSOA beds

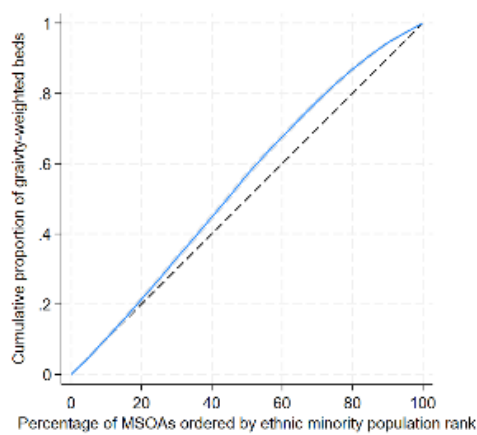
Figure 4: Concentration curves of distribution of MSOA bed supply by older people ethnic minority (excluding white minorities) population rank



A) MSOA beds

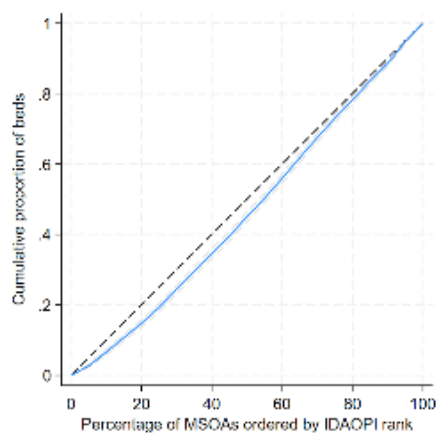


B) MSOA beds per 1,000 people aged 65+

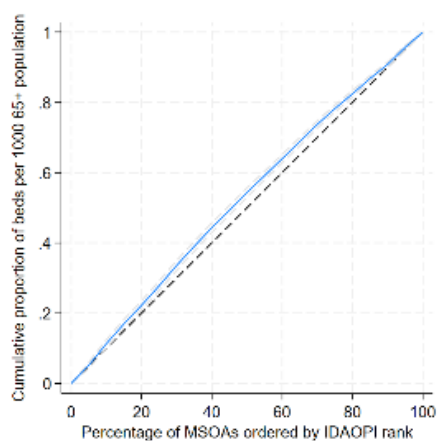


C) Gravity-weighted MSOA beds

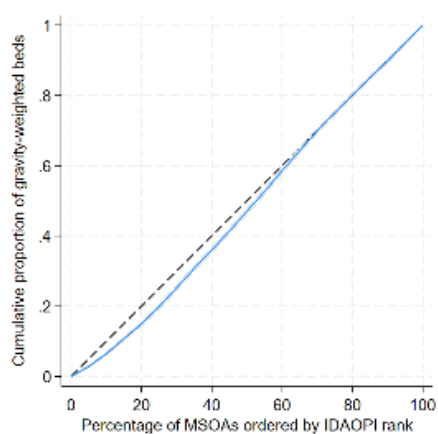
Figure 5: Concentration curves of distribution of MSOA bed supply by older people income deprivation rank



A) MSOA beds



B) MSOA beds per 1,000 people aged 65+



C) Gravity-weighted MSOA beds

Table 1: Descriptive statistics of variables included in adult social care supply models

Variable	Mean	S.D.	Minimum	Maximum
Care home supply				
Number of homes	1.60	1.76	0	25
Number of beds	61.01	67.87	0	649
Number of residential care beds	29.92	42.52	0	426
Number of nursing home beds	31.09	48.23	0	448
Number of higher quality beds	45.64	56.38	0	491
Competition (beds within 10km)	1,261.29	899.44	0	3,635.71
Home care supply				
Number of agencies	1.61	2.57	0	47
Number of higher quality agencies	1.00	1.58	0	27
Competition (agencies within 10km)	49.72	56.22	0	260.50
Control variables				
Population 65+	1527.17	602.12	10	4,983
Population 85+ (%)	12.82	3.65	0	34.92
Ethnic minority (excl. white minorities) population (%)	9.65	15.97	0	95.05
Older people affluence index (percentile)	50.48	28.86	1	100
Informal care supply (%)	8.86	1.63	2.23	15.48
Needs benefit uptake (%)	21.50	7.91	4.01	60.25
Median house price (£)	328,714	180,875	53,000	2,755,000
MSOA rural	0.164	0.370	0	1
MSOA coastal built up area	0.133	0.340	0	1
Instruments				
Population male (%)	48.92	1.36	42.14	65.06
Household of size two (%)	33.98	5.66	12.97	51.82
LA district rural MSOAs (%)	16.41	21.08	0	100
LA district Population 85+ (%)	13.23	1.34	9.46	17.96
LA district low income quintile MSOAs (%)	20.01	23.37	0	100
LA district 65+ benefit uptake (%)	20.68	5.34	10.85	39.27

Notes: n=6,854. MSOA = Middle Layer Super Output Area; LA = Local authority.

Table 2: Marginal effects of association of ethnic minority (excluding white minorities) population share with care home supply

Dependent variable	Beds per 1,000 over 65 population			Beds
Model	OLS	Tobit	Heckman	Poisson
Supply measure				
Care home beds	-0.356*** (0.069)	-0.325*** (0.097)	-0.213*** (0.041)	-0.434*** (0.096)
Residential beds	-0.146*** (0.041)	-0.135** (0.058)		-0.187*** (0.046)
Nursing home beds	-0.244*** (0.056)	-0.188*** (0.065)		-0.244*** (0.054)
Higher quality beds	-0.286*** (0.055)	-0.249*** (0.073)		-0.342*** (0.082)
Dependent variable	Care homes per 1,000 over 65 population			Care homes
Model	OLS	Tobit	Heckman	Poisson
Care homes	-0.006*** (0.002)	-0.006** (0.003)	-0.006*** (0.001)	-0.007*** (0.002)

Notes: n=6,854. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Full results of models available in appendix.

Table 3: Marginal effects of association of affluence of older people with care home supply

Dependent variable	Beds per 1,000 over 65 population			Beds
Model	OLS	Tobit	Heckman	Poisson
Supply measure				
Care home beds	0.136*** (0.048)	0.133** (0.053)	0.099*** (0.031)	0.168*** (0.059)
Residential beds	-0.029 (0.030)	-0.012 (0.035)		-0.0001 (0.029)
Nursing home beds	0.173*** (0.040)	0.161*** (0.040)		0.124*** (0.036)
Higher quality beds	0.060 (0.040)	0.057 (0.049)		0.091* (0.051)
Dependent variable	Care homes per 1,000 over 65 population			Care homes
Model	OLS	Tobit	Heckman	Poisson
Care homes	0.0001 (0.001)	0.001 (0.002)	-0.00005 (0.001)	-0.002 (0.0015)

Notes: n=6,854. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Full results of models available in appendix.

Table 4: Marginal effects of association of all other ethnic groups combined population share on care home supply when interacted with affluence of older people

Dependent variable	Beds per 1,000 over 65 population						Beds	
Model	OLS		Tobit		Heckman		Poisson	
Affluence index (percentile)	Marginal effect	S.E.	Marginal effect	S.E.	Marginal effect	S.E.	Marginal effect	S.E.
1	-0.343***	0.069	-0.349***	0.090	-0.210***	0.038	-0.361***	0.071
10	-0.301***	0.065	-0.284***	0.080	-0.189***	0.037	-0.290***	0.067
20	-0.255***	0.067	-0.207***	0.074	-0.164***	0.041	-0.204***	0.069
30	-0.209***	0.075	-0.126	0.078	-0.137***	0.048	-0.110	0.080
40	-0.163*	0.088	-0.040	0.091	-0.108*	0.058	-0.007	0.098
50	-0.117	0.103	0.051	0.112	-0.078	0.071	0.106	0.124
60	-0.071	0.120	0.145	0.139	-0.046	0.085	0.228	0.155
70	-0.024	0.138	0.244	0.169	-0.011	0.100	0.360*	0.192
80	0.022	0.157	0.347*	0.202	0.025	0.117	0.504**	0.235
90	0.068	0.176	0.452*	0.237	0.064	0.134	0.660**	0.284
99	0.110	0.194	0.550**	0.270	0.100	0.151	0.811**	0.333

Notes: n=6,854. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. S.E. is Standard error.

Table 5: Marginal effects of association of high-level ethnic minority group population share and affluence of older people with care home bed supply

Dependent variable	Beds per 1,000 over 65 population			Beds
Model	OLS	Tobit	Heckman	Poisson
Asian ethnic group population share (%)	-0.205** (0.081)	-0.110 (0.127)	-0.202 (0.054)	-0.166 (0.112)
Black ethnic group population share (%)	-0.755*** (0.152)	-0.773*** (0.224)	-0.318*** (0.095)	-1.30*** (0.306)
Mixed and Other ethnic groups' population share (%)	-0.160 (0.393)	-0.502 (0.581)	-0.004 (0.263)	-0.147 (0.712)
Affluence index (percentile)	0.090*** (0.044)	0.069 (0.046)	0.097*** (0.033)	0.116** (0.057)

Notes: n=6,854. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Marginal effects of association of care home bed supply models, with LA fixed effects

Dependent variable	Beds per 1,000 over 65 population		Beds
Model	OLS	Tobit	Poisson
Ethnic minority (excl. white minorities) population share (%)	-0.387*** (0.089)	-0.327*** (0.125)	-0.361*** (0.087)
Affluence index (percentile)	0.101* (0.056)	0.079 (0.053)	0.091* (0.054)

Notes: n=6,854. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Marginal effects of association of care home bed supply models, with LA fixed effects, excluding London

Dependent variable	Beds per 1,000 over 65 population		Beds
Model	OLS	Tobit	Poisson
Ethnic minority (excl. white minorities) population share (%)	-0.456*** (0.113)	-0.384** (0.171)	-0.412*** (0.104)
Affluence index (percentile)	0.133** (0.058)	0.096* (0.053)	0.115** (0.057)

Notes: n=5,853. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Marginal effects of association of ethnic minority (excluding white minorities) population share with home care supply

Dependent variable	Agencies per 1,000 over 65 population		Agencies per 1,000 over 65 population (log)		Agencies	
Model	OLS	Tobit	OLS	Tobit	OLS	Poisson
Supply measure						
Agencies	0.030*** (0.009)	0.030*** (0.009)	0.006*** (0.001)	0.006*** (0.002)	0.019*** (0.005)	0.021*** (0.003)
Higher quality agencies	0.015*** (0.004)	0.014*** (0.005)	0.004*** (0.001)	0.004*** (0.001)	0.010*** (0.003)	0.012*** (0.002)

Notes: n=6,854. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Full results of models available in appendix.

Table 9: Marginal effects of association of affluence of older people with home care supply

Dependent variable	Agencies per 1,000 over 65 population		Agencies per 1,000 over 65 population (log)		Agencies	
Model	OLS	Tobit	OLS	Tobit	OLS	Poisson
Supply measure						
Agencies	0.002 (0.006)	-0.012* (0.005)	-0.004*** (0.001)	-0.004*** (0.001)	-0.012*** (0.003)	-0.017*** (0.002)
Higher quality agencies	-0.004 (0.003)	-0.008*** (0.002)	-0.003*** (0.001)	-0.003*** (0.0006)	-0.010*** (0.002)	-0.011*** (0.002)

Notes: n=6,854. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Full results of models available in appendix.

Table 10: Marginal effects of association of all other ethnic groups combined population share on home care supply when interacted with affluence of older people

Dependent variable	Agencies per 1,000 over 65 population					
Model	OLS		Tobit		Poisson	
Affluence of older people (percentile)	Marginal effect	S.E.	Marginal effect	S.E.	Marginal effect	S.E.
1	0.028***	0.021	0.058***	0.011	0.018**	0.009
10	0.031***	0.020	0.064***	0.010	0.019**	0.007
20	0.034***	0.019	0.071***	0.010	0.021***	0.006
30	0.038***	0.021	0.078***	0.012	0.022***	0.006
40	0.041***	0.024	0.085***	0.015	0.023***	0.006
50	0.044**	0.027	0.092***	0.018	0.024***	0.007
60	0.047**	0.032	0.098***	0.021	0.024***	0.008
70	0.050**	0.037	0.105***	0.024	0.024***	0.009
80	0.053*	0.042	0.112***	0.028	0.024**	0.010
90	0.056*	0.047	0.119**	0.032	0.024**	0.011
99	0.059*	0.052	0.125**	0.035	0.024**	0.011

Notes: n=6,854. *** p<0.01, ** p<0.05, * p<0.1.

Table 11: Marginal effects of association of affluence of older people and high-level ethnic group population share with home care supply

Dependent variable	Agencies per 1,000 over 65 population		Agencies per 1,000 over 65 population (log)		Agencies	
Model	OLS	Tobit	OLS	Tobit	OLS	Poisson
Asian ethnic group population share (%)	0.012 (0.009)	0.032* (0.018)	0.004*** (0.001)	0.005** (0.003)	0.017*** (0.004)	0.012*** (0.003)
Black ethnic group population share (%)	0.045* (0.024)	0.121*** (0.042)	0.010*** (0.002)	0.017*** (0.006)	0.033*** (0.010)	0.034*** (0.008)
Mixed and Other ethnic groups' population share (%)	0.194*** (0.057)	0.272* (0.140)	0.015*** (0.006)	0.021 (0.013)	0.104*** (0.024)	0.085*** (0.027)
Affluence index (percentile)	0.005 (0.006)	-0.022* (0.012)	-0.003*** (0.001)	-0.006*** (0.0015)	-0.014** (0.003)	-0.016*** (0.002)

Notes: n=6,854. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Appendix

Table A1: MSOA Care home beds supply models, results

Dependent variable	Beds per 1,000 65+ population			Beds
Model	IV OLS	IV Tobit	IV Heckman	IV Poisson
Ethnic minority (excl. white minorities) population (%)	-0.326*** (0.068)	-0.431*** (0.142)	-0.406*** (0.081)	-0.007*** (0.002)
Affluence index (percentile)	0.172*** (0.048)	0.258*** (0.076)	0.270*** (0.059)	0.004*** (0.001)
Needs benefit uptake (%)	2.126*** (0.216)	2.706*** (0.345)	2.806*** (0.249)	0.058*** (0.004)
Population 85+ (%)	5.119*** (0.182)	7.265*** (0.306)	7.304*** (0.204)	0.103*** (0.005)
Median house price (log)	-14.26*** (2.217)	-20.39*** (4.286)	-20.13*** (2.689)	-0.210*** (0.044)
MSOA rural	0.165 (1.748)	1.783 (2.365)	1.146 (2.617)	-0.041 (0.040)
MSOA coastal built-up area	3.179* (1.605)	3.671 (2.928)	3.954* (2.141)	0.042 (0.031)
Competition (Beds 10km)	-0.008*** (0.001)	-0.014*** (0.002)	-0.016*** (0.002)	-0.0002*** (0.00003)
Informal care supply (%)	-10.40*** (1.249)	-12.13*** (1.793)	-12.62*** (1.430)	-0.233*** (0.028)
Population 65+ (log)				1.318*** (0.076)
Constant	204.3*** (33.09)	249.1*** (60.79)	248.7*** (38.58)	-3.423*** (0.662)
Endogeneity (Competition)	9.99**	12.67***	-5.49***	-5.49***
Endogeneity (Informal care)	7.00***	5.78**	-7.07***	-7.07***
Weak instruments (Competition)	1494.91***	282.84***	1449.13***	1449.13***
Weak instruments (Informal care)	289.13***	162.26***	82.15***	82.15***
Underidentification (Competition)	1416.55***			
Underidentification (Informal care)	465.40***			
Overidentification (Competition)	0.093 ^{NS}			
Overidentification (Informal care)	0.001 ^{NS}			
n	6,854	6,854	6,854	6,854

Table A2: MSOA Care home supply models, results

Dependent variable	Care homes per 1,000 65+ population			Care homes
	IV OLS	IV Tobit	IV Heckman	IV Poisson
Ethnic minority (excl. white minorities) population (%)	-0.006** (0.002)	-0.007* (0.004)	-0.007*** (0.002)	-0.0041*** (0.0016)
Affluence index (percentile)	0.001 (0.001)	0.003 (0.002)	0.0022 (0.0014)	-0.001 (0.001)
Needs benefit uptake (%)	0.042*** (0.006)	0.045*** (0.010)	0.042*** (0.006)	0.035*** (0.004)
Population 85+ (%)	0.147*** (0.005)	0.167*** (0.008)	0.147*** (0.005)	0.0847*** (0.005)
Median house price (log)	-0.690*** (0.064)	-0.714*** (0.122)	-0.690*** (0.064)	-0.352*** (0.042)
MSOA rural	0.093** (0.044)	0.125* (0.064)	0.160** (0.063)	0.052 (0.038)
MSOA Coastal built-up area	0.309*** (0.05)	0.356*** (0.103)	0.357*** (0.052)	0.229*** (0.034)
Competition (Homes 10km)	-0.008*** (0.001)	-0.015*** (0.003)	-0.010*** (0.002)	-0.005*** (0.001)
Informal care supply (%)	-0.300*** (0.036)	-0.353*** (0.055)	-0.371*** (0.035)	-0.257*** (0.029)
Population 65+ (log)				1.422*** (0.079)
Constant	8.481*** (0.864)	10.06*** (1.726)	10.30*** (0.925)	-5.001*** (0.624)
Endogeneity (Competition)	25.80***	19.09***	0.36 ^{NS}	0.36 ^{NS}
Endogeneity (Informal care)	15.18***	8.15***	-7.07***	-7.07***
Weak instruments (Competition)	1417.13***	268.96***	931.96***	931.96***
Weak instruments (Informal care)	278.10***	161.33***	82.15***	82.15***
Underidentification (Competition)	1393.22***			
Underidentification (Informal care)	454.84***			
Overidentification (Competition)	1.05 ^{NS}			
Overidentification (Informal care)	0.93 ^{NS}			
n	6,854	6,854	6,854	6,854

Notes: *** p<0.01, ** p<0.05, * p<0.1.

Table A3: Heckman MSOA Care home beds selection model, results

Dependent variable	Beds per 1,000 65+ population	Homes per 1,000 65+ population
Ethnic minority (excl. white minorities) population (%)	-0.008*** (0.002)	-0.003* (0.002)
Affluence index (percentile)	0.004*** (0.001)	0.001 (0.001)
Needs benefit uptake (%)	0.050*** (0.005)	0.027*** (0.005)
Population 85+ (%)	0.144*** (0.004)	0.128*** (0.004)
Median house price (log)	-0.375*** (0.05)	-0.503*** (0.054)
MSOA rural	0.014 (0.053)	0.085 (0.052)
MSOA coastal built-up area	0.055 (0.043)	0.280*** (0.044)
Competition (10km)	-0.0003*** (0.00004)	-0.012*** (0.002)
Informal care supply (%)	-0.235*** (0.028)	-0.224*** (0.029)
Constant	4.692*** (0.766)	6.787*** (0.767)

Notes: n=6,854. *** p<0.01, ** p<0.05, * p<0.1.

Table A4 Association of affluence of older people with care home bed supply when interacted with ethnic minority (excluding white minorities) population share

Dependent variable	Agencies per 1,000 over 65 population					
Model	OLS		Tobit		Poisson	
Ethnic minority (excl. white minorities) population share (percentile)	Marginal effect	S.E.	Marginal effect	S.E.	Marginal effect	S.E.
1	0.108**	0.048	0.158**	0.074	0.110**	0.047
10	0.110**	0.048	0.163**	0.074	0.114**	0.047
20	0.111**	0.048	0.166**	0.074	0.117**	0.047
30	0.112**	0.048	0.170**	0.074	0.120**	0.047
40	0.114**	0.048	0.176**	0.074	0.125***	0.047
50	0.118**	0.048	0.186**	0.074	0.134***	0.048
60	0.125***	0.048	0.206***	0.075	0.151***	0.049
70	0.139***	0.048	0.245***	0.078	0.185***	0.052
80	0.171***	0.052	0.336***	0.092	0.267***	0.065
90	0.254***	0.076	0.574***	0.153	0.493***	0.132
99	0.442***	0.152	1.108***	0.317	1.064***	0.391

Notes: n=6,854. *** p<0.01, ** p<0.05, * p<0.1.

Table A5: MSOA Home care agencies supply models, results

Dependent variable	Agencies per 1,000 over 65 population		Agencies per 1,000 over 65 population (log)		Agencies	
Model	IV Tobit	2SLS	IV Tobit	2SLS	IV Poisson	2SLS
Ethnic minority (excl. white minorities) population (%)	0.062*** (0.021)	0.030*** (0.010)	0.009*** (0.003)	0.006*** (0.001)	0.013*** (0.002)	0.019*** (0.005)
Affluence index (percentile)	-0.028** (0.012)	0.002 (0.007)	-0.006*** (0.001)	-0.003*** (0.001)	-0.011*** (0.002)	-0.012*** (0.003)
Needs benefits uptake (%)	0.098 (0.075)	0.052** (0.026)	0.025*** (0.006)	0.020*** (0.003)	0.032*** (0.008)	0.086*** (0.013)
Population 85+ (%)	-0.011 (0.061)	-0.103*** (0.022)	0.014*** (0.004)	0.004** (0.002)	-0.006 (0.007)	-0.003 (0.011)
Median house price (log)	-0.414 (1.059)	-1.312*** (0.361)	0.099 (0.091)	-0.004 (0.036)	0.092 (0.101)	-0.300* (0.166)
MSOA rural	-0.721* (0.429)	-0.069 (0.256)	-0.163*** (0.045)	-0.091*** (0.025)	-0.476*** (0.057)	-0.442*** (0.107)
MSOA coastal built-up area	-0.377 (0.368)	-0.012 (0.242)	-0.078 (0.051)	-0.041* (0.024)	-0.261*** (0.060)	-0.193* (0.102)
Informal care supply (%)	-1.658*** (0.286)	-0.915*** (0.152)	-0.335*** (0.031)	-0.258*** (0.015)	-0.508*** (0.050)	-1.136*** (0.100)
Competition (agencies 10km)	-0.039*** (0.011)	-0.007 (0.005)	-0.009*** (0.001)	-0.005*** (0.000)	-0.011*** (0.001)	-0.017*** (0.002)
Population 65+ (log)					1.022*** (0.167)	2.113*** (0.244)
Constant	27.317*** (3.007)	26.327*** (4.746)	2.030* (1.207)	2.831*** (0.471)	-3.359** (1.510)	-0.282 (1.887)
Endogeneity (Competition)	3.04*	3.04*	56.24***	56.24***	59.24***	59.24***
Endogeneity (Informal care)	0.38 ^{NS}	3.817*	30.69***	39.779***	28.6***	28.6***
Weak instruments (Competition)	921.06***	921.06***	921.06***	921.06***	890.72***	890.72***
Weak instruments (Informal care)	293.19***	575.5***	293.19***	575.50***	207.53***	207.53***
Underidentification (Competition)	2356.54***	2356.54***	1410.87***	1410.87***	1666.07***	1666.07***
Underidentification (Informal care)	1603.40***	1152.86***	1010.41***	1152.86***	864.32***	864.32***
Overidentification (Competition)	0.008 ^{NS}	0.008 ^{NS}	0.370 ^{NS}	0.370 ^{NS}	0.25 ^{NS}	0.25 ^{NS}
Overidentification (Informal care)	33.3***	36.148***	9.583***	19.111***	0.73 ^{NS}	0.73 ^{NS}
Observations	6,854	6,854	6,854	6,854	6,854	6,854

Table A6: MSOA High quality home care agencies supply models, results

Dependent variable	Agencies per 1,000 over 65 population		Agencies per 1,000 over 65 population (log)		Agencies	
Model	IV Tobit	2SLS	IV Tobit	2SLS	IV Poisson	2SLS
Ethnic minority (excl. white minorities) population (%)	0.036*** (0.013)	0.015*** (0.004)	0.009*** (0.003)	0.004*** (0.001)	0.013*** (0.002)	0.010*** (0.003)
Income deprivation (percentile)	-0.022*** (0.006)	-0.004 (0.003)	-0.007*** (0.001)	-0.003*** (0.001)	-0.012*** (0.002)	-0.010*** (0.002)
Needs benefits uptake (%)	0.044 (0.034)	0.021* (0.011)	0.020*** (0.006)	0.013*** (0.002)	0.034*** (0.008)	0.047*** (0.008)
Population 85+ (%)	0.045* (0.024)	-0.019** (0.009)	0.021*** (0.004)	0.007*** (0.002)	-0.000 (0.007)	0.008 (0.007)
Median house price (log)	0.126 (0.445)	-0.576*** (0.155)	0.220*** (0.079)	0.048 (0.030)	0.247** (0.100)	0.035 (0.102)
MSOA rural	-0.586*** (0.204)	-0.013 (0.110)	-0.208*** (0.046)	-0.083*** (0.022)	-0.465*** (0.061)	-0.329*** (0.066)
MSOA coastal built-up area	-0.164 (0.204)	0.022 (0.104)	-0.071 (0.050)	-0.030 (0.020)	-0.215*** (0.061)	-0.116* (0.063)
Informal care supply (%)	-0.886*** (0.167)	-0.536*** (0.065)	-0.249*** (0.031)	-0.175*** (0.013)	-0.477*** (0.051)	-0.611*** (0.061)
Competition (agencies 10km)	-0.026*** (0.005)	-0.006*** (0.002)	-0.009*** (0.001)	-0.004*** (0.000)	-0.012*** (0.001)	-0.011*** (0.001)
Population 65+ (log)					1.101*** (0.165)	1.267*** (0.150)
Constant	5.854 (6.208)	13.000*** (2.029)	-0.454 (1.053)	1.327*** 1.327***	-6.623*** (1.437)	-3.299*** (1.161)
Endogeneity (Competition)	4.78*	4.78*	49.98***	33.788***	64.16***	64.16***
Endogeneity (Informal care)	0.25	0.197	18.02***	2356.54***	19.08***	25.626***
Weak instruments (Competition)	921.06***	921.06***	921.06***	921.06***	890.72***	890.72***
Weak instruments (Informal care)	293.19***	575.50***	293.19***	575.503***	207.53***	305.78***
Underidentification (Competition)	2356.54***	2356.54***			669.78***	669.78***
Underidentification (Informal care)	986.863***	986.863***	1603.40***	1152.86***	268.51***	562.370***
Overidentification (Competition)	0.77	0.77	0.0499	0.0499	0.029	0.029
Overidentification (Informal care)	50.25***	56.313***	20.614***	23.755***	2.34	6.573*
Observations	6,854	6,854	6,854	6,854	6,854	6,854

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