Executive summary

- When funding formula systems are designed and adopted, care should be taken to avoid arbitrary allocations since, by definition, these cannot be justified in terms of pursuing the intended objectives.
- The 2013/14 formula funding system, which remains the basis of allocations to local authorities in England, contained several features that could produce arbitrary outcomes.
- Criteria can be identified that rule out certain forms of arbitrary behaviour of funding allocation mechanisms. Government should adopt these criteria when designing and implementing future funding allocation models.
- Tests can be designed that help to establish whether a proposed funding allocation mechanism breaches a criterion. These tests should be deployed on proposed funding allocation mechanisms whilst they are in development.
- A table containing several recommended criteria and associated tests is provided.
- Data should be provided in a relatively raw format where possible. Specifically, rather than providing values as proportions, numerators and denominators should be provided separately,
- Where transitional measures are adopted, they should be designed from the outset to unwind towards the most recent assessment of needed allocation over a period of time, rather than remaining indefinitely tied to an earlier assessment.

About the author

I am currently a Research Fellow in the Department of Government at the University of Essex, widely recognised as one of the UK’s highest-rated departments in the field. I was previously a Research Fellow in the ESRC Business and Local Government Data Research Centre (also at the University of Essex). Whilst at the Business and Local Government Data Research Centre I led a study of the formula funding system for local government in England since 2013; the findings from that study provide the motivation for this submission.

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Scope of submission with respect to inquiry’s terms of reference

1. This submission addresses various aspects of the scope of the inquiry as noted in the four topics listed in the terms of reference. The research that it is based on derives from analysis of the operation of the 2013/14 funding formula system, so it draws on the lessons of the past. It identifies ways in which the 2013/14 system produces arbitrary outcomes, which reduce the system’s fitness for purpose. It is based in particular on the relative needs formula funding system. And it makes practical suggestions for the design of future allocation models.

A principle of non-arbitrariness

2. Formula funding systems can be designed with various objectives in mind. The English local government formula funding system in place since 2013 includes features of both ‘equity’ and ‘incentive’ objectives.

3. Equity objectives represent an intention of ensuring that “similarly situated citizens should be treated equally regardless of geography” and that ‘postcode lotteries’ should be minimised (McLean 2018, 6). Equity objectives typically require equalisation of the resources of authorities in relation to their spending needs based on their populations and their revenue-raising capacities. The central design of the English local government formula funding system is a needs-based model that attempts to assess the relative need of each local authority and factors in its tax base.

4. Incentive objectives represent an attempt by the formula-setter (in this case, central government) to steer the receiving organisations (local authorities) towards activities that will produce particular outcomes. In the case of the current English local government system, this has broadly taken the form of local authorities being able to retain some of the increase in business rates in their areas. This is intended to “provide a strong incentive for local authorities to promote growth” in their local economies (Department for Communities and Local Government 2012, para. 3).

5. Whatever the objectives of a formula funding system, however, it should be uncontroversial to say that the formula should not produce arbitrary results. Arbitrary results are ones where it is not possible to produce a principled justification that the results are aligned with the objective. In the context of equity, arbitrariness in a formula would reduce the degree to which it delivers the intended equity; in the context of incentives, arbitrariness would tend to incentivise arbitrary behaviours, which may not pull in the direction that the funder desires.

6. By rebuilding the 2013-based formula funding mechanism in a new software implementation, we were able to test a variety of scenarios to see what allocations it would produce. This analysis identified several situations in which the outcomes were clearly arbitrary. A working paper report of the analysis is available providing full details of the approach and the problems identified (Vine 2018).

7. Perhaps the most striking example of an arbitrary outcome in the system is the so-called Wokingham Effect. In a reasonable system we would expect that removing Wokingham, with its funding allocation of £4.44 million, from the calculations and re-running the allocations would result in the £4.44 million being redistributed between some or all of the
remaining authorities. When we run this test, however, we find large and unjustified changes to the allocations of many authorities – including losses as well as gains. The biggest increase sees the ‘GLA – police’ authority being allocated £84.6 million more, and the biggest loss is Surrey, seeing its allocation drop by £35.6 million (over half of its total allocation).

**Adopting criteria to avoid arbitrary allocations**

8. There is a further important feature of the Wokingham Effect: the study described here was not the first to identify it. It was discovered in the 2008/09 system by Gibson and Asthana (2011), and their finding was summarised in a report as early as 2009 (Stone 2009, 36). This effect was known long before the adoption of the 2013 formula funding system, where it persists.

9. In order to avoid arbitrary allocations, therefore, it is not sufficient to identify ways in which arbitrariness can enter the mechanism. The system should also adopt procedures specifically designed to prevent them.

10. Where arbitrary behaviours have been identified, these can be translated into criteria that future allocations mechanisms should meet if they are to avoid repeating the problems. These criteria can have tests attached, so that any proposed new system can be investigated to see whether it complies with the criteria.

11. The table below presents a set of criteria, derived from analysis of the 2013/14 English local government formula funding system, that should be adopted in relation to future funding systems. These are principally derived from problems that can be observed from an examination of the behaviour of the 2013/14 funding formula system – for full details of the problematic behaviours see (Vine 2018). Each criterion is accompanied by at least one test that would help to identify whether a proposed system would breach the criterion.

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<tr>
<th>Problem</th>
<th>Criterion</th>
<th>Test</th>
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<tbody>
<tr>
<td>Adding resources can result in losses</td>
<td><strong>Resource monotonicity</strong>: If the total amount of resource to be allocated to a group of authorities is changed (increased or decreased) then none of the resultant allocations to the authorities that are members of that group should change in the opposite direction.</td>
<td>Remove each authority in turn, comparing allocations to the case with all authorities.</td>
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<td>Impact of authority reorganizations</td>
<td><strong>Aggregation additivity</strong>: In the case of reorganization of a group of authorities, the total allocation of the successor authorities should equal the sum of those of their predecessor authorities. All other authorities’ allocations should remain unchanged.</td>
<td>Merge combinations of authorities and calculate resultant funding allocations.</td>
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<td>Sensitivity of allocations to data updating</td>
<td><strong>Commensurate variation:</strong> When calculating funding allocations using data from different years, the results should not vary disproportionately to the underlying changes that are reflected in the data.</td>
<td>Run with a time series of historic data, assessing for excessive sensitivity/instability and unexplained variation over the series.</td>
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<td>Data availability</td>
<td><strong>Empirical update frequency:</strong> Data for allocations should be updated with a frequency that reflects the extent to which allocations are expected to vary over time if re-assessed using the same formula and data from different times.</td>
<td>Run with a time series of historic data, analysing the degree of change in authorities' relative shares over the period. Use findings to inform design of updating process and frequency.</td>
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<td>Data availability</td>
<td><strong>Continued availability of data:</strong> Funding mechanisms that are intended to be used for multiple years should be based on data that will continue to be published reliably in the future or where current estimates are expected to remain relevant for several years.</td>
<td>Analysis indicating that the data series will continue to be available and that any point-in-time estimates will have sufficient longer-term validity.</td>
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<td>Duplicate indicators</td>
<td><strong>Parsimony within concepts:</strong> For a given underlying property of authorities that is included in the model, the single best variable estimating that concept should be used consistently throughout.</td>
<td>Documentation for each variable indicating the publishing frequency of updates and explanation of acceptability of relying on the data according to that publishing schedule.</td>
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<td>Errors and inconsistencies</td>
<td><strong>Quality control:</strong> Practices should be adopted that minimise chances of error and/or maximize chances of errors being detected prior to final deployment.</td>
<td>Calculate correlations between each of the variables that are proposed to be used in the formula. Assess any high correlation coefficients. Document the justification for any correlated pairs that are retained in the final dataset.</td>
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<td>Testing data for being within plausible ranges, including automated numerical techniques and possibly visual techniques.</td>
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12. This set of criteria is not intended to be comprehensive. There are inevitably other ways in which funding mechanisms could produce arbitrary outcomes. However, if this set of criteria and tests were adopted by central government in designing any future funding mechanisms, the range of potentially arbitrary outcomes would be substantially reduced.

13. The process of analysing the 2013/14 formula system also highlighted the issue that presentation of data can constrain certain types of analysis. The following recommendation would help to address this constraint.

Recommendation: Data should be provided in a format that is raw enough to enable tests requiring the merger of authorities’ data. Rather than providing values as proportions, numerators and denominators should be provided separately, with any proportions calculated as part of the calculation process, rather than treated as a data input. This would improve transparency in general, as well as facilitating criteria tests.

**Transitional protection**

14. The main research that forms the basis of this submission was focused on the actions of the core 2013/14 funding formula system. It did not look at the way in which subsequent allocations have developed over the intervening period. However, my understanding is that there was a damping mechanism applied to ensure that no authority experienced too great a shift in its allocation from the previous system. Such transitional arrangements can be justified on practical grounds: large step changes in funding level can be difficult for organisations to adjust to.

15. However, it also appears that no steps were undertaken in subsequent years to transition towards the allocations as assessed by the ‘undamped’ formula. To the extent that the undamped formula produced an accurate reflection of the relative needs of different authorities, a lack of progress towards that need, anchoring each authority’s allocations based on a point that is strongly influenced by its allocation pre-2013, is itself an arbitrary process.

16. Where transitional measures are adopted, they should be designed from the outset to unwind towards the most recent assessment of needed allocation over a period of time, rather than remaining indefinitely tied to an earlier assessment.

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Government Data Research Centre, the LGA or any other body. All responsibility for the analysis reported here rests with the author.

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References


Stone, Mervyn. 2009. Failing To Figure. Civitas. http://www.civitas.org.uk/pdf/FailingToFigure.pdf.