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Local variability in long-term care services: local autonomy, exogenous influences and policy spillovers

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Abstract: In many countries, public responsibility over the funding and provision of long-term care services is held at the local level. In such systems, long-term care provision is often characterised by significant local variability. Using a panel dataset of local authorities over the period 2002 to 2012, the paper investigates the underlying causes of variation in gross social care expenditure for older people in England. The analysis distinguishes between factors outside the direct control of policy makers, local preferences, and local policy spillovers. The results indicate that local demand and supply factors, and to a much lesser extent local political preferences and spatial policy spillovers, explain a large majority of the observed variation in expenditure.

1 Introduction

Long-term care is in many countries a local government responsibility. The case for local autonomy in the funding and provision of long-term care services is often argued in terms of the need to tailor care policies to local circumstances. The devolution of responsibility can help overcome informational problems by empowering local policy makers with direct knowledge about the needs of the local population and the local resources available to meet such needs. This argument is particularly relevant to long-term care services because of the impact that environmental factors, such as the availability of informal care and local levels of deprivation, have on the need for formal support. Local care systems are also argued to reflect local values and preferences about the prioritisation of public resources across services and user groups, and thus to promote local democracy (Powell and Boyne, 2001).

Countries with locally managed long-term care systems are characterised by significant variability in the levels and type of care services provided (Colombo et al., 2011). A tension exists between maximising local accountability/flexibility and universalist principles of equal access for equal need – or 'territorial justice' – whereby service provision is proportional to needs across areas (Boyne and Powell, 1991; Davies, 1968; Powell and Boyne, 2001). This tension has been somewhat addressed in a number of OECD countries with local long-term care systems by the introduction of national minimum care eligibility criteria. These criteria and other benchmarking policy instruments can reduce geographic disparities in state support (Colombo et al., 2011; Fernandez and Snell, 2014). Concerns have also been raised about possible management inefficiencies in highly decentralised systems and about the risk of 'parochialism' in local policy-making processes (Morgan, 2001; Trydegård and Thorslund, 2010). As a result, some Nordic countries have been engaged in a process of re-centralisation of their care system (Kröger, 2011; Magnussen and Martinussen, 2012). In addition, the use of performance management techniques and local targets has been concerned with increasing local consistency as well as with improving efficiency (Audit Commission, 2003).

A growing strand of the public economics literature is exploring the link between local levels of provision and strategic policy interactions between local authorities in charge of public services. These analyses have been justified on the grounds that care policy decisions generate significant externalities outside the local policy unit, and that as a result it is in the best interest of policy makers to take into account neighbouring care systems when setting local policies. Two main sources of externalities have been put forward.

In the first, the 'welfare competition' strand of argument has suggested that, in some cases, due to the potential for local services to attract demand from outside the authority, local policy makers internalise the benefit levels provided in neighbouring authorities when setting local care policies (Besley and Case, 1995; Case, 1993). Otherwise, it is argued, relatively higher-spending authorities run the risk of becoming 'welfare magnets', faced with excess demand for their services relative to their local needs and resources. Under such conditions, the incentives are for local authorities to join a 'race to the bottom' and the subsequent under-provision of public services (Sinn, 2003).

A second strand of argument has suggested that, even if welfare competition is unlikely to happen in the care system, strategic inter local authority behaviour might still occur due to informational spillovers (Revelli, 2005). The argument here relies on the fact that locally elected policy makers are likely to be expected by their electorate to maintain levels of welfare provision comparable to those in their neighbouring authorities. Also, it could be argued that, to the extent that geographical proximity facilitates information exchanges between local officials, greater similarities in care policies could be expected in nearby areas.

Identifying the underlying causes of geographic variations is therefore fundamental to judging their defensibility. Local heterogeneity in care provision can be compatible with the goal of territorial justice if it responds to factors outside of the control of policy makers, such as differences in local needs and supply conditions (Powell and Boyne, 2001). From a localist perspective, variability born out of differences between the preferences of local populations over the prioritisation of public services and user groups could also be perceived as a positive rather than negative phenomenon (Robson, 1966).

The cases for centralisation and devolution in long-term care will depend therefore on the extent to which local patterns of service provision can be accounted for and on the nature of their underlying explanatory factors. However, as yet there is limited quantitative evidence about the causes of local variations in long-term care services (Bebbington and Davies, 1993; Boyne and Powell, 1991).

A growing literature has considered factors associated with local and regional variations in the provision of health care services (Morris et al., 2005; Panopoulou and Pantelidis, 2013; Rettenmaier and Wang, 2012). Increasing attention has been been paid to the identification of spatial correlations in patterns of expenditure in order to explore interdependencies in local policy decisions. In the health care area, Moscone and Knapp (2007) explored local variations in mental health expenditure in England, and identified spatial inter-dependencies in expenditure levels between neighbouring areas. Kopetsch and Schmitz (2014) used spatial models to identify factors correlated with variations in the use of ambulatory services in Germany, and found that a considerable proportion of the observed regional differences remain unexplained after controlling for needs and supply factors, and for the presence of significant spatial interactions. Revelli (2005) represents the only recent significant quantitative studies investigating variations and spatial interdependencies in local expenditure patterns in social care. Using spatial regression methods, the study identified a reduction in the intensity of social care policy spillovers among contiguous authorities following the introduction in England in 2002 of a central government-led performance assessment framework.

The present paper builds on the methods used in this literature to explore factors associated with local variations in gross social care expenditure of councils with social care responsibilities in England (the upper-tier local authorities in England). The analysis focuses on (long-term) *social care* services, non-medical care inputs supporting individuals with long-term care needs arising from physical and mental health problems.

Exploring the English case is particularly interesting because of the flexibility that local authorities experience when determining the coverage and intensity of the social care services they provide. In England, a significant proportion of funding for social care flows from Government on a formula basis (Darton et al., 2010). However, local councils also use local taxes to complement central state funds. Most grant revenue is not ring-fenced so it can be reprioritised locally across services and service user groups. Local decision makers, however, also act within a national performance-monitoring framework whereby councils are encouraged to seek centrally determined objectives and performance is assessed against a range of indicators.

A first aim of this paper is to assess the extent to which local variation in social care expenditure is due to the local environment, and in particular to local needs and costs differences. It therefore aims to cast light on the extent to which access to services for a given need varies across the areas.

The second aim is to explore whether variation (beyond need and cost) is associated with indicators of local autonomy as exercised by councils. The paper therefore assesses the relationship between indicators of local preferences and differences in social care deployment. We consider in particular the impact of differences in political control between councils, and the degree to which local taxation powers allow councils local flexibility in determining social care spending. Finally, we seek to assess the extent to which local decision makers are influenced by the policy decisions of neighbouring councils.

2 Analytical framework

A theoretical model can help to clarify the relevance and inter-play of the potential explanatory factors of public social care provision. Any full structural analysis of local authority decision making would need to model the interaction between the local electorate and politicians, whereby the latter is an imperfect agent of the former. Rather, for our purposes here, we can proceed with a simple reduced-form composite utility function of a social care 'decision-maker' in each local authority i at time t:

$$U_{it} = u_{it}\left(h_{it}\left(x_{it1,}, m_{it}, x_{-it1}\right), x_{it2}(w_{it}), T_{it}(w_{it}); \theta_{it}\right) \qquad (1)$$

where

x_{it1} Long-term care/social care provision

x_{it2} Other council services

h_{it} The value of social care provision

x_{-it1} Social care provision in neighbouring councils

m_{it1} Local needs-related characteristics

θ_{it} (Political) preferences: higher values denoting a more Conservative electorate

T_{it} Local council tax revenue

w_{it} Local wealth characteristics (e.g. tax base)

We would expect that provision of services increases the utility of the decision maker ($u_{x_2} > 0$), but a higher taxation rate required to fund further provision reduces utility ($u_T < 0$). The latter effect on decision makers (local politicians) will mainly arise through the consequences of the ballot box.

Decision makers will work to a budget constraint that sets central government grant income (which is a function of local needs characteristics) and local tax revenues against expenditure: $B_{it} = g_{it}(m_{it}) + T_{it}(w_{it}) = p^*_{it1}(w_{it})x_{it1} + x_{it2} = p^*_{it1}(w_{it})x_{it1} + x_{it2}$. In this constraint, p^*_{it1} are (realised) local market prices of care services, which will embody local care supply factors, such as prevailing wage rates (Forder and Allan, 2014). We can safely assume that this constraint binds, and therefore we can substitute directly for T_{it} in (1). The marginal effect of increased care provision is: $U_{x_{it}} = u'_{it}(.)\big(\theta^h_{it}(\theta_{it})h_{x_{it1}}(x_{it1,}, m_{it}, x_{-it1}) + \theta^T_i(\theta_{it})p^*_{it1}(w_{it})\big)$. Solving for the endogenous variables gives a reduced-form optimal provision function of:

$$x^*_{it} = x_{it}(m_{it}, x_{-it1}, w_{it}, \theta_{it}) \tag{2}$$

The distinctive contribution here is the specification of both spatial effects from neighbours and the impact of need as mediating factors on the marginal utility of extra care provision i.e. that $u_{x_{it1}x_{-it1}} > 0$ and $u_{x_{it1}m_{it}} > 0$. On the usual assumption of the concavity of the utility function, we have a standard result of higher-need areas having greater marginal utility of care services than areas with lower need. Exactly the same argument can be made for the care provided by neighbours. As noted in the introduction, we expect spatial effects to arise from information spillovers. The active encouragement of councils to 'benchmark' their activity relative to peers through the central publication of public league tables is a strong facilitator. Welfare magnet effects – where people with care needs are drawn to (away from) more (less) generous neighbour local authorities, given their need – would tend to result in different patterns of need locally in authority i.

The use of relative need formulas to allocate central government grants (Darton et al., 2010) will strengthen the positive relationship between provision and need. Rather than rely just on local preferences to meet need (acting through $h_{x_{it}m_{it}} > 0$ and the disutility of unmet need: $h_{m_{it}} < 0$), higher-need areas will attract high grant revenues.[1] The use of both performance frameworks and funding formulas to guide local decision making is consistent with the concept of territorial justice.

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[1] The second order effects are:
$U_{x_{it}m_{it}} = u'_{it}(.)\big(\theta^h_{it}(\theta_{it})h_{x_{it1}m_{it}}\big) + u''_{it}(.)u_{m_{it}} = u'_{it}(.)\big(\theta^h_{it}(\theta_{it})h_{x_{it1}m_{it}}\big) + u''_{it}(.)\big(h_{m_{it}} - g_{m_{it}}\big) > 0$, where $u''_{it}(.) < 0$ by the concavity assumption, and $g_{m_{it}} > 0$ due to formula funding.

The modelling of political preferences also produces the standard result: namely, more Conservative areas have a smaller marginal utility of care provision than less Conservative areas (comprising a direct marginal utility of service provision component $\theta_{\theta t}^{h} h_{x_{it}} < 0$ and a component capturing the greater marginal disutility of the extra taxation required, working through the budget constraint, $\theta_{\theta t}^{T} p_{it} < 0$). Both these individual effects stem from Conservative preferences for smaller government (after controlling for local wealth characteristics).

The overall effect of local wealth factors w_{it} on the marginal utility of extra care services will combine a number of individual effects. There will be an effect through increasing the local tax base and therefore allowing greater tax raising for given disutility of tax in the population. At the same time, local factor prices, and so service prices, will be strongly positively correlated with local wealth characteristics (e.g. property prices). Also, wealthier local populations will tend to have more Conservative (smaller government) preferences than poorer areas. Furthermore, central government grants – which are allocated on a formula basis – will give lower amounts to wealthier areas. It is not clear, therefore, whether a wealthier local authority will produce a net increase or decrease in the marginal utility of care compared to a less wealthy authority, even if we control for political preferences.

Untangling the effects of supply will also be difficult for this reason. If the price of care were higher in one area than another for the same given local wealth characteristics, then we would expect this to mean lower demand for care in the area (e.g. if factor prices were independent of local wealth characteristics). But, in practice, we would expect factor prices to be a function of (exogenous) wealth characteristics. In the empirical analysis we therefore control for wealth characteristics, but we do not seek to directly test hypotheses about wealth effects.

To summarise, we propose three hypotheses. First, that areas with higher need than other areas will provide more public care. Second, that through the action of information spillovers/benchmarking and peer-group effects on councils, care spending in one area should be positively correlated with that of neighbours. Third, that areas with more Conservative political preferences, in favouring smaller government, will have less public provision of services than less Conservative areas. Supply and wealth characteristics will also have important effects on provision rates, but we cannot hypothesise as to the overall direction of effect without further assumptions.

3 Empirical specification

The paper explores two empirical specifications of Equation (2), with expenditure per capita on care services used as the dependent variable i.e. $y_{it} = p_{it}^{*} x_{it}^{*}$. In the first instance, we evaluate variations in gross social care spending using a panel fixed-effects model as follows:

$$y_{it} = \beta_0 + \beta_1 m_{it} + \beta_2 w_{it} + \beta_3 \theta_{it} + D_t + \alpha_i + e_{it} \tag{3}$$

As outlined above, the term m_{it} represents 'need' indicators for social care support. Need is determined by councils through assessment and application of eligibility rules. One component is the severity of a person's condition, which leads us to include proxies for disability in the vector m_{it}. Another component is the availability of informal care, which we can model directly, although also taking account of possible endogeneity. Finally, the eligibility conditions include a financial means test. We therefore include in m_{it} measures of the wealth of the potential service user population. Accounting for financial need is particularly relevant because councils in England have the capacity to define local charging policies (within a national framework which sets maximum charging levels), and because of the significant differences in income deprivation across councils.

Population wealth w_{it} captures wealth effects for the wider local authority. Main empirical proxies include the local tax base, house prices and income support. These are also correlates for local factor prices. We explicitly model a local preferences term, θ_i, to account for the differences between the parameters of the social care function of each council. In the estimated models, we use indicators of local political control to proxy for differences in local preferences across areas.

The term α_i identifies the time-invariant fixed effect for each area i. This term should account for unobserved (time-invariant) heterogeneity between councils. Similarly, we include time dummies D_t to account for general shifts between time periods. This model does not explicitly include the spillover variable x_{-it1}. The panel model was estimated using the XTREG command in Stata 13.

A second empirical specification explicitly incorporates a spatial dimension. We include both a spatial autoregressive expenditure term (y_{-it1}) to capture possible policy spillovers (equivalent to the effect identified by x_{-it} in (2)) and also allow the error to have a spatial component (Anselin, 2002). Specifically, we implement a Spatial Autocorrelation model (SAC) by adding two terms to (2) to allow for spatial autocorrelation between contiguous authorities in the dependent variable and in the error term.

$$y_{it} = \rho W y_{-it} + \beta_0 + \beta_1 m_{it} + \beta_2 w_{it} + \beta_3 \theta_{it} + D_t + \alpha_i + e_{it} \quad (4)$$

with

$$e_{it} = \lambda W \varepsilon_{it} + v_{it} \quad (5)$$

In (4), ρ represents the spatial autoregressive coefficient of gross per capita spending and W represents a spatial contiguity weight matrix. In (5), λ represents the coefficient of the spatial autoregressive error term ε_{it}, and v_{it} is an independent and identically distributed error term.

Under the SAC model, a positive and significant ρ would identify a positive correlation in expenditure between contiguous areas, controlling for factors in council i, and could be indicative of policy interactions between areas. Positive values of ρ would suggest positive spillover effects, with policy makers setting local levels of expenditure to approximate levels of expenditure in neighbouring areas. Positive spillovers could result for instance from the effect on local public expectations of service coverage in neighbouring areas, or through the use of joint policy planning processes. The value of λ is of more difficult policy interpretation, as it captures the combined effect on local expenditure of shocks in expenditure levels in contiguous areas and the effect of unaccounted for spatially distributed heterogeneity. The SAC model was estimated using the XSMLE command in Stata 13 (Belotti et al., 2013).

Descriptive statistics of variability and spatial dynamics

The analysis presents descriptive statistics of local variability and spatial correlation in expenditure across local authorities. Standardised levels of dispersion in local expenditure are calculated using the coefficient of variation $CV_t = \frac{\sigma_t}{\mu_t}$, where σ_t

represent the standard deviation in per capita expenditure across areas in year t, and μ_t represents the mean area per capita expenditure in year t.

We summarise spatial correlations using the Moran-I spatially weighted correlation coefficient (Anselin, 1988). Values of the Moran-I coefficient range between -1 and 1, with values larger and smaller than 0 indicating positive and negative spatial autocorrelation, respectively. Both the Moran-I and the spatial regression models assumed a first-order queen contiguity matrix W to define the nature of spatial interaction in the dataset.

Following methods used in research on earnings dynamics by Pesaran and Yamagata (2008), the analysis tests for the presence of spatial correlation by estimating the Moran-I coefficient on the residuals estimated from the panel-data model in Equation (3). This strategy allows the analysis to estimate the changes in the degree of spatial autocorrelation of local social care expenditure following the introduction of control variables in the model.

4 Data

Table I summarises key descriptive information about the indicators in the analysis. The analysis sample includes yearly data at the level of English Councils with Social Services Responsibilities (CSSRs) for the period 2001-02 to 2011-12, collected from a range of government and independent sources. Two councils (City of London and Isles of Scilly) were excluded from the analysis due to their very small size and widely recognised uncharacteristic nature. The number of councils included was also affected by a local authority reconfiguration during the period covered by the analysis. On 1st April 2009, the council of Cheshire split into two new authorities, 'Cheshire East' and 'Cheshire West and Chester', and Bedfordshire council split into 'Bedford Borough' and 'Central Bedfordshire'. In order to ensure consistency of boundaries across the study period, the councils of Cheshire and Bedfordshire were imputed in the dataset post 2009 by aggregating indicators for 'Cheshire East' and 'Cheshire West and Chester', and 'Bedford Borough' and 'Central Bedfordshire', respectively.

Table I indicates the presence of missing data in a very small number of cases for 3 of the indicators in the analysis. Due to the very limited extent of missing data and the need for a strongly balanced panel to estimate the spatial autocorrelation model, missing values were imputed using the IMPUTE command in Stata 13. All the models were therefore estimated using a panel of 1,617 observations, equivalent to 11 years of data across 147 councils. Whenever possible and appropriate, indicators were standardised by population over 65.[2] Due to the skewness in the distribution of per capita spending, the models used log transformed per capita expenditure as the dependent variable.

Three types of indicators (dependency, informal care support and financial need) are included in the analysis in order to control for local levels of social care demand m_{it}. Local dependency levels are proxied by the rate of uptake of Attendance Allowance among older people (the main universal benefit for older people with physical disabilities in the UK) and by the proportion of the older population aged 85 and over. The mediating effect of informal care on the demand for formal support is controlled by the rate of the population providing informal care. This indicator was derived from the 2001 and 2011 UK population Census, and was interpolated to other years in the analysis. The interpolation process (i) calculated yearly informal caregiving rates for different age and gender groups within each authority assuming a linear change between 2001 and 2011; (ii) calculated changes in the population by age and gender groups of local councils for the years covered in the analysis, using ONS population estimates; and (iii) derived overall yearly estimates of informal caregiving for each area by factoring for each age and gender group the estimates of prevalence of informal caregiving by its population size.

Given its role as the main source of care for people with long-term care needs, controlling for informal care supply is essential in order to estimate underlying demand for formal social care. However, problems in the estimation could arise due to the potential endogenous nature of the indicator. The analysis tested for the endogeneity of the informal care indicator in Equation (3) using an instrumental variables approach (Van Houtven and Norton, 2004). The results of the estimation are reported in Annex 1, and do not reject the null hypothesis of lack of endogeneity at the 10% level. This result is perhaps not surprising given the general nature of the informal care indicator used, which covers care provided to the whole population (including all age groups and

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[2] Several population standardisation strategies were explored for the indicator of income deprivation. The indicator including recipients of income-related benefits across all age groups was found to fit the data best.

individuals excluded from state support by the means-test) and does not refer specifically to the population of potential older users of state funded care.

Indicators of income (uptake of financial assistance benefits) and wealth (home ownership rates) are included in the models in order to capture financial need in the local population. In England, financial eligibility to care is defined in terms of a measure of 'assessable income', which incorporates a combination of the service users' disposable income and their liquid wealth. In addition, housing wealth can be taken into account when determining financial eligibility for residential care services, the service which accounts for the majority of social care service expenditure among older people. Home ownership and financial assistance are therefore key indicators of likely financial eligibility to state support.

English councils can select the level of local taxation by setting their Council Tax rates, which are applied to the value of the housing stock in their area. In the estimations, councils' capacity to raise additional tax T_{it} is therefore proxied using Tax Base, which summarises the total value of taxable property in a given council. Average house prices are included in the model in order to control further for local wealth w_{it}. Given the strong correlations between house prices and the residential care prices identified in previous research (see for instance Forder and Allan, 2014), house prices should also help control for supply-side effects, and would be expected to be positively correlated with local per capita expenditure levels, other things being constant.

In the models estimated, local preferences are measured by dummy variables indicating which of the main political parties is in control of the council. The models include dummies for Conservative control, control by the Liberal Democrat party and no overall control, the reference category being control by the Labour party. Whereas local public preferences over care services need not be perfectly aligned with local political control, it is reasonable to expect a degree of correlation between public attitudes to care and overall political preferences. The interaction between political control and care policies is also justified by the close interaction that Directors of Adult Services (the local official with overall responsibility over social care for adults) have with locally-elected counsellors in English local authorities.

5 Results

Figure 1 shows the distribution of the local authority gross yearly social care expenditure on older people, per older population, and pooled across the period 2002-2012. The figure highlights the significant variability in gross social care expenditure per older person across English councils. Even averaged across the 11 years of the study, Figure 1 shows a four-fold difference in per capita expenditure. The figure also shows a heavy skew in the distribution of local expenditure.

Figure 2 describes the extent of spatial autocorrelation (using the Moran-I coefficient) and of variability (on the basis of the coefficient of variation) in local expenditure for the 11 years covered in the study. The results in Figure 2 indicate very high but declining levels of spatial dependence in local public per capita social care expenditure. Hence, the Moran-I suggests a positive spatial correlation close to 0.6 in 2002, which falls to 0.53 by 2012. In contrast, the coefficient of variation remains broadly unchanged over the same period at close to 0.3.

Table II summarises the estimation results for equations (3) and (4). The sign and significance of the effects estimated appears to be compatible with the assumptions in the analytical framework of the paper. Local levels of need (proxied by the receipt of Attendance Allowance and the proportion of older people aged 85 and over) are positively related to gross expenditure. In contrast, the presence of informal care support reduces formal social care expenditure per capita.

Local indicators of income deprivation (receipt of income support and pension credit) and home ownership among older people appear to capture successfully the effects of the financial means test on potential care users. Income deprivation is thus found to be positively associated with public social care expenditure, and home ownership rates to be negatively related. The positive and significant effect of Tax Base and local house prices on expenditure indicates that they capture a combination of the effect of increased potential tax revenue and of higher local prices on local expenditure.

The results in Table II also suggest that local preferences, as indicated by local political control, play a part in determining local expenditure levels. In particular, areas under the control of the Conservative party appear to spend less, other things being equal, than Labour controlled authorities. The effect, which appears to be more significant in the SAC results, is however very small, and accounts for less than 2% of the overall expenditure levels observed.

For all indicators, the nature and size of the coefficients is very similar across the two models, suggesting the spatial dependence in expenditure does not lead to significant biases in the coefficients, once the covariates explored are included in the model. Altogether, the regressors in the models account for a large proportion of the variation in per capita expenditure. Even excluding time dummies, the model Within R^2 of the two models would exceeds 0.55.

The results of the SAC specification indicate strong and significant spatial endogeneity of the dependent and error variable. In particular, the positive spatial autocorrelation of the dependent variable suggests the presence of interdependencies in the policy process between contiguous authorities. However, Figure 2 shows that once the indicators in Equation (3) are controlled for in the model, the level of spatial correlation of the residuals decreases sharply relative to spatial correlation levels for the raw indicator of per capita expenditure. The Moran-I for the residuals in (3) also falls through time, from 0.37 in 2002 to 0.15 in 2012. The large reduction in the spatial dependence of the residuals indicates therefore that at least a significant part of the spatial dependence in gross per capita expenditure is linked to spatial heterogeneity in need, supply and wealth factors.

6 Discussion

Levels of per capita spending in social care for older people in England are characterised by substantial local variability, as demonstrated by Figures 1 and 2. Furthermore, the pattern of variability is significantly spatially concentrated. The results suggest, however, that variations in spending can be linked to a large extent to differences in key (rational) factors such as levels of need and supply conditions, the capacity to raise local revenue and to some extent local preferences. Both sets of model estimations reached consistently high Within R^2 levels.

The high explanatory power of the models overall and the significance and effect sizes on both the need and local wealth characteristics is an encouraging sign from the point of view of the objective of territorial justice, and suggests a common overarching policy-making framework across areas. On average, public social care expenditure in different English councils appears to respond significantly to differences in local levels of need, a necessary condition for achieving equal treatment for equal need. And whereas other factors are also found to have statistically significant effects on local levels of expenditure, the size of those effects is more limited. Although we could not directly estimate the impact of different supply/input costs, the results suggest that these factors have some influence (particularly through the house price proxy).

Political control – as a marker for local preferences – is found to affect local spending decisions. However, the analysis shows that the effect of political control, whilst statistically significant, is very small and accounts for less than 2% of per capita expenditure (after controlling for relevant factors such as local wealth characteristics). Given the limited nature of political control as a proxy for local attitudes towards social care, it is nevertheless difficult to assess whether local preferences are reflected insufficiently in local expenditure decisions.

The results suggest strong interdependences between contiguous authorities in levels of expenditure. However, a significant proportion of the spatial correlation in gross expenditure appears to be linked to spatial heterogeneity in local characteristics, and the size of the correlation is substantially reduced by the introduction in the models of the control factors. The intensity of the spatial interdependence appears to decline steadily over the period of time observed, both in terms of the raw indicator of expenditure, and in terms of the error term e_{it} in Equation (3). The small acceleration in the decline of the spatial autocorrelation from 2010 coincides with increased budgetary pressures in the English social care system (Fernandez et al., 2013). The patterns might indicate that local authorities respond to fiscal pressures by shifting their reference point away from neighbouring authorities, or that fiscal constraints reduce policy options and force policy makers to take a common set of policy decisions.

From a policy perspective, it would be useful to assess the degree to which the correlations observed are the product of local self-determination and 'choice', or whether they are motivated partly at least by national performance management processes. Over the period studied, local authorities had the freedom to set local eligibility criteria to care, and to reflect their budgetary situation in their care rationing policies. Nonetheless, there are (anecdotal) indications that the performance management regime can exert pressure on councils to achieve comparable performance.

Interestingly in the context of the findings in Revelli (2005), the discontinuation in England in 2008 of the existing performance management and local authorities star ratings system does not seem to have led to increases in the dispersion of local expenditure (as indicated by the coefficient of variation) or to increases in spatial correlation levels.

Ultimately, judging the appropriateness of variations in care activity requires a normative judgement about the relative prioritisation of the objectives of local self-determination and national consistency. Without attempting to resolve such debates, our results provide some reassurance that, whilst per capita social care expenditure for older people in England varies significantly across England, such variation responds to a large extent to factors which are compatible with principles of territorial justice. The results are particularly striking given the relative paucity and aggregated nature of the indicators available in the analysis.

7 Appendix

Insert Table III here.

8 Acknowledgements

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Table I. Descriptive Statistics

	Mean	Std. Dev	Min	Max	N	Source
Gross yearly local social care expenditure on older people per older population (£)	1122.8	339.6	489.2	2820.3	1617	HSCIC
Local per capita tax base	348.95	52.29	241.71	621.80	1609	DCLG
Recipients of income support and pension credit (1,000s) divided by older population	556.08	263.93	159.01	1665.04	1617	DWP
Proportion of home owners within older population	0.62	0.11	0.17	0.80	1617	ONS Census
Proportion of the population (1,000s) providing informal care	100.71	13.35	64.77	130.07	1605	ONS Census
Proportion of older population in receipt of Attendance Allowance	0.15	0.03	0.00	0.24	1617	DWP
Proportion of older population aged 85 and over	0.13	0.02	0.07	0.19	1617	ONS
Average house prices	175625	98881	40656	1087112	1617	HM Land Registry
Proportion of older population living alone	0.34	0.04	0.26	0.52	1617	ONS
Proportion of older population that are male	0.49	0.01	0.47	0.52	1617	ONS
Average gross weekly pay	455.96	115.07	251.40	1366.00	1601	ONS ASHE
Standardised Mortality Ratios	104.35	63.99	58.00	1370.85	1617	ONS
Political control: Conservative	0.35	0.48	0.00	1.00	1617	LGCEC
No overall political control	0.27	0.44	0.00	1.00	1617	LGCEC
Political control: Liberal Democrat	0.07	0.25	0.00	1.00	1617	LGCEC

Abbreviations: HSCIC=Health and Social Care Information Centre; ONS = Office for National Statistics; DCLG = Department for Communities and Local Government; ASHE = Annual Survey of Hours and Earnings; LGCEC = Local Government Chronicle Elections Centre, Department of Politics, University of Plymouth

Table II. Regression results

	Gross local social care expenditure per older person per year (log)			
	Fixed effects panel model		Spatial autocorrelation model	
Local per capita tax base (log)	0.355***	(3.82)	0.345***	(4.38)
Recipients (1,000s) of income support or pension credit divided by older population (log)	0.310***	(4.96)	0.212***	(3.98)
Proportion of home owners within older population (log)	-0.410***	(-3.71)	-0.330***	(-3.68)
Proportion of the population (1,000s) providing informal care (squared)	-0.0000101**	(-2.49)	-0.0000110**	(-3.16)
Proportion of older population in receipt of Attendance Allowance	0.823***	(4.01)	0.672***	(3.95)
Proportion of older population aged 85 and over (log)	0.158**	(3.01)	0.123**	(2.86)
Average house prices (log)	0.0769**	(2.79)	0.0476**	(2.39)
Political control: Conservative	-0.0149*	(-1.75)	-0.0150**	(-2.03)
Political control: Liberal Democrat	-0.00780	(-0.68)	-0.0103	(-1.03)
No overall political control	0.00537	(0.81)	0.00508	(0.87)
Year is 2002	-0.172***	(-8.65)	-0.108***	(-6.21)
Year is 2003	-0.143***	(-7.94)	-0.0936***	(-6.05)
Year is 2004	-0.0874***	(-5.05)	-0.0672***	(-4.90)
Year is 2005	-0.0610***	(-3.42)	-0.0587***	(-4.29)
Year is 2006	-0.0411**	(-2.34)	-0.0509***	(-3.83)
Year is 2007	-0.0427**	(-2.38)	-0.0521***	(-3.87)
Year is 2008	-0.0138	(-0.84)	-0.0357**	(-2.91)
Year is 2009	0.0249*	(1.75)	-0.0121	(-1.09)
Year is 2010	0.0302**	(2.43)	-0.00508	(-0.53)
Year is 2011	0.00127	(0.13)	-0.0106	(-1.51)
Constant	2.210**	(2.97)		
Spatial				
ρ			0.483***	(7.97)
λ			-0.386***	(-4.35)
σ_e^2			0.00406***	(25.09)
Observations	1617		1617	
R-squared (within)	0.60		0.61	

NB: t statistics in parentheses; * p<0.10; ** p<0.05; *** p<0.001

Table III. Informal care endogeneity test results

Local per capita tax base (log)	0.378**	(3.01)
Recipients (1,000s) of income support or pension credit divided by older population (log)	0.305***	(4.69)
Proportion of home owners within older population (log)	-0.432**	(-3.19)
Proportion of the population (1,000s) providing informal care (squared)	-0.0000138	(-0.98)
Proportion of older population in receipt of Attendance Allowance	0.844***	(3.86)
Proportion of older population aged 85 and over (log)	0.153**	(2.77)
Average house prices (log)	0.0742**	(2.55)
Political control: Conservative	-0.0146*	(-1.70)
Political control: Liberal Democrat	-0.00800	(-0.70)
No overall political control	0.00514	(0.78)
Year is 2002	-0.178***	(-6.05)
Year is 2003	-0.149***	(-5.63)
Year is 2004	-0.0917***	(-3.94)
Year is 2005	-0.0644**	(-2.97)
Year is 2006	-0.0439**	(-2.19)
Year is 2007	-0.0445**	(-2.35)
Year is 2008	-0.0151	(-0.89)
Year is 2009	0.0237	(1.60)
Year is 2010	0.0296**	(2.36)
Year is 2011	0.00122	(0.12)
Constant		
Observations	1617	
R-squared (within)	0.60	

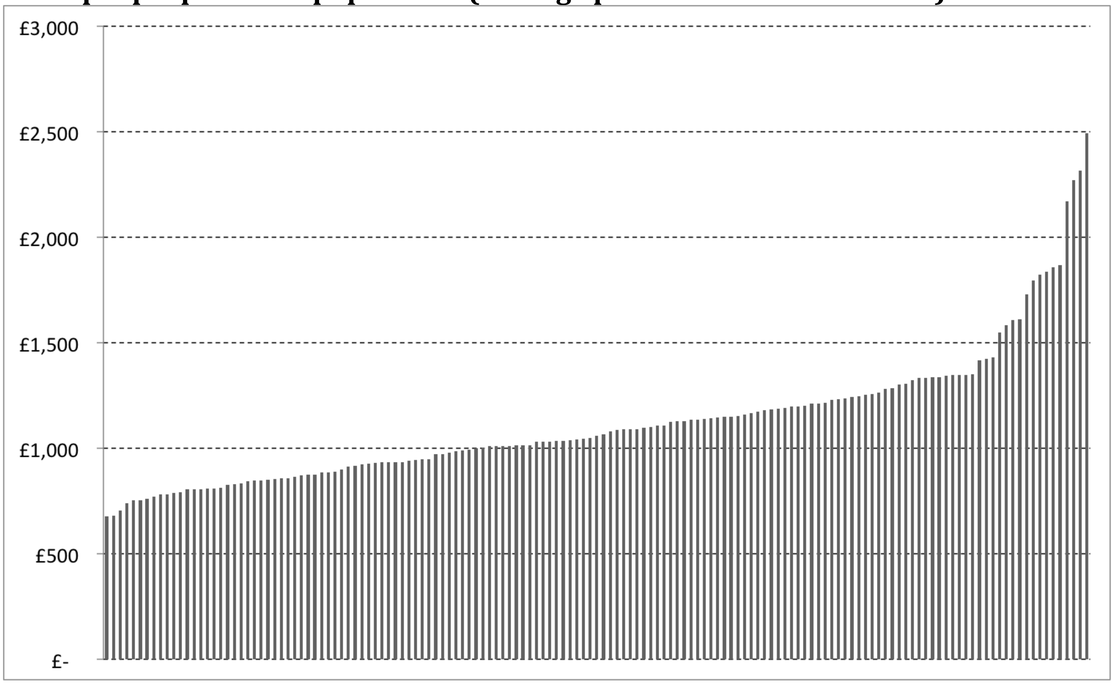
Excluded instruments: Proportion of older population living alone (linear and squared terms); proportion of male older people (linear and squared terms); average gross weekly pay (linear and squared terms); Standardised Mortality Rates (linear and squared terms)

Underidentification test (Anderson canon. corr. LM statistic): 65.455; Chi-sq(8) P-val = 0.0000

Sargan statistic (overidentification test of all instruments): 11.220; Chi-sq(7) P-val = 0.1293

Endogeneity test of endogenous informal care regressor: 0.076

Figure 1. Distribution of local authority gross yearly social care expenditure on older people per older population (average pooled across 2002-2012)



Source: Analysis of data from the Office for National Statistics and Health & Social Care Information Centre.

Figure 2. Spatial autocorrelation coefficient and coefficient of variation of local authority average yearly gross social care expenditure on older people per population aged 65 plus (2002 to 2012)