

WORK IN PROGRESS

PLEASE DO NOT CITE WITHOUT PERMISSION

Variability in older people social care expenditure in England: local autonomy or widespread inefficiency?

José-Luis Fernandez¹, Julien Forder and Francesco Moscone
PSSRU, London School of Economics

Introduction

The remarkable proliferation of targets and the development of sophisticated frameworks for the monitoring of performance in public services are testimony to the eagerness of central government to enhance performance in the use of public resources (Audit Commission 2003). These concerns for performance improvement have been expressed most acutely in relation to the provision of local services. For instance, through the duty of best value placed on local authorities by the Local Government Act 1999, requiring them ‘to seek to achieve continuous improvement by having regard to the efficiency, effectiveness and economy of their service delivery’ (para.3(1)) (Knapp and Wistow 1999; Martin 2000).

In the area of social services, widespread concerns about inefficiencies in the allocation of resources can be traced back to the 1980s (Social Services Inspectorate 1987; Webb and Wistow 1987; Davies, Bebbington et al. 1990). In 1986, an influential

¹ Correspondence to J-L Fernandez, j.fernandez@lse.ac.uk

Audit Commission report severely criticised community care, and the ‘perverse incentives’ of the funding system (Audit Commission 1986). It condemned the excessive use of residential care and the uneven pattern of local provision. Such views were upheld by Government and academics alike (Davies, Bebbington et al. 1990; Department of Health 1990; Wistow, Knapp et al. 1996; Audit Commission 1997).

Since 1997, the Labour administration has repeated calls for efficiency improvements in social care, noting how there is ‘scope for many authorities to get more for what they spend on social services’ (Department of Health 1998, para. 1.4), and the need to further develop the local mixed economy to achieve more flexible, user-oriented services. Overall, however, the government has placed the need for efficiency improvements within the wider goal of increasing consistency, particularly around issues of eligibility and charging (Audit Commission 2000; Department of Health 2002). Hence, the 1998 White Paper criticised unacceptable variations in ‘standards of treatment’ and in ‘who gets what services’, and drew attention to ‘inconsistencies in what types of provision are available in different parts of the country’ (Department of Health 1998, para 2.25) . The White Paper also set out recommendations for strengthening the statutory regulation of services in pursuit of better and more consistent standards of care. The 2006 White Paper, *Our health, our care, our say* focuses on shifting the balance of care to the community, making care ‘closer to home’ and promoting individual choice. This agenda is reinforces localism (Department of Health, 2006). Nonetheless, the Department of Health’s Care Services Efficiency Delivery (CSED) programme (following the Gershon Review) has considered a more centralised basis for the commissioning of some services.

With the notable of exemption of Revelli (2006), there are no recent significant quantitative studies investigating the interplay and variation between local characteristics and social care expenditure patterns in England. Shedding light on such relationships is obviously important, because of their implications for the design and implementation of central policies and for the management of central-local relations. Within the context outlined above, the aim of the paper is therefore to understand the nature of the factors driving local variability in a key indicator of social care provision for older people, the level of local gross per capita expenditure.

Understanding local variations in social care

The existence of wide local variations in most key aspects of social care has been well documented (Social Services Inspectorate 1998; Audit Commission 2000; Audit Commission 2000; Audit Commission 2000; Department of Health 2000; Department of Health 2001; McLean and McMillan 2003). However, as yet there is little significant quantitative evidence allowing a more systematic interpretation of the nature of such heterogeneity (Boyne 1991; Bebbington and Davies 1993). The question is the extent to which such variability can be justified on the grounds of local accountability and responsiveness to local preferences and constraints, or whether it bears witness to significant variations in performance and territorial inequity (Boyne, Powell et al. 2001; Powell and Boyne 2001). In other words, identifying the underlying causes of local social care heterogeneity is fundamental to judging its defensibility. Localists, for instance, have for a long time argued that variability born out of divergences in local preferences and constraints should be perceived as a positive rather than negative phenomenon (Robson 1966). Even if we put aside the territorial justice/local autonomy argument, understanding the sources of variability illuminates the extent to which changes in observed patterns lie within the control of local policy makers, a central question for judging the relative performance of councils. Research has shown, for instance, that variations in local prices of staff and other inputs can have large effects on which and how much services are provided (Jackman and Papadachi 1981; Fernández and Forder 2002).

Analytical framework

There are a number of main factors that can together explain patterns of resource use in social care.

- **Demand:** Demand factors affect the willingness of social care departments to purchase services at given levels of prices. They are subdivided between factors associated with local need for services (social environment, health and dependency status, material environment) and local authority wealth. In the English social care context, the wealth of councils with social services responsibilities (CSSRs) will be determined by the size of the grant allocated to

the council by central government (composed of the Revenue Support Grant and the Redistributed Business Rates), and by their local ability to raise revenue through the local council tax, as indicated by the tax base.

- **Supply:** factors associated with service unit costs such as local wages or house prices.
- **Local preferences:** factors measuring local attitudes towards service provision, such as local political control, racial and demographic profiles.
- **Local institutional factors:** factors relating to local idiosyncratic characteristics of CSSRs, and to the strategic interaction between CSSRs². These will determine, for instance, the nature of the space and time correlations structures in local expenditure levels.

These factors are linked by a number of processes. There is the interplay of demand and supply. High demand and/or low supply prices will lead to higher expenditure compared to other areas, for example. Furthermore, the relationship between demand and supply factors and patterns of expenditure is assumed to be mediated by two sets of factors: (i) local preferences and (ii) organisational features of social service departments. The literature has illustrated, for instance, marked ideological differences between local political parties in their attitudes towards privatisation, expenditure levels, and targeting patterns (Stoker 1991).

Clearly, institutional characteristics are under the control of local policy makers. However, whether or not other factors are endogenous to the policy process will depend, amongst other things, on the time horizon contemplated. In the short term, for instance, the ability of local authorities to change levels of provision might be curtailed for instance by the existence of long-term commitments to block contracts. In addition to short-term 'stickiness' in decision making processes, temporal interdependence in local expenditure levels may be linked to the introspective nature

² Whereas institutional features could be expected to be broadly determined by local preferences and demand factors, their separation in Figure 1 acknowledges the likelihood that through time the two might disassociate, and that local policies might become more responsive to introspective departmental concerns of the type described by Rowley (Rowley, C. K. (1994). Foreword to Bureaucracy and Public Economics, by Niskanen, W.A. Hants, Aldershot.).

of local government. Indeed, it has been argued that patterns of local public service provision tend to follow incrementalist patterns, whereby levels of provision in one year are substantially determined by previous levels rather than by current levels of need or supply conditions (Boyne, Powell et al. 2001; Powell and Boyne 2001).

Finally, a growing strand of the public economics literature is exploring the existence of 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 internalize the benefit levels provided in neighbouring authorities when setting local care policies (Case 1993; Besley and Case 1995). 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 case of social care services because for instance of the unlikelihood of significant care migration flows taking place amongst dependent older people, strategic inter local authority behaviour might still occur due to informational spillovers (Revelli 2006). The argument here relies in the fact that locally elected policy makers are likely to have strong pressure from their electorate to maintain levels of welfare provision comparable to those in their neighbouring authorities.

A simple theoretical model helps to clarify the relevance of these factors. This model is summarised in Figure 1. It serves as a basis for specifying an empirical model that will attempt to identify these issues in data on expenditure. Suppose a social care commissioner’s utility in each local authority is:

$$(1) \quad U_{it} = U_{it}(h_{it}(x_{it}, n_{it}, T_t, h_{-it}, x_{it-1} p_{it-1}), m_{it}; \Phi_{it})$$

Where subscripts i denote each council and t is time. Utility is then a function of care and other services, x , which commissioners procure to improve the (care-related) utility of service users (or well-being for short). Improvements in well-being will also depend on underlying service user's need, n (their capacity to benefit from services). User well-being does not enter the commissioner's utility directly. Rather, the function h is the commissioner's interpretation of user well-being, with this perception shaped by central government policy and targets (T) and also on the performance of other councils. The latter is captured by the term h_{-it} where $-i$ denotes councils other than council i . Furthermore, performance in this regard could depend on previous levels of resourcing (as reflected by the product $x_{it-1} p_{it-1}$). Commissioners are also assumed to have other (i.e. non-care) objectives, summarised by variable m , and these might include remuneration, status, professional accomplishment etc. Finally, Φ are preferences.

Commissioners operate with specific financial constraints, as follows.

$$(2) \quad G_{it}(x_{it}, m_{it}, B_{it}(n_{it}, T_t), p_{it})$$

This constraint function includes service (x) prices, p , which are expected to have the usual negative relationship with demand: $\partial x / \partial p < 0$ (the price of m is assumed to be 1). Also B is budget including local income (taxes and charges), y , and Government grants, g :

$$(3) \quad B_{it} = g_{it}(n_{it}, T_t) + y_{it}$$

Grants are a function of need and policy targets. We assume that this budget constraint is binding such that $G = 0$ and, as a result, it can be re-arranged for m and substituted back into the utility function:

$$(4) \quad U_{it} = U_{it}(h_{it}(x_{it}, n_{it}, T_t, h_{-it}, x_{it-1}, p_{it-1}), x_{it}, B_{it}, p_{it}; \Phi_{it})$$

Income y is a policy choice variable for councils (e.g. setting council tax rates) and is also subject to constraints relating to the size of the tax-base, preferences around local taxation, Government limits (capping) and so forth. Strategic choices in this regard will be taken across the council as a whole, not with specific commissioners, and will involve important trade-offs. Raising more income locally will improve the resourcing and deployment of care services. But this benefits needs to be set against the political and other risks of coercing high levels of revenue from the tax-base. A detailed analysis of the political agency problem this implies is outside the remit of this paper. Nonetheless, corporate level decisions might take the general form of this objective function:

$$(5) \quad Z_{it} = \rho(y_{it}, Y_{it})U_{it} + (1 - \rho(y_{it}, Y_{it}))U_{it}^0$$

where ρ is a probability dependent on the size of local revenue y being sought, and also Y , a set of variables reflecting the capacity of the council to raise local income, including a measure of the size of the tax-base. The higher councils set y , the lower is the chance that intended tax policies can be carried off without detrimental consequences, such as loss of political control, damaging local demonstrations, capping etc. For simplicity assume that two outcomes can result; the planned (good) outcome and a poor outcome reflecting the detrimental consequences. In model terms, $\partial\rho/\partial y_{it} < 0$ and $\partial\rho/\partial Y_{it} > 0$, with an (exogenous) outcome utility of U^0 applying to represent these detrimental effects, and where $U^0 < U_{it}$. Councils maximise Z with respect to y and x with first-order conditions:

$$(6) \quad \frac{\partial Z_{it}}{\partial y_{it}}(y_{it}^*) = \rho \frac{\partial U_{it}}{\partial y_{it}}(Y_{it}) + U_{it} \frac{\partial \rho_{it}}{\partial y_{it}}(Y_{it}) - \frac{\partial \rho_{it}}{\partial y_{it}}(Y_{it})U_{it}^0 = 0$$

$$(7) \quad \frac{\partial Z_{it}}{\partial x_{it}} = \rho \frac{\partial U_{it}}{\partial x_{it}} = 0$$

Condition (7) gives an optimal function for x_{it} conditional on y_{it} of

$x_{it} = x_{it}(n_{it}, T_t, h_{-it}, g_{it}, p_{it}, x_{it-1}, \Phi_{it}, y_{it})$. Similarly, (6) gives

$y_{it} = y_{it}(n_{it}, T_t, h_{-it}, g_{it}, p_{it}, x_{it-1}, \Phi_{it}, x_{it}, Y_{it})$. Substitution of the latter into the former therefore provides a reduced form optimal set of demands:

$$(8) \quad x_{it}^* = x_{it}^*(n_{it}, T_t, g_{it}, p_{it}, \Phi_{it}, Y_{it}, x_{it-1}, h_{-it})$$

The latter two terms point to both a spatial and temporal dependence of x_{it}^* . They are elements of a set, $\{x_{it-1}, h_{-it}\} \in L_{it}$ of factors that identify local policy and institutional features. The dependence of demand on the (perceived) performance in other areas in improving service user's well-being (the h_{-it} term) reflects the externalities and strategic interactions discussed above. Furthermore, a lagged term captures the possible institutional inertia in resource decisions.

Partial reduced form functions

Commissioners experience market supply of services that can be described by the following function:

$$(9) \quad \hat{x}_{it} = \hat{x}_{it}(p_{it}, w_{it})$$

where w are factor input prices. We make no prior assumptions as to the underlying supply relation and nature of market interaction (although Forder and Netten 2000, suggest that care markets in England can be described as imperfect competition model with product differentiation). Demand (8) and supply (9) can be solved for the reduced form service functions, and when multiplied through by the (reduced form) price function and summed (i.e. $X_{it} = \sum x_{it} p_{it}$), gives total care expenditure:

$$(10) \quad X_{it}^* = X_{it}^*(n_{it}, T_t, g_{it}, w_{it}, \Phi_{it}, Y_{it}, x_{it-1}, h_{-it})$$

As standard results, we hypothesise higher levels of expenditure in areas with higher need, greater revenues, and/or in areas with higher service costs (Jackman and Papadachi 1981; Fernández and Forder 2002).

Function (10), in stochastic form $X_{it} = X_{it}^* + u_{it}$, can be fitted to the data. High significance of the right-hand-side terms in (10), and of the spatial and temporal components, as well as high overall explanatory power would provide support for the above theory and so improve our understanding of the processes that drive resource decisions. This is crucial in developing practical policy, which is sometimes driven by unsubstantiated (and often simplistic) theoretical models. Two particular aims in this regard are:

- To consider how defensible the significant variability is that we observe, particularly between councils, in expenditure rates. If this variation is highly correlated with either factors beyond councils' control, like wage rates, or with other 'rational' factors, such as well-established local preferences, as specified in (10), then the variation in expenditure is more defensible (Davies 1968).
- To establish the degree of time and spatial interdependence in expenditure decisions, that is the extent to which expenditure levels in one locality are influenced by levels of expenditure in contiguous authorities, and/or by its own previous patterns of expenditure.

Whereas the local policy and institutional features from the set L_{it} cannot be observed directly, the analysis will explore the evidence of incrementalism and/or strategic inter-authority interdependence in the patterns of expenditure by exploring the presence of time and spatial correlation in the data.

Data and methods

Table 1 summarises the sources of data used in the analysis. Yearly data at the level of Councils with Social Services Responsibilities (CSSRs) were collected for the period 1998-99 to 2004-05, from a range of government sources. Whenever possible and appropriate, indicators were standardised by population over 65.

Due to their widely recognised uncharacteristic nature, City of London and Isles of Scilly were dropped from the dataset.

In order to exploit the panel nature of the data, function (10) was estimated using a population-averaged panel-data model in STATA 9.2 (Stata Corporation 2005). Population-averaged panel-data models are particularly valid for panels with a large number of clusters (as in the present case) and are characterised by their capacity to encompass a wide range of link functions and correlation structures. Also, they do not require the working correlation structure to be correctly specified for the estimated coefficients and variances in the model to be consistent (Zeger and Liang 1986). However, it has been shown that significant losses in efficiency of the estimates can follow from misspecifications in the working correlation matrix.

The analysis therefore explored the impact on the estimates and on the general goodness of fit of the model of alternative correlation structures through time. In particular, the analysis estimated function (10) assuming exchangeable and AR1 correlation structures.

Testing for spatial dynamics

Following methods used in research on earnings dynamics, the analysis tested directly for the presence of spatial correlation on the residuals estimated from the population-averaged panel-data model (Pesaran and Yamagata 2005). The purpose was to observe changes in the degree of spatial correlation, as indicated by the Moran-I coefficient, following the effect of control variables on the patterns of spatial dependence.

Subsequently, spatial lag and spatial error models were fitted, using the statistical software GEODA (Anselin 2003). Respectively, these two models were used to test the statistical significance of a spatially lagged indicator and of a spatial correlation between error terms in the model, as follows.

Spatial lag model:

$$(11) \quad X = \rho WX + n\beta_1 + g\beta_2 + w\beta_3 + \phi\beta_4 + Y\beta_5 + \varepsilon$$

where W represents a spatial weight matrix (assuming first order queen contiguity), β represents a vector of estimated coefficients and ε represents a vector of identically distributed error terms.

Spatial error model:

$$(12) \quad X = n\beta_1 + g\beta_2 + w\beta_3 + \phi\beta_4 + Y\beta_5 + \varepsilon \quad \text{with } \varepsilon = \lambda W\varepsilon + u$$

where λ represents the spatial autoregressive coefficient, and u represents a vector of independent and identically distributed error terms.

The available software cannot carry out such estimations with panel data and therefore the spatial analysis was implemented on the average of the pooled values of the indicators in the analysis over the period 1998/99 to 2004/05 (we hope to implement the panel spatial approach as a further refinement of the paper).

Both the Moran-I and the spatial regression models assumed a first order queen contiguity matrix to define the nature of spatial interaction in the dataset.

Results

The extent of local variability

Figure 2 demonstrates, for the average of the values over the 1998/99 to 2004/05 period, the significant degree of local variability in levels of gross yearly expenditure on social care services for older people in England. Overall, the figure shows a three-

fold difference in the levels of per capita expenditure between the bottom and top spending authorities.

In turn, Figure 3 shows that the distribution of per capita expenditure follows a distinct geographical pattern, with the highest levels of expenditure concentrated around the London and metropolitan areas. In fact, the Moran's I spatial correlation coefficient value of 0.6 suggests a very significant degree of spatial interdependence in levels of expenditure.

Impact of local circumstances on expenditure

Table 2 reports the results from the two population-averaged panel-data models estimated. Overall, the effects described follow the theoretical assumptions implicit in (10). More importantly, both model specifications achieve very significant pseudo-R² levels, suggesting that a large proportion of the variability in expenditure observed can be explained by the terms included in the model. Local levels of expenditure are found to increase with local need (n), as indicated by the number of recipients of social security disability related benefit for older people (Attendance Allowance). The positive effects of the number of people living alone relates to the lack of close informal support.

Both the level of central grant (g) and the extent of local tax base (Y) are found to be positively related to levels of expenditure (in particular, and unsurprisingly, the level of income transferred from central government shows the strongest and most significant effect in the model). The degree to which local tax base affected levels of expenditure was found to vary with the nature of political control, with labour-controlled areas extracting a greater proportion of their local tax base into increases in expenditure than conservative-controlled areas. In other words, as hypothesised in Figure 1, local preferences appear to mediate to some extent the relationship observed between local circumstances and levels of expenditure.

Local supply conditions (w), as indicated by local wages, with their impact on the unit costs of services, appear to affect very significantly expenditure levels.

Inter-temporal correlation of expenditure patterns

As noted previously, one of the advantages of population-averaged panel models is that they allow the specification of alternative correlation structures through time in the error-term. This allowed the analysis to explore the extent to which past expenditure decisions had an effect on subsequent ones. Assuming an exchangeable correlation structure (which imposed equal correlations between error terms across different time periods) suggested a high degree of average correlation (0.65) between error terms through time (see Table 3). However, a better fit of the data in terms of the pseudo- R^2 value was achieved by imposing an AR1 correlation structure. As shown in Table 4, the AR1 structure estimated very high correlations between subsequent error-terms, which faded significantly as the distance in time between error –terms increased.

The evidence of dependence between errors through time provides therefore significant circumstantial evidence pointing towards the existence of a degree of path dependence through time in local expenditure decisions.

Analysis of spatial dependence

Figures 5 and 6 indicate significantly lower levels of spatial correlation in spending for the error terms of the exchangeable and AR1 population-averaged panel-models than for the raw indicator of expenditure (shown in Figure 4). Hence, whereas Moran's I coefficient is 0.61 on expenditure directly (Figure 4), the value drops to 0.29 for the error term in the exchangeable correlation model (Figure 5) and to 0.16 for the error term of the AR1 model (Figure 6). In other words, the comparison of Figures 5 and 6 against Figure 4 indicates that a large share of the spatial dependence in gross expenditure is due to the fact that the factors which influence expenditure levels are themselves non-randomly spatially distributed.

The reduction in the degree of spatial dependence once important explanatory factors are controlled for in the model is further illustrated in Table 5, which reports the results from statistical tests for spatial dependence based on the OLS estimation of equation (10) on the average sample values for the analysis period. Indeed, only the Moran's I (error) test appears to indicate (weakly) the presence of significant spatial dependence in the model.

Neither of the two spatial regression models presented in Table 6 improves in any significant way the general fitness of the model. Furthermore, the spatially weighted lag dependent variable in the Spatial Lag model is not found to have a significant effect on levels of expenditure. The spatial error model, however, appears to identify the presence of unaccounted for spatial correlations, as indicated by the significant value of λ . Potentially, this finding could indicate the existence of missing, spatially concentrated explanatory factors from the model, or misspecification in the specification of the spatial analysis (for instance in the specification of the spatial weight matrix, or in the specification of the nature of the spatial correlations between local authorities).

Discussion

Clearly, as demonstrated in Figure 1, levels of per capita spending in social care for older people in England are characterised by a very significant degree of local variability. Furthermore, the pattern of variability is significantly spatially concentrated, with as a result significant regional disparities in the levels of service provision.

The results suggest, however, that to a very large extent, variations in spending can be linked to local variability in key (rational) factors such as local levels of need, wealth, supply conditions and local preferences. A range of alternative specifications of the population-averaged panel-data models reached consistently high R^2 levels.

The fact that out of the alternative indicators explored, levels of central funding and local supply conditions showed by far the strongest influences on expenditure stresses the importance for government to develop appropriate mechanisms for matching local grants to local circumstances. In particular, the extent to which variations in local unit costs of services are accounted for through the Area Cost Adjustment factor has been a hotly contested issue. Similarly, there is debate about the needs variables used in the Relative Needs Formulae (previously called formula spending share) that allocate the Revenue Support Grant (Darton et al, 2006). Local expenditure levels are primarily determined by factors outside the control of local policy makers, underlying the

importance of resource allocation formulae that do account for differences in these factors.

Local authority specific effects, however, are also found to play a role in determining expenditure levels. Hence, political control was shown to mediate to some extent the extent to which local tax base is 'exploited' in order to extract further revenue for services. Also, the analysis identified significant correlation through time, hence suggesting a degree of incrementalism in local decision making processes.

The evidence for strategic interdependences between authorities, on the other hand, appears to be weaker. Hence, high degree of spatial correlation exhibited by the raw indicator of expenditure was drastically reduced by the introduction in the models of the explanatory variables postulated in the analytic section.

Also, findings relating to overall expenditure may not necessarily hold in terms of more refined indicators of social care provision, such as the relative use of alternative modes of care (and particularly the relative balance between residential and community-based care), charging policies, or the targeting of resources amongst recipients of care.

In addition to looking at those other important issues, further revisions of the paper will attempt to improve some of the methodological aspects of the analysis, particularly in terms of the estimation of spatial interactions, using panel methods, and investigating other potential covariates in the analysis such as local poverty and indices of deprivation.

References

- Anselin, L. (2003). GeoDa 0.9 User's Guide. Urbana-Champaign, IL., Spatial Analysis Laboratory, University of Illinois.
- Audit Commission (1986). Making a Reality of Community Care. London, HMSO.
- Audit Commission (1997). The Coming of Age: Improving Care Services for Older People. London, Audit Commission.
- Audit Commission (2000). Charging with care: how councils charge for home care. London, Audit Commission: 85.
- Audit Commission (2000). Forget me not : mental health services for older people. London, Audit Commission.
- Audit Commission (2000). Fully equipped : the provision of equipment to older or disabled people, Audit Commission for Local Authorities and the National Health Service.
- Audit Commission (2003). Comprehensive performance assessment. London, Audit Commission.
- Bebbington, A. C. and B. P. Davies (1993). "Efficient targeting of community care: the case of the home help service." Journal of Social Policy **22**: 373-91.
- Besley, T. and A. Case (1995). "Incumbent Behavior: Vote-Seeking, Tax-Setting, and Yardstick Competition." American Economic Review **85**(1): 25.
- Boyne, G. (1991). "Territorial Justice: A Review of Theory and Evidence." Political Geography Quarterly **10**(3): 263-281.
- Boyne, G., M. Powell, et al. (2001). "Spatial Equity and Public Services: An empirical analysis of local government finance in England." Public Management Review **3**(1): 19-34.
- Darton, R., Forder, J., Bebbington, A., Netten, A., Towers, A.-M. and Williams, J. (2006) Analysis to Support the Development of FSS Formulae for Older People: Final Report, PSSRU, Discussion Paper 2265.
- Case, A. (1993). "Interstate Tax Competition After TRA86." Journal of Policy Analysis and Management **12**(1): 136.
- Davies, B. (1968). Social Needs and Resources in Local Services. London, Michael Joseph.
- Davies, B., A. Bebbington, et al. (1990). Resources, Needs and Outcomes in Community-Based Care. Aldershot, Avebury.
- Department of Health (1989). Caring for People: Community Care in the Next Decade and Beyond. HMSO, London, Cm 849.
- Department of Health (1990). Caring for People: Community Care in the Next Decade and Beyond - Policy Guidance. London, HMSO.
- Department of Health (1998). Modernising Social Services: Promoting Independence, Improving Protection, Raising Standards. London, The Stationary Office.
- Department of Health (2000). Shaping the Future NHS: Long Term Planning for Hospitals and Related Services. Consultation Document on the Findings of the National Beds Inquiry - Supporting Analysis. London, Department of Health.
- Department of Health (2001). National Service Framework for Older People. London, HMSO.

- Department of Health (2002). Fair access to care services : guidance on eligibility criteria for adult social care, Great Britain, Department of Health.
- Department of Health (2006) *Our health, our care, our say: a new direction for community services*, London, Cm 6737.
- Fernández, J. L. and J. Forder (2002). "The importance of social care in achieving an efficient health care system: impact on hospital delay discharge rates." LSE Health and Social Care Discussion Papers 7.
- Forder, J. and A. Netten (2000). "The Price of Placements in Residential and Nursing Home Care." Health economics 9(7): 643-657.
- Jackman, R. and J. Papadachi (1981). "Local authority education expenditure in England and Wales: why standards differ and the impact of government grants." Public Choice 36: 425-439.
- Knapp, M. and G. Wistow (1999). *Social care markets in England: commissioning for best value and quality*. University of Kent at Canterbury, Personal Social Services Research Unit.
- Martin, S. (2000). "Implementing 'Best Value': Local Public Services in Transition." Public Administration 78: 209-227.
- McLean, I. and A. McMillan (2003). "The distribution of public expenditure across the UK regions." Fiscal Studies 24(1): 45-72.
- Pesaran, M. H. and T. Yamagata (2005). "Testing slope homogeneity in large panels." CESIFO Working Paper 1438.
- Powell, M. and G. Boyne (2001). "The spatial strategy of equality and the spatial division of welfare." Social Policy and Administration 35(2): 181-194.
- Revelli, F. (2006). "Performance rating and yardstick competition in social service provision." Journal of Public Economics 90(3): 459-475.
- Robson, W. A. (1966). Local Government in Crisis. London, George Allen and Unwin.
- Rowley, C. K. (1994). Foreword to Bureaucracy and Public Economics, by Niskanen, W.A. Hants, Aldershot.
- Sinn, H.-W. (2003). The New Systems Competition. Malden ; Oxford, Blackwell Publishing.
- Social Services Inspectorate (1987). From Home Help to Home Care: An Analysis of Policy Resourcing and Service Management. London, DHSS.
- Social Services Inspectorate (1998). A matter of chance for carers? : inspection of local authority support, Great Britain, Department of Health, Social Services Inspectorate.
- Stata Corporation. (2005). Stata reference manual : release 9. College Station, Tex., Stata Press.
- Stoker, G. (1991). The Politics of Local Government. Macmillan, London, 2nd edition.
- Webb, A. and G. Wistow (1987). Social Work, Social Care and Social Planning: The Personal Social Services Since Seebom. London, Longman.
- Wistow, G., M. Knapp, et al. (1996). Social Care Markets: Progress and Prospects. Buckingham, Open University Press.
- Zeger, S. L. and K. Y. Liang (1986). "Longitudinal data analysis for discrete and continuous outcomes." Biometrics 42(1): 121-30.

Figure 1 Analysis framework

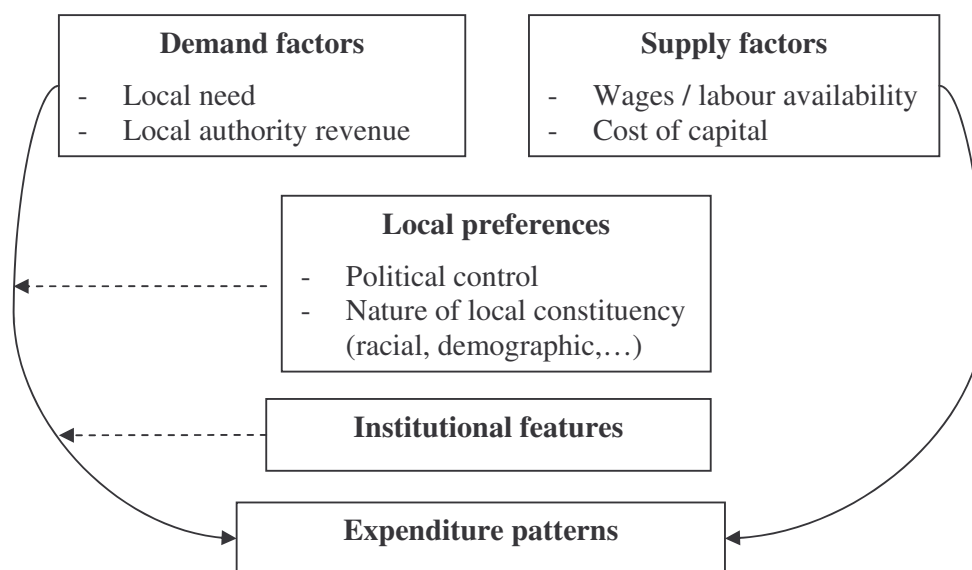


Table 1 Data sources

	Source
Demand factors	
<i>Need indicators</i>	
Demographic characteristics	ONS
Number of Attendance Allowance claimants	DWP
Standardised mortality rates	ONS
Limiting-long-standing illness	Census
Self-rated health status	Census
Provision of unpaid care	Census
Housing composition	Census
ONS area classification	ONS
<i>Local income</i>	
Central revenue grant	ODPM
Local tax base	ODPM
Supply factors	
Property prices	HM Land Registry
Weekly gross earnings	New Earnings Survey
Labour market statistics	Labour force survey
Local preferences	
Local political control	Local Government Chronicle Elections Centre, Department of Politics, University of Plymouth
Demographic profile	ONS
Service utilisation patterns	
Expenditure levels	Department of Health

Figure 2

Distribution of local authority gross social services expenditure on older people standardised by population over 65 - average for 1998-99 to 2004-05

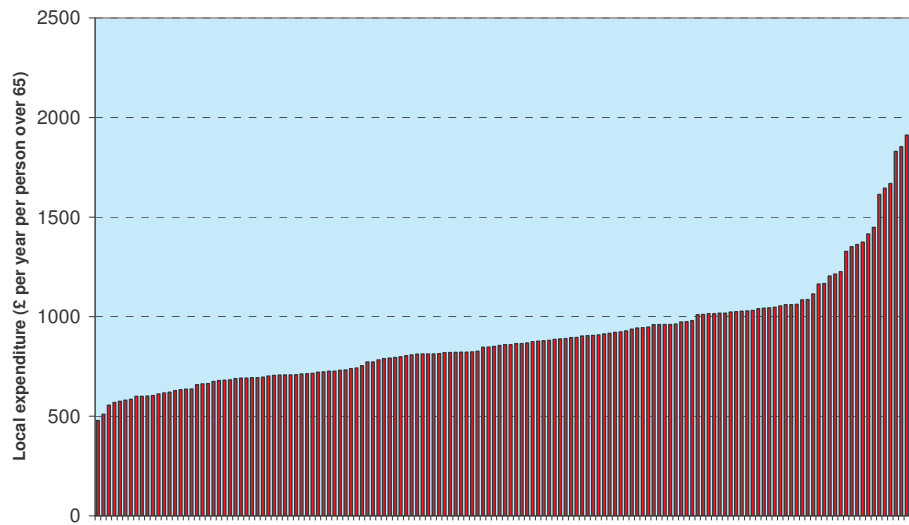


Figure 3 Distribution (quartiles) of levels of per capita (65 plus) gross social care expenditure for older people in England (darker shades indicate higher levels of expenditure)

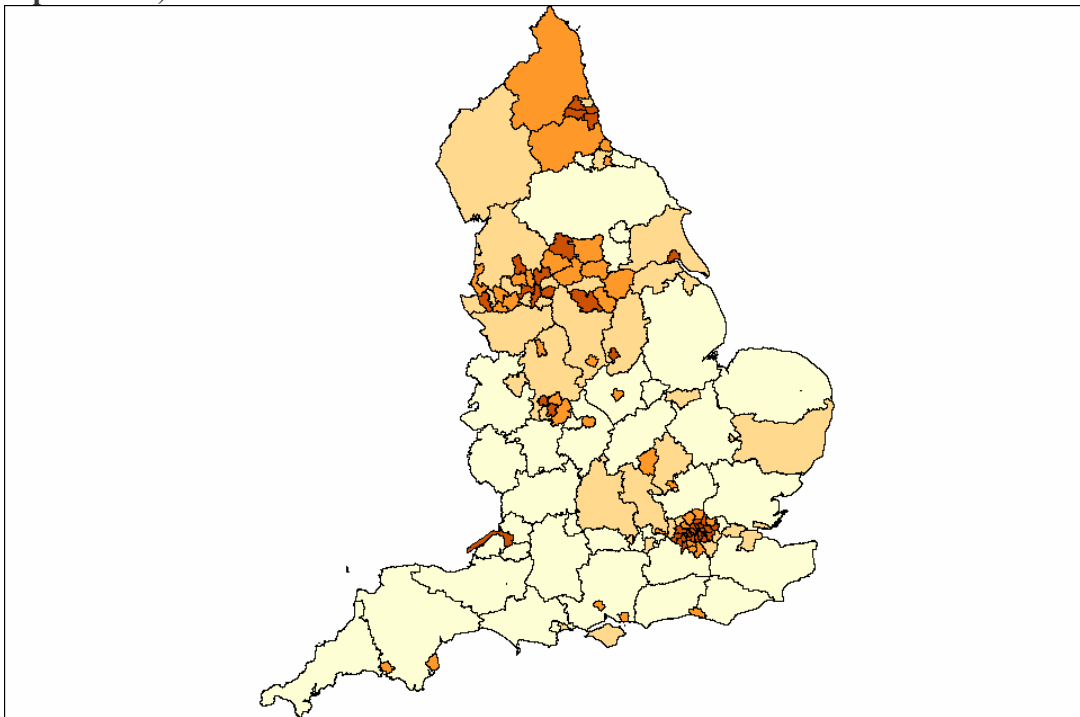


Figure 4 Global spatial dependence in expenditure as indicated by the Moran's I coefficient (average over 1998/99 – 2004/05)

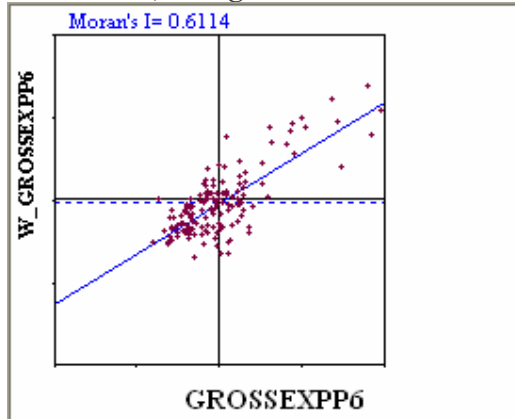


Table 2 Factors associated with local per capita expenditure levels^{1,*}

	Correlation structure assumed					
	Exchangeable			AR1		
	Coeff	Z value	ey/ex	Coeff	Z value	ey/ex
Need						
AA claimants	1.03	2.91	0.14	0.55	1.96	0.08
People living alone**	1.53	4.91	0.52	2.20	7.26	0.75
Income						
Central grant**	1.18	15.8	0.81	0.97	13.79	0.67
Tax base**	4.6E-4	1.50	0.16	2.0E-4	0.91	0.07
Tax base** - conservative interaction	-5.2E-4	-1.35	-0.04	-2.1E-4	-0.68	-0.01
Tax base** - labour interaction	6.3E-4	1.62	0.10	7.2E-4	2.32	0.11
Supply conditions						
Median local wage	1.2E-3	7.34	0.37	4.1E-4	4.06	0.13
Local preference						
Labour control	-0.021	-1.67	-0.11	-0.24	-2.35	-0.12
Conservative	0.25	1.69	0.04	0.13	1.11	0.02
Lib democrat control	-0.03	-0.96	0.00	5.9E-3	0.30	0.00
Proportion of people over 65	0.23	0.27	0.04	-1.06	-1.51	-0.16
Proportion of people over 85	2.22	0.50	0.04	4.13	1.18	0.08
Constant	4.68	26.25		5.14	36.04	
Pseudo R2	0.77			0.81		

¹ Estimated as panel GEE, with log link and gamma distribution, and semi-robust standard errors.

* Standardised by population over 65 years of age

** Per capita

Table 3 Estimates of exchangeable correlation structure

	c1	c2	c3	c4	c5	c6	c7
r1	1						
r2	.6495962	1					
r3	.6495962	.6495962	1				
r4	.6495962	.6495962	.6495962	1			
r5	.6495962	.6495962	.6495962	.6495962	1		
r6	.6495962	.6495962	.6495962	.6495962	.6495962	1	
r7	.6495962	.6495962	.6495962	.6495962	.6495962	.6495962	1

Table 4 Estimates of AR1 correlation structure

	c1	c2	c3	c4	c5	c6	c7
r1	1						
r2	.7594225	1					
r3	.5767226	.7594225	1				
r4	.4379761	.5767226	.7594225	1			
r5	.3326089	.4379761	.5767226	.7594225	1		
r6	.2525907	.3326089	.4379761	.5767226	.7594225	1	
r7	.1918231	.2525907	.3326089	.4379761	.5767226	.7594225	1

Figure 5 Global spatial dependence of panel GEE error terms (exchangeable correlation structure) as indicated by the Moran's I coefficient (average over 1998/99 – 2004/05)

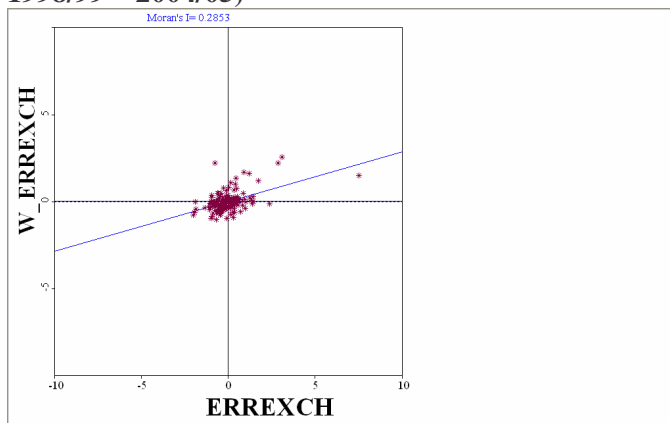


Figure 6 Global spatial dependence of panel GEE error terms (AR1 correlation structure) as indicated by the Moran's I coefficient (average over 1998/99 – 2004/05)

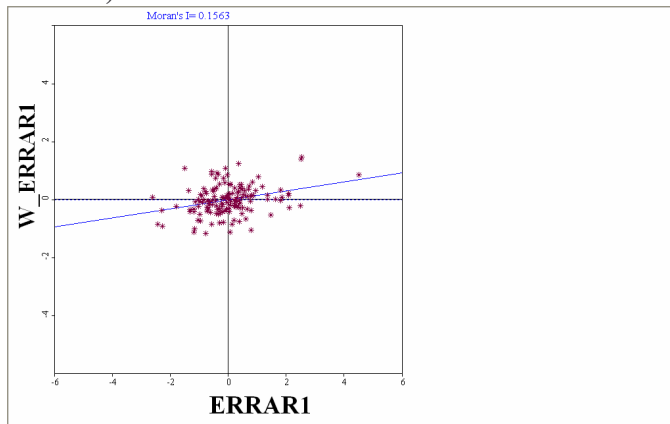


Table 5 Diagnostics for spatial dependence - OLS model

TEST	MI/DF	VALUE	PROB
Moran's I (error)	0.08	2.04	0.04
Lagrange Multiplier (lag)	1	1.85	0.17
Robust LM (lag)	1	1.54	0.21
Lagrange Multiplier (error)	1	2.13	0.14
Robust LM (error)	1	1.82	0.18
Lagrange Multiplier (SARMA)	2	3.67	0.16

Table 6 Spatial regression models (average over 1998/99 to 2004/05)¹

	OLS		Spatial lag		Spatial error	
	Coeff	t-Stat	Coeff	z-value	Coeff	z-value
AA claimants*	0.61	1.74	0.55	1.66	0.34	0.82
People living alone**	3.66	9.79	3.56	9.85	4.08	9.76
Central grant	0.53	6.49	0.54	6.93	0.32	3.10
Tax base**	6.02E-04	1.37	6.17E-04	1.48	-4.68E-04	-0.99
Tax base** - labour	-1.08E-04	-0.20	-9.64E-05	-0.19	-8.76E-05	-0.19
Tax base** - conservative	-1.39E-03	-2.33	-1.37E-03	-2.42	-8.84E-04	-1.62
Labour	0.07	0.37	0.06	0.35	-3.65E-04	0.00
Lib democrat	0.02	0.54	0.49	2.28	0.30	1.45
Conservative	0.50	2.23	0.03	0.58	-0.03	-0.62
Proportion of people over 65	-1.47	-3.05	-1.37	-2.94	-1.67	-3.00
Median local wage	2.61E-04	0.90	2.39E-04	0.86	2.51E-04	0.91
Constant	4.99	22.63	4.91	22.59	5.44	23.11
ρ			0.01	1.37		
λ					0.80	15.11
R ²		0.88		0.89		0.89
LR test for spatial dependence			1.86	0.17	6.71	0.01
Breusch-Pagan heteroscedasticity test			12.68	0.31	12.27	0.34

¹ The models are estimated using as dependent variable the log of gross expenditure per population over 65 years of age.

* Standardised by population over 65 years of age.

** Per capita.