Ministry of Housing, Communities & Local Government

Title: NR Technical Working Group

Paper: **NR TWG 18/02 Discussion paper on an alternative to regression (Society of County Treasurers)**

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**POLICY DEVELOPMENT: NOT A STATEMENT OF GOVERNMENT POLICY**

## Introduction

1) For at least the last decade, and possibly considerably longer, funding formulae for local government have relied upon statistical regressions. Even those formulae with an element of judgment, ministerial or otherwise, have been based on regression.

2) Regression is a statistical technique which, in essence, determines the relationship between a dependent variable and a number of non-correlated, independent measures. In the case of local government funding the dependent variable must be "need to spend/demand for services". The independent measures should be drivers of demand or indicators of need. For example, an intuitive indicator of Adult Social Care need is the number of elderly people in the population, but there can be any number of potential predictors. Regression analysis will not only identify the indicators that have the greatest influence but also how much weight they should carry in a formula (i.e. how important they are).

3) One of the key considerations of any type of regression is to determine what the dependent variable is. In other words – how do we quantify "need" or "service demand" in the first place in order to establish indicators which predict it well?

4) The current formula review timeline indicates that the Technical Working Group has the luxury of more time than I can remember to review the current formula and suggest a replacement. External analysts have already been recruited to carry out multi-level modelling in the Adults and Children's service areas; something which, together with data collection, can be very time consuming. It would be remiss of the working group to not use the time available to consider other alternatives; which would still be evidence-based but might also offer the chance to understand the demands facing the sector better.

**The drawbacks of regressing to historic spend or activity levels**

5) Historically there have tended to be two primary datasets used as a proxy for "need" or "demand"; past spending and past activity levels. These datasets are attached to local areas and the goal of regression analysis is to establish which indicators best predict the variations in “need” or “demand”. To use these datasets in expenditure/activity based regression analysis presumes that patterns of unmet need and/or unjustified supply in local areas can be isolated and controlled for. They cannot.

6) The current consultation paper (Fair funding review: a review of relative needs and resources) highlights a number of issues with this type of regression. These include:

    - Local choices regarding the level of provision affecting overall expenditure
    - Historic funding decisions
    - Unmet need resulting in current expenditure not reflecting the actual underlying need of an area

7) Whilst expenditure-based regression models will clearly use spending as a proxy for “need” or “demand”, it would also be possible to use “activity” or “service usage” as the dependent variable in an analysis. Activity data is also highly likely to be used when carrying out multi-level modelling.

8) In most cases, population groups will use the services that are available locally. These services are likely to be differentially available, for a variety of reasons ranging from local decisions to external factors. It would seem intuitive to say that where services are better funded (relative to need) they tend to be more available (relative to need). This will be reflected in activity data and result in models - and allocations - which could overestimate the actual level of need. Services remain well-funded, activity remains high, and is interpreted as “high demand” and the service continues to be well resourced – thus creating a positive feedback loop. Conversely, of course, there is a risk of underestimating the needs of populations which have a lower level of activity precisely because of lower levels of funding (relative to need).

9) All local authorities are different - they all have political leaders with slightly different priorities, they serve different demographics and they often deliver different services. This will frequently be manifested in local authorities spending differing proportions of their budget on different services. For example, in some areas schools will take priority over the roads, in other areas pressures in social care services might mean libraries have to close.

10) The same is true for many activities. People will only be able to use a bus route if there is one in operation. Children will only be attending a children's centre if there is one near their home.

11) Consequently, we have questioned whether the combination of regression analysis with historic spend (or activity) as a proxy for need is appropriate to predict future service demand. There is an intuitive and inextricable link between past funding allocations and the levels of spending and/or activity in these years. Creating a regression formula which models future allocations by basing them on past patterns of spending or activity will only serve to lock in the current distribution patterns. If an area is under or over funded; this cycle will be perpetuated and fairness cannot be achieved.

**Multi-Level Modelling (MLM)**

12) MLM and small area estimation (SAE) are both outlined in the current needs consultation. It is argued that MLM/SAE provides a way of isolating (and excluding for allocation purposes) the impact that LA-level variations in policy and practice have on expenditure.

13) MLM/SAE is certainly an improvement on traditional regression but, in practice, this approach may not offer quite the panacea hoped for. It rests on being able to assign spend or 'need' data to small areas (e.g. LSOAs/MSOAs or even individuals) – yet it seems unlikely that local authorities will be able to provide good quality data at this level of granularity, for all services. Without good quality data to base a model upon, the statistical adage of "rubbish in, rubbish out" applies and the resulting allocation model will not be reliable, accurate or trusted.

14) It is, moreover, not always obvious how variations in expenditure should be attributed between levels in a multi-level model, particularly when the socio-demographic characteristics of the populations served by different local authorities vary so markedly. This means, in effect, that it is difficult to be sure when variation in expenditure reflects variations in "legitimate" factors (such as the composition and characteristics of local populations) as opposed to being due to "illegitimate" factors (such as local policy and practice). As allocations are calculated using only "legitimate" factors it is crucial that these can be identified – otherwise patterns of current use will continue to 'infect' future allocations.

**The alternative method**

15) In its simplest form the alternative approach could simply be described as "asking experts". These experts might be service managers or team leaders or they could be involved in service procurement or members of performance teams.

16) The consultation already asks responders to provide comments on the cost drivers for a number of services;

- adult social care,
- children's services,
- highways maintenance and public transport,
- waste collection and disposal,
- fire and rescue services,
- legacy capital financing and
- other services

17) These responses could provide a useful starting position for further focussed discussions. Focus groups or surveys would ask experts, for each service area, what measures are considered to drive current demand. In other words we are looking to get expert input on the characteristics of populations that create service demand in different areas – characteristics that can then be measured and attributed to authorities.

18) This method has previously been employed in the Health sector in the creation of the Jarman Index – also referred to as the Underprivileged Area Score, and used to quantify deprivation. Jarman asked GPs 'Who takes up your time?' and 'What proportion of your time do they take up?' On the basis of the responses he developed a formula to predict demand in GP's surgeries which included measures such as the 'number of children under 5', 'elderly living alone' etc. This demonstrates that "expert opinions" can be translated into something measurable.

19) At the very least, this expert feedback could be used to check against the result of any statistical modelling – not just the independent variables chosen as predictors but also the weightings applied.

20) Naturally, these expert groups would need to be made up of representatives from all areas of the country, representing differing types of authorities too - rural/urban, large/small, highly/less deprived, one/two tier etc. It would also not be appropriate for a special interest group to lead on this work. We would suggest that the work be outsourced to experts in running focus groups and/or survey work.

21) On the surface this alternative method shares many characteristics with the cost-driver proposal from the ALATS sub-group of the Technical Working Group. Something which local government members of the group seem attracted to; primarily for its simplicity but also because it appears to breaks the link with past spending/activity.

22) This alternative method would not impact on the considerations currently ongoing with regard to the treatment of resources, transitional arrangements and the area

cost adjustment. This is simply a way to predict the need to spend, based on expert opinions.

23) Whilst we consider that this method could offer an alternative to traditional statistical techniques. We also believe it could be further expanded to provide evidence for a future sector-wide spending review submission. The following section outlines the idea, but is not something that we consider appropriate for the current formula review.

**Using an extension of the alternative method to promote good practice: something for a spending review?**

24) Financial austerity increases the likelihood that resources will be focused on crisis intervention rather than prevention. There are strong grounds for developing an approach to formula funding that can provide the means to explicitly shift services towards prevention. This would reduce demand for services further down the line which are often more expensive – both in monetary terms as well as the impact on quality of life.

25) The different practices and policies in each authority will undoubtedly lead to differences in outcomes and the demand for more expensive services. These expert discussions are likely to naturally lead from "*what is*" to "*what ought to be*". For example, there will probably be discussions on prevention, what has already been proven to work (and not work), where investment is needed to stem the demand for expensive services and who the more targeted services should be directed at.

26) For example, in the case of Adult Social Care services, the "universal", preventative service might be linked to public health spending and might include subsidised gym membership, smoking cessation support and access to green spaces. The next tier of service provision might be more targeted; perhaps to those in poor housing, living alone or on low incomes. Then the next level might be for those already in poor health, a considerable distance from a hospital or those who are very old.

27) In Children's Services it might be a universal service provision including reasonable access to Children's Centres, Health Visitors and good nursery provision. The next tiers might be more and more targeted support for families with lone parents, those with poor parental education and/or in poor health. Then up towards more finely targeted (and likely more expensive) services.

28) A similar example for services such as Highways might involve preventing pot holes from worsening into expensive compensation claims, encouraging less use of cars or investment to improve the life of road repairs.

29) This evidence, once collected, can be used to construct a formula that distributes funding in a smarter way: universally for preventative work and targeted serviced for the population that needs them. Clearly this would not be achievable or appropriate for delivery through a formula review, but would require further investment in preventative services over and above what currently exists.

**How to find out "what ought to be"**

30) An exercise on this scale would be unlike anything seen in recent years for local government. It is possible that the "*what ought to be*" will simply come from clever questioning of the expert focus groups and the sharing of experiences of what works and what doesn't.

31) However, detailed analysis of the MLM "residuals" may also lead to clues as to places to investigate further. For example an authority found to be spending far less than others, given their population/underlying need, may simply be under-resourced or it could be that their local policy to invest in prevention is working; reducing demand for services and saving them money.

32) There also exists a group within the Cabinet Office called the "What Works Network" which was set up in 2013 to "*improve the way government and other organisations create, share and use high quality evidence for decision-making*". More information can be found on their website: https://www.gov.uk/guidance/what-works-network.

33) Its stated aim is to support more effective and efficient services across the public sector at national and local levels. Initial analysis of their work and findings indicate that it may not be the wide-ranging advice we require but nonetheless should be investigated further.

**Summary**

34) Given the identified drawbacks of expenditure-based regression (specifically the availability of an ideal dependent variable), the technical difficulties associated with multi-level modelling and the time available to review the current formula; it would be remiss not to consider other methods of formula construction.

35) Some may consider the use of expert opinions and focus groups to be too subjective, but its goal would still be to develop a set of measures that can be applied to local areas. It offers, not just an alternative methodology, but also a "sense check" on the statistical work being commissioned.

36) It should also be noted that even statistically-derived formulae include significant elements of judgement: The choice of dependent variable, the size of areas used,

the selection of independent variables, the thresholds for inclusion and the treatment of between-level effects.

37) The “*what ought to be*” work is doubtless something better-suited to a spending review submission from the sector; providing evidence for more efficient and effective use of public funds through investment in proven, preventative services.