How Proportional are the 'British AMS' Systems?

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The battle to introduce proportional representation into the UK has reached an uneasy draw, with PR systems apparently well-established in the two devolved nations, Scotland and Wales, as well as in the Greater London Assembly (GLA). These three systems are the most important mainland ones and share some common institutional features. In addition Northern Ireland has a well-established tradition of using the Single Transferable Vote (STV) for its distinctive party system. New institutional forms also remain possible locales for an extension of PR systems. The GLA pattern will be replicated in any English regional assemblies established in the next two years. Scottish local government may shift over to STV elections. And if direct elections for the House of Lords are ever brought in, some form of PR seems inevitable (see Dunleavy and Margetts, 1999b). So the UK has decisively entered on a possibly protracted phase of co-existence between PR and plurality rule elections, of which the core are the three British AMS systems. Here we examine how they have fared in terms of delivering proportional results, representing the votes cast by electors without artificial distortion, and reflecting or distorting the pattern of alignments. We sketch the devolved systems key features and examine how deviations from proportionality might be applied to them. The experience of British AMS systems so far has some key implications for the future reform of Westminster voting system.

1. British AMS systems

The salient features of the Scottish, Welsh and London systems are sketched in Table 1. As in the well-known German and New Zealand systems, citizens vote twice, to choose a local representative and to take part in a list PR election at regional or sub-regional level. The list PR election is applied in a 'top-up' manner, compensating as much as feasible for seats distortions introduced at the constituency stage. Unlike overseas AMS systems which divide seats 50:50 between the two levels, the British systems all have a preponderance of constituency representation, especially marked in Wales where two thirds of seats are chosen by plurality rule. (An extreme form of the same philosophy was also followed by the Jenkins Commission whose unimplemented proposals for Westminster elections are shown for comparison in Table 1. They proposed that five sixths of seats should be locally elected, with an absolute minimum of top-up seats, but with the additional vote (AV) used instead of plurality rule in the local contests – see Dunleavy and Margetts, 1999a).

The other strong feature of the Scottish and Welsh systems is that relatively small sub-regions are used for the top-election, which keeps the effective number of seats in that election (the 'district magnitude') down to relatively small levels. Obviously the larger the effective number of seats the more fine-grain can be the match between votes shares and seats. In Scotland and Wales parties essentially need 5 or 6 per cent of the vote in a sub-region respectively to win a seat. The GLA election is an at-large London election, and in theory any party securing a 4 per cent share is guaranteed representation. In practice, it is possible for a favourable distribution of other parties' remainder votes to result in a party winning less than 4 per cent to be elected, and fear of a British National Party success lead to the imposition of a 5 per cent legal threshold in London.

Table 1: Key Features of 'British AMS' Systems Enacted or Proposed

	Scottish Parliament	**Welsh Assembly**	**London Assembly**	**Jenkins Commission 'AV+' system**
Assembly size	129	60	25	659
Mix of local: top-up seats members (%)	57: 43	67: 33	57: 43	83: 17
Elected by	Plurality rule in 73 Westminster constituencies	Plurality rule in 40 Westminster constituencies	Plurality rule in 14 double or triple borough areas	Alternative Vote in 543 redrawn Westminster constituencies
Top-up areas	8 former Euro constituencies	5 former Euro constituencies	Greater London as a whole	80 counties in England; top-up areas in Scotland and Wales; 2 new areas in N. Ireland
Top-up seats per area	7	4	11	1 or 2
Effective district magnitudes	15 to 17	11 to 13	25	5 to 11
Inclusion threshold	4.8	5.9	3.6 (5)	7.1
Exclusion threshold	5.6	7.1	3.8 (5)	8.3

Note: The inclusion threshold is the minimum level of the vote on which a party could win a seat, if conditions such as the fragmentation of the vote were optimal. The exclusion threshold is the level a party needs to win in order to be guaranteed a seat (Rae et al., 1971).
Both thresholds given here are the minimum feasible levels. In London there is a legal threshold: parties must win 5 per cent of the list vote across the capital to secure representation. In the Jenkins system these figures assume a basically proportional allocation of local seats between major parties. Where this condition does not hold, the threshold for winning top-up seats could be much higher. For detailed consultants' report on why and how the areas were defined as they are for the London system and the Jenkins report, see Dunleavy and Margetts (1998a,b).

2. Assessing deviation from proportionality

There are three main ways of measuring how far systems allocate seats not in relation to vote shares, all of which have significant problems with them:

• **DV** (the conventional deviation from proportionality measure) subtracts parties' vote shares from their seats shares, adds up the absolute values of the resulting differences (the deviations) ignoring the positive or negative signs, and then divides the resulting total by 2 (to eliminate the double-counting that would otherwise occur). DV has a ready intuitive meaning – it denotes the proportion of members of the legislature who occupy seats to which they are not entitled in virtue of their party's share of the overall vote. Put another way, it shows the proportion of seats that would have to be redistributed to achieve a complete fit between seats distributions and electorate's actual pattern of alignments.

In practical terms the minimum DV score will always be shaped by the total number of seats available in the whole election district (at both stages). In polities with multiple electoral districts (but not in London, which is a single electoral district) there may also be compensating effects across districts where a well-established party that is under-represented in one district does better elsewhere. The combined effect of these factors is that minimum DV is invariably at least 2 per cent (rather than zero) and in most cases the effective minimum at national level (and hence a benchmark for Scotland and Wales) will be around 4 per cent.

In practice, the lowest feasible level of DV is mostly driven by quite another factor - the proportion of the vote going to 'other' parties, that is very small political groupuscles with under 1 per cent support, which are too small and fragmented to win representation. If voters choose to extensively fragment their votes in this way (as they often may in newly established voting systems, for instance) then there is no conceivable set of arrangements that can lower the DV score below the combined vote share of the groupuscles.

• **The DV- 1 score** is an easy to implement way of allowing for this effect. Here we compute the conventional DV score but *excluding* the 'other' vote going to parties or candidates with less than 1 per cent of the vote. The logic of this measure is that no electoral system (of any type) is likely to afford representation to small political groupuscles or candidates who attract less than 1 per cent of the vote. Across different elections, and notwithstanding the arguments of Cox (1997) to the contrary, the proportion of the vote going to these elements may vary, especially in new electoral systems such as those here. Yet conventional DV will add these non-defects to the charge sheet against a system, overstating

the level of disproportionality. Hence the DV –1 score is a better basis for comparison and gives a fairer view of how many representatives occupy seats not justified in terms of their party's vote share than does the conventional measure. (The only difficulty for DV – 1 arises in comparative politics analyses covering many countries, where it may not be easy to acquire details of election results that are sufficiently full and accurate to identify parties under 1 per cent. Here the LDV measure below may have advantages).

The main problem with the DV and the DV-1 scores is that they have no useful fixed *maximum* value. This limitation is a serious one, since ideally we want our indices to run from 0 to 100 per cent. In fact a DV score of 100% can only arise if all the seats go to a party that gets no votes at all, a nonsensical result in a liberal democracy and hence not a relevant point of reference against which to measure performance. (Readers new to this field should be warned that some of the older literature on electoral systems did use this wholly inappropriate point of reference to give meaningless 'proportionality index' scores constructed as 100% minus DV, a nonsense number).

• **Alternative DV** (ADV) copes with this limitation by relativizing the DV score by reference to the size of the largest party's vote share. The intuition here is that the highest possible value of DV that can be racked up within a liberal democracy arises if all the seats were to go to the largest party (a common result in UK local government elections, for instance, where one-party councils can endure for years in some areas – see Dunleavy and Margetts, 1999c). If this is indeed the most extreme disproportional result that we would be prepared to recognize as still occurring in a liberal democracy, then we can scale ADV scores against it. We multiply the DV score by 100 and then divide by the size of the 'remainder' vote after subtracting the vote share of the largest party (V_1):

$$ADV = (DV*100)/(100 - V_1)$$

The ADV score has a ready intuitive meaning, measuring in a consistent way how far a polity is on a dimension from being a perfect democracy (0) to not being a liberal democracy at all (100). For instance, an ADV score of 48 per cent denotes a voting system that is halfway to ceasing to be democratic. However, the effective minimum score for ADV will of course be considerably above zero and higher than for DV (depending on the size of the largest party's vote). For instance, the practicable minimum conventional DV score of around 4 per cent would translate to an ADV score of around 8 per cent with a largest party on half the vote, or of 5 per cent with the largest party on 20 per cent support.

• **The least squares DV measure** (LDV) handles computing deviations in a different way. First we square all the individual (seats minus votes) deviations (which automatically gets rid of the minus signs), then sum these up and divide by two (to avoid double counting), and then take the square root of the resultant number. LDV closely follows the DV score itself except that it yields much lower scores, because the measure is chiefly influenced by deviations in the largest parties' seats and votes. The squaring operation, followed later on by seeking a square root, tends to automatically render insignificant deviations in seats won by the smallest parties, which contribute only negligibly to changing LDV scores. Hence LDV has been strongly advocated for use in comparative politics research by some writers who see it as irrelevant in this context how very small parties are treated and want to concentrate only on the handling of significant political groupings (see especially Lijphardt, 1994, 58-62).

However, for the purposes of analysing proportionality within the same political system over time it is hard to see what on earth the advantages of LDV are supposed to be. It simply produces an artificially low DV score in a disguised mathematical manner that is not transparent for most readers. Furthermore the score number is without any intuitive meaning whatsoever, unlike the DV, DV - 1 and ADV scores. In the analysis below we include LDV scores for completeness' sake and in case they are of use to other analysts. But we regard the measure as without merit. A much better and more explicit way to handle the problem of the small party votes is to compute DV-1 as above. In this way readers can make their own choice of which score they think most useful or appropriate, without the behind-the-scenes-manipulation qualities of the LDV method.

3. The performance of the Scottish, Welsh and London AMS systems

The basic features of the two elections so far for the Scottish Parliament and Welsh Assembly are shown in Table 2 and compared with the single election so far held in London plus projections for all three AMS systems made from the 1997 general election results (also very similar to the 2001 outcomes). The key trend in Scotland has been for Labour's vote share at the top-up stage to be less than the party's general election fortunes and to shrink over time, with all the established parties getting fewer top-up stage votes than constituency votes. The effective number of parties (ENP) measure controls for the relative sizes of parties and rose to 5.7 in 2003, (radically up from 4.3 in 1999 and 3.3 in the 1997 general election). A key

influence was the increased left-of-Labour vote accruing to the Greens and the nearly 7 per cent top-up vote for the Scottish Socialist Party. Six parties secured multiple seats in the Scottish Parliament, so that the ENP for seats was 4.2, the largest number of parties ever recorded for a mainland Britain political institution for many decades. Even so the relative reduction of parties (RRP) measure shows that in both 1999 and 2003 the Scottish Parliament voting system reduced the number of parties by abut a quarter on the number of parties that the electorate voted for. Labour secured nearly 10 per cent more seats than it had top-up votes share, far more than its increment in the constituency vote (5 per cent). No other vote deviation was even a fifth as large.

In Wales by contrast Labour's 2003 vote share rebounded by 1 per cent on its 1999 score and Plaid Cymru's support fell off by 7 points, with support for smaller parties the main change in the top-up votes. Labour support at this stage was also down by just over 3 per cent on its constituency votes, twice as much as for Plaid Cymru and the Liberal Democrats. The extra dispersion of the top-up vote went chiefly to the Greens, Socialist Labour Party and the UK Independence Party, but voting for other than the big four parties was half the level in Wales that it was in Scotland. Nonetheless Wales recorded an ENP of nearly 4.5 in votes (up from 3.8 in 1999), while the ENP for seats remained stubbornly at 3, a relative reduction in the parties according representation of nearly a third. Labour was the only party over-represented in the Assembly result, achieving over13 per cent more seats than its top-up vote share (and 10 per cent more than even its constituency share). The main parties under-represented were the Greens, UKIP, and the Liberal Democrats, while others' seat shortfalls were less.

Table 3 shows how these varied fortunes affected the various deviation from proportionality measures in the 2003 elections. For 2003 we show two alternative measures, one looking at the differences between the top-up votes and the final seats breakdown, and the second showing the differences between the average vote for the parties and final seats.

Table 3: Measures of disproportionality in Scotland and Wales, 2003 and 1999, and London 2000

	Scotland			Wales			London
	Top-up votes basis 2003	**Average votes basis 2003**	**Top-up votes basis 1999**	**Top-up votes basis 2003**	**Average votes basis 2003**	**Top-up votes basis 1999**	**Top-up votes basis 2000**
DV-1	10.0	7.9	9.6	12.9	12.6	10.6	12.9
DV	12.1	9.4	10.3	14.1	14.0	10.6	14.8
ADV	17.1	13.4	15.6	22.2	22.2	16.1	21.2
LDV	7.6	6.6	7.6	10.5	10.2	8.6	7.7

Notes: DV-1 is DV excluding other parties below 1 % (which also covers independents not winning seats). ADV is alternative DV and LDV is least squares DV – see main text for explanations. The average votes basis computes party vote shares as the average of the constituency vote and top-up vote, except where parties did not contest the constituency stage, in which case we use the top-up votes alone. We re-base these numbers to equal 100 per cent and measure deviations between the resulting party vote shares and final seats.

In 1999 the Scottish and Welsh systems behaved almost equally proportionally in DV and ADV terms. But in 2003 the Labour party's resumption of a stronger lead over Plaid Cymru was very favourable for its winning seats in Wales, and the DV score there jumped 3.5 points. In Scotland the DV score also rose, but chiefly because of the dispersion of votes to small parties. The ADV score for Wales for 2003 is appreciably higher than for Scotland, even exceeding the level recorded in London in 2000 – which reflected the high 'other' vote there. Whichever measure we use, it should be clear that all the British AMS systems have relatively high levels of deviation from proportionality, even if we screen out the non-representation of groupuscles using the DV-1 measure. The proportional systems are clearly much better than plurality rule – which has recorded conventional DV scores of 19 to 24 nationally for three decades now, since the Liberal breakthrough in the mid 1970s. In Scotland and Wales Labour's hegemony means that regional DV scores under plurality rule are much higher – 28 per cent in Wales in 1997 and with scores of 28, 33 and an astonishing 42 per cent in three Scottish regions. So the new AMS systems are performing much better than plurality rule, on average halving the level of DV in Wales and in Scotland producing deviations only a third of those recorded in plurality rule elections. Similarly the London

2000 levels of DV were appreciably lower than the 31 per cent DV score for inner London in 1997, but not massively better than the outer London DV of 18 under plurality rule. For each of the AMS systems the DV-1 scores also show a better performance once the impact of the dispersion of the vote to new or small parties is screened out.

Nonetheless we can also trace out some important implications of the remaining levels of disproportionality by looking at the patterns of seats and coalitional power that results, shown in Table 4. In Scotland Labour's decline meant that it slipped further away from the threshold needed for majority control, to the point where it can now only barely pass this level in coalition with the Liberal Democrats. If this trend continues a three-party coalition (perhaps Labour-LD-Green) may well be needed for majority government in Edinburgh in 2007. Yet the greater fragmentation of the Scottish parliament, and especially the decline of SNP seats actually meant that Labour's coalitional power score (measured by the Banzahf index) was completely stable between 1999 and 2003, and that its relative advantage viz a viz each of the main opposition parties actually increased. Meanwhile in Wales Labour's accession of two more seats in 2003 was enough it to give it half of the Assembly seats, but four fifths of the coalitional power according to the Banzahf index, with all the other main parties seeing their Banzahf scores cut by two thirds. Clearly the very limited top-up element provided in Wales was not enough to stop Labour benefiting from what is essentially the creation of an artificial majority, a result that PR systems are supposed to guard against.

How inclusive have the new systems been in forming governments? The Scottish bare majority coalition in 2003 rests on a combined top-up stage vote share of 41 per cent (less than Tony Blair's or Margaret Thatcher's mandate) and 6 points less than the 1999 vote base, which was almost a majority. The Welsh 'artificial' majority in 2003 is based on 37 per cent support, compared with the previous Labour-Liberal Democrat coalition, which rested on 49 per cent support. In these respects the Scottish and Welsh systems contrast unfavourably with the GLA, where the outcome of the 2000 election (affecting only the legislature, since the London Mayor is separately elected) was a de facto ruling coalition of Labour, Liberal Democrats and Greens, commanding 69 per cent of the vote.

An even more interesting 'welfare' test of the British AMS systems is suggested by recent work from Josep Colomer (2001) who points out that there are good a priori grounds for believing that systems which assign governing power to a party or coalition including the

median voter position will be more welfare-maximizing for voters as a whole than those with more extreme positions. The 1999 governments in Scotland and Wales, and the GLA outcome in 2000, all clearly spanned the median voter's position. It seems uncontroversial to count the Greens and Scottish Socialist Party (with nearly 14 per cent support between them) as being left of Scottish Labour in 2003, so the Labour-LD coalition still seems to span the median voter despite its minority vote backing. But the Welsh 2003 outcome equally clearly does not span the median voter position, unsurprisingly for an artificial majority government.

4. Conclusions – the need for further reform

To ask any mixed election system to cope with the historic legacy of Labour's massive predominance (in plurality rule terms) in Scotland and Wales was a pretty tall order. The Scottish system has responded reasonably well, achieving creditable levels of DV scores. There seems reason to believe that the problems that remain (especially the pro-Labour bias of seats compared with top-up votes) will be eased by the growth of support for left-of-Labour parties and perhaps some further revival of Scottish conservatism. The changes that might be made here could include some tidying up as the number of Scottish MPs at Westminster is allowed to fall. Opportunities could be taken to reduce the number of constituency seats in the Scottish Parliament so as to better approximate a 50:50 split of seats.

But the Welsh arrangements clearly have not worked well, and for one clear reason - there are simply insufficient top-up seats in each of the sub-regions to compensate for Labour's gross advantages in the plurality rule election stage. The simplest reform to implement would be to increase the number of Assembly members elected at the top-up stage by two in each sub-region, taking the top-up members share in the assembly to 41 per cent and boosting its size by a modest 8 extra seats. Adding an extra seat in each of the three largest Welsh top-up areas would take the top-up seats total to 31, giving the same 57/43 per cent split of seats as in Scotland and London, but still only increasing the Assembly's size to 71 members. A change of this kind is clearly justified from the existing poor performance of the Welsh system. There would seem to be a case for the opposition parties to unite to demand change, possibly before the opportunity to tie the Assembly disappears with a further artificial Labour majority in 2007.

The longer-term implications of the British AMS systems' performance for introducing proportional representation at Westminster (and for council elections) remain to

be gauged, but some interim implications can be drawn. Each of the three systems has achieved considerable legitimacy, with little media or popular criticism of the way that they voting systems have worked. Coalition governments in Scotland and Wales have worked reasonably well and the 'governability' problems anticipated by opponents of PR have simply never materialized. But clearly the democratic 'fine-tuning' which the Jenkins Commission attempted to accomplish, seeking a system that would be at best 'broadly proportional', is no longer very credible in the light of the Scottish, Welsh and London systems' performance.

In thinking about electing a UK-wide legislature there are various mitigating factors which mean that one might not need to have 43 per cent of its MPs elected at the top-up stage. With 659 MPs the House of Commons is amongst the world's largest legislatures, so that the mechanical effects which impede proportional matching in small bodies (like the Welsh Assembly and especially the GLA) are absent at the national scale. Similarly the regional imbalances in British politics are quite favourable for achieving a reduced DV level with fewer top-up seats, because Labour over-representation in urban areas, the north and Wales and Scotland is often offset by Conservative predominance in the south east and rural England. But we also now have very good reasons to believe (from the Scottish, Welsh and London experience) that a national AMS system would lead to a considerable splintering of top-up stage votes away from the major parties, and a considerable increase in the vote for 'other' parties, many of them unlikely to win representation. We conclude therefore that the Jenkins Commission's hope that broad proportionality could be obtained with only one sixth top-up seats is no longer tenable. At a minimum the experience of British AMS so far suggests that achieving broad proportionality at Westminster elections will require many more top-up seats, certainly no fewer than a quarter and ideally at least the one third level used in Wales. There might also be a good case for envisaging larger top-up stage sub-regions than the counties in which the Jenkins Commission reposed its faith. Larger sub-regions of around 20 to 25 seats, in tandem with a legal threshold of 4 to 5 per cent in the regional vote, would enhance the likelihood of being able to represent the more diversified patterns of alignment which continue to develop in contemporary Britain, yet without encouraging a trend to further fragmentation of the vote that no election system is likely to be able to represent.

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Table 2: Actual and projected votes and seat shares for the major parties in the three AMS assemblies

	Per cent share of top-up stage votes							Per cent share of total seats							
	Lab	**Con**	**Lib Dem**	**SNP or PC**	**Green**	**All others**	**ENPv**	**Lab**	**Con**	**Lib Dem**	**SNP Or PC**	**Green**	**All others**	**ENPs**	**RRP**
Scottish Parliament 2003	29	16	12	20	7	16	5.7	39	14	13	21	5	8	4.2	26
1999	34	15	13	27	4	8	4.3	43	14	13	27	1	2	3.3	23
(1997 projection)	46	18	13	22	-	2	3.3	45	10	16	29	-	0	3.1	5
Welsh National Assembly 2003	37	19	13	20	4	8	4.4	50	18	10	20	0	2	3.0	31
1999	36	17	13	31	3	2	3.8	47	15	10	28	0	0	3.0	20
(1997 projection)	55	20	12	10	-	4	2.8	58	17	12	13	-	0	2.5	9
London Assembly 2000	30	29	15		11	15	4.7	36	36	16		12	0	3.3	40
(1997 projection)	50	31	15		-	5	2.7	52	32	12		-	4	2.6	6

Notes to Table 2: - All the 1997 projections are derived from Dunleavy, Margetts and Weir (1997) for Scotland and Wales, from Dunleavy and Margetts (1998a) for London. Green votes were not separately modelled in these simulations since 1997 Green support was too low to do so. Note that our vote and seat shares for the Scottish Parliament and Welsh National Assembly are based on survey data showing how 1184 respondents in Scotland and 650 respondents in Wales said they would vote in elections for the devolved bodies, the survey conducted within three days of the actual 1997 general election vote. The ENPv columns shows the effective number of parties in the electorate's votes, and the ENPs shows the effective number of parties in the resulting legislature. The RRP column shows the 'relative reduction in parties' defined by Taagepera and Shugart as the percentage difference between ENPv and ENPs.

Table 4: Actual and projected seats outcomes and normalized Banzhaf scores for the major parties in the three AMS assemblies

	Number of seats								Normalized Banzahf score					
	Total	**50% + 1**	**Lab**	**Con**	**Lib Dem**	**SNP /PC**	**Green**	**Other**	**Lab**	**Con**	**Lib Dem**	**SNP /PC**	**Green**	**Others**
Scottish Parliament 2003	129	65	50	18	17	27	7	10	0.51	0.14	0.14	0.14	0.02	0.04
1999			56	18	17	35	1	2	0.5	0.17	0.17	0.17	0	0
(1997 projection)			58	13	21	37	-	0	0.5	0.17	0.17	0.17	-	0
Welsh National Assembly 2003	60	31	30	11	6	12	0	1	0.79	0.05	0.05	0.05	0	0.05
1999			28	9	6	17	0	0	0.5	0.17	0.17	0.17	0	0
(1997 projection)			35	10	7	8	-	0	1	0	0	0	-	0
London Assembly 2000	25	13	9	9	4		3	0	0.33	0.33	0.33		0	0
(1997 projection)			13	8	3		-	1	1	0	0		-	0

Notes to Table 3 : - In the SNP/PC and Other columns the normalized Banzhaf scores are the sum of all parties' scores in that column, which is an obvious simplification, especially for the 'Other' parties, who are unlikely to act together. In the original calculations, however, seat shares for all parties are entered independently, so that the Banzahf scores for the larger parties reflect the actual or projected legislative situation in detail. We used Brauninger and Konig (1997)'s excellent programme to compute these scores. The raw Banzahf score for a party is the number of majority coalitions where a party's exit would make it non-winning, divided by the total number of majority coalitions. The normalized score adds up all parties' scores and shows the percentage of total power in the system enjoyed by each party.