

Unequal and unequally distributed votes:  
the sources of electoral bias at recent British general elections

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The issue of electoral reform is rarely embraced simultaneously by all three of Britain's largest political parties. Although reform has been at the core of the Liberal Democrats' (and their predecessors') aspirations for many decades, both the Conservatives and Labour have generally sustained a commitment to the *status quo* (although with small elements within each committed to a move away from the current system). The year 2010 was thus unusual in that, to a greater or lesser extent, all three parties included some form of reform for Parliamentary elections in their general election manifestos.

The Liberal Democrats' manifesto maintained their promise to introduce a 'fair, more proportional voting system for MPs' using the Single Transferable Vote; they also proposed reducing the number of MPs by 150, to 500.<sup>1</sup> Labour's commitment paralleled earlier flirtations with the idea of voting reform when they feared they could not win again under first past the post (FPTP) rules.<sup>2</sup> Under Neil Kinnock in the early 1990s, for example, two reports were commissioned from a group led by Lord Plant (1991, 1993) which commended a version of the alternative vote (AV) later adopted for the election of mayors in England. When still uncertain of their prospects in 1997, the party's manifesto included a commitment to hold a referendum on the parliamentary voting system, following a report from an independent commission. The Jenkins report (1998) recommended a change to a more proportional system (known as AV+) but was quickly shelved after the landslide general election victory.

Labour returned to the issue in 2009 when victory at the forthcoming general election looked doubtful although a hung Parliament appeared a distinct possibility. Gordon Brown indicated that if re-elected Labour would hold a referendum on changing from FPTP to AV; the facility for this was introduced to the *Constitutional Reform and Governance Bill 2010* but the relevant clauses were removed before it was enacted. The offer was renewed in the party's 2010 manifesto, however. It was clearly addressed at the Liberal Democrats, the party with most to gain from a switch to the preferential AV system (which given current voting patterns might probably result in a slightly more favourable outcome for them than FPTP: Sanders et al., 2011); were there to be a hung Parliament, Labour would hope to form a coalition with the Liberal Democrats, so the smaller party was being offered a share of power.<sup>3</sup>

The Conservatives, with the exception of a small group, Conservative Action on Electoral Reform (CAER)<sup>4</sup>, have always been strongly committed to FPTP. Changing the voting system has never been a manifesto commitment. However, the party was increasingly concerned during the last two decades with aspects of how FPTP is structured and operates in the UK and its 2010 manifesto promised reform measures to try and negate some of those. Those proposals had been first raised in a pamphlet published by Conservative Reform (Tyrie, 2007), publicized in a Bill presented to the House of Lords by Lord Baker in 2007 and, with one slight change, repeated in a proposed amendment to Labour's *Constitutional Reform and Governance Bill 2010* (on which see McLean et al., 2009). Subsequently, the 2010 manifesto indicated the party's support for FPTP but also an intention to 'ensure every vote will have equal value by introducing 'fair vote' reforms to equalize the size of constituency electorates, and conduct a boundary review to implement these changes within

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<sup>1</sup> The manifesto is available at [http://www.libdems.org.uk/our\\_manifesto.aspx](http://www.libdems.org.uk/our_manifesto.aspx).

<sup>2</sup> The manifesto is available at <http://www.labour.org.uk/manifesto-splash>.

<sup>3</sup> In the negotiations over the possibility of a Labour-Liberal Democrat coalition being formed immediately after the 2010 election, it is suggested that Labour offered to make the change to AV without a referendum although Mandelson (2010, 548-9) suggests that holding a referendum in autumn 2010 remained the plan.

<sup>4</sup> <http://www.conservativeelectoralreform.org/>.

five years', while at the same time reducing the number of MPs by 10 per cent (from 650 to 585).<sup>5</sup>

In the post-election coalition bargaining, the Conservatives had few qualms in meeting the Liberal Democrats' desire for both a reduction in the number of MPs and for putting the issue of voting reform to a referendum, especially when the system being suggested was AV rather than some form of proportional representation. After one of the longest Parliamentary debates ever, the Bill facilitating a binding referendum on a switch to AV in May 2011, reducing the number of MPs, and introducing new rules – where electoral equality predominated – for delimiting constituencies, to be implemented by October 2013, in time for the next general election due in May 2015, was passed on 16 February 2011.

All three parties, therefore, had different motives for manifesto pledges to alter some aspect of the system for electing Parliament. The contention of this paper, however, is that much of the discussion within and between the various political parties about the operation of the current voting system is based on fundamental misconceptions so that some elements of the logic in their arguments for supporting some form of electoral reform are faulty. To clarify these points we explore recent election results, using a recently-enhanced method of measuring electoral bias (Borisyyuk et al. 2010). Having identified the nature and extent of the bias affecting each party the different biases are decomposed to understand better why that comes about. It appears that much, but not all, of the bias will prove immune to changes in either the number of MPs that are elected or the re-drawing of constituency boundaries.

## **WHY REFORM? RECENT UK ELECTION RESULTS**

The reasons why two (Conservatives and Liberal Democrats) at least of the parties are presently concerned with the current electoral system are readily appreciated by perusal of the results of the last seven general elections. Table 1 gives each party's shares of the UK votes and seats, and the difference between the two. For the Liberal Democrats, the problem is acute: at all seven elections, they were very substantially under-represented in the House of Commons, with a much smaller share of the seats than of the votes (the largest deficit being in 1983, when with over one-quarter of the votes cast they obtained only 3.5 per cent of the MPs).

Table 1 here

For the Conservatives, the main problem is seen when comparing their performance *in similar situations* with that of Labour. At each of the seven elections Labour obtained a larger share of the seats than of the votes, by an average of 20.6 percentage points at the three it won – in 1997, 2001 and 2005. For the Conservatives, on the other hand, at their four victories (1983-1992 and 2010) the average difference between their share of the seats and votes was only 13.8 percentage points. Furthermore, at the three which they lost they obtained a *smaller* share of the seats than of the votes (an average of 4.6 percentage points less) whereas when Labour lost it still gained a *greater* share of the seats than votes (an average of 6.7 percentage points more). Indeed, in 2010 Labour had a 'bonus' of some 10.7 percentage points in its share of the seats compared to its vote share, which was almost as large as the Conservatives' bonus as the winning party. A further point worthy of note is that

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<sup>5</sup> <http://www.conservatives.com/Policy/Manifesto.aspx>. Labour responded to these proposals – which it termed gerrymandering – in its manifesto by promising to establish a 'non-partisan Parliamentary Boundaries Review to examine the rules for constructing Parliamentary constituencies'.

after winning 40.7% of votes in 2001 Labour won a clear majority (62.5%) of seats but in 1992 the Conservatives, despite winning a similar vote share (41.9%), barely secured an overall majority of seats (51.6%). Clearly, operation of the voting system in the elections considered here has favoured Labour over the Conservatives (as well as the Liberal Democrats).

### *Decomposing unequal treatment*

Why, over a sequence of seven consecutive general elections, has FPTP not only very substantially discriminated against the smallest of the three main British parties in the translation of votes into seats but also favoured one of the larger two parties over the other? A way of ‘unpacking’ such election results in order not only to measure the extent of such ‘favouritism’ but also to understand its origins was proposed by a New Zealand political scientist, Ralph Brookes (1959, 1960); he termed the unequal treatment ‘distorted representation’ but it is now termed ‘bias’ by British social scientists who have adopted and subsequently modified his method.

Brookes’ approach was based on two methodological contentions. The first was that by using the widely-deployed concept of a uniform swing in the analysis of election results it was possible to construct a ‘notional election’ (we prefer the term ‘norm for comparison’ – see below) whereby the overall strength of the parties was changed, but their relative strength (and that of all other parties, plus non-voters) across the country’s constituencies remained constant. Using Brookes’ two-party bias method in 1997, for example, when Labour won 43.2 per cent of the votes cast and the Conservatives 30.7 per cent, if Labour’s vote share was reduced by 6.25 percentage points in each constituency and the Conservatives’ share increased by the same amount, so that each had equal shares (36.95 per cent of the votes cast nationally) in that ‘notional election’, then Labour would have won 82 more seats than the Conservatives (Johnston et al., 2001). This can be taken as the extent to which the election result is ‘biased’ or ‘distorted’, with respect to the two largest parties only: with equal shares of the votes cast, they would have been very unequally treated in the translation of votes into seats.<sup>6</sup>

Brookes’ second contention was that the distorted representation or electoral bias could be decomposed into different sources – viz., malapportionment/unequal electoral size; abstention/turnout; impact of small parties; and vote distribution/geography (for a detailed discussion of these see Johnston et al., 2001; Rallings et al., 2008). Brookes’ approach (his algebra is set out in Brookes, 1960) has been adapted (notably by Mortimore, 1992, and Johnston et al., 1999, 2001) and used to identify the volume and direction of bias at post-World War II UK general elections (e.g. Johnston et al., 2001, 2006).<sup>7</sup> These approaches show that in the 1950s and 1960s there was considerable bias favouring the Conservatives; in the 1970s and 1980s there was little overall bias favouring either them or the Labour party;

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<sup>6</sup> The full sequence of bias estimates calculated in that way for the seven elections since 1983 is – where a positive figure indicates a bias towards Labour and a negative figure a bias towards the Conservatives was: 1983, -5; 1987, -6; 1992, +38; 1997, +82; 2001, +142; 2005, +112; 2010, 54. (These are taken from Johnston et al., 2001; Borisjuk et al., 2010; and Johnston and Pattie, 2011a). In addition to this “equal shares” approach Brookes also allowed for a procedure that involved reversing the shares of the two main parties which gave similar, though not identical, bias estimates.

<sup>7</sup> Blau (2001; 2003) has presented a reasoned critique of this approach and proposed an alternative method, which reaches very similar conclusions about the size, direction and components of the observed bias,.

but from the 1990s on the volume of bias increased substantially, to the Labour party's very considerable advantage.

One major change in the British electoral scene over recent decades, however, has reduced the value of the adaptations of Brookes' approach, which was originally designed for use in a political context – New Zealand in the 1950s – where two parties predominated. This change is the movement away from a two-party to a somewhat more complex party system. The growth of electoral support since 1970 for both the Liberal Democrats and the two nationalist parties (the Scottish National Party and Plaid Cymru) has very substantially eroded the previous Conservative-Labour predominance. No longer do they together win more than 90 per cent of all the votes cast as they did in the 1950s; instead, their share has fallen to less than two-thirds (although they still gain a very disproportionate share of the MPs elected – in 2010, 89 per cent of the 632 elected on the British mainland, for example; Northern Ireland is excluded from all of the discussion in this paper because of its separate party system). Indeed, only 45 per cent of all British constituencies at the 2010 general election saw Conservative and Labour candidates occupy the first two finishing positions (Johnston and Pattie, 2011a); in almost one-third the Conservatives and Liberal Democrats occupied the first two places, with Labour and Liberal Democrat candidates relegating the Conservative candidate to third place in a further 15 per cent.

Great Britain no longer has a two-party system, therefore (see also Curtice 2009, 2010), and so in seeking to appreciate why its elections are characterized by such distorted representation (biased outcomes) a methodology for identifying and decomposing electoral bias is needed that better encompasses the contemporary situation. This is done by reworking Brookes' algebra so that, while in no way violating the original method's axioms, it can identify the impact of how the FPTP electoral system translates votes into seats for each of the Conservative, Labour *and* Liberal Democrat parties.

The conventional description of the Brookes' method refers to the creation of a 'notional election' using uniform swing. However, another interpretation is possible, which is useful when extending the method to the three-party situation. This 'notional election' could be considered simply as a technical step for the creation of the norm for comparison (Borisyuk et al., 2010), i.e. a specific symmetrical distribution that retains many important features of the actual data. Each party's bias is evaluated by contrasting its actual electoral outcome against that expected from this symmetrical distribution/the norm.

In the three-party case, the norm for comparison is a combination of six distributions – one for each of the possible orderings of those three parties (the actual election outcome and five artificial constructs/ "notionals" that should be considered as technical steps necessary for construction of the norm). Similar to the two-party situation, each party's bias is defined as the difference between its actual result and what is expected from the 'norm'. In effect, the degree of bias is calculated as the difference between the observed result and the average outcome over all six of those notional elections (Borisyuk et al., 2010).

Thus, for example, if the result of the actual election was that the (C)onservatives, (L)abour and Liberal (D)emocrats won 40, 35 and 20 per cent share of the votes respectively (finishing in the order 'CLD'), the five 'notional' elections would re-calculate the distribution of seats using the orderings CDL, LCD, LDC, DCL, DLC, where the three parties in the given order would obtain 40, 35 and 20 per cent of the votes respectively. The net bias estimate for the Conservative party, therefore, is calculated by subtracting its average number of seats across

the six ‘elections’ which constitute the norm for comparison (i.e. two elections when it is in the first position, two elections when it is positioned second and two further elections when it occupies the third-placed position) from the number of seats actually won at the general election. A positive figure indicates that the result was biased in the party’s favour; a negative figure indicates that it was disadvantaged. The net bias towards or against each party can then be decomposed – again, using a direct extension of Brookes’ algebra. Four such bias components are identified: three are the non-partisan equivalents of malapportionment (variations in constituency electorates, numbers of abstainers, and minor party votes – including the SNP and PC); the fourth is the geography component, which evaluates the effect of the distribution of each party’s support across the constituencies. In addition, we calculate a residual, net interaction component.<sup>8</sup>

## **BIAS IN BRITAIN’S THREE-PARTY SYSTEM 1983-2010**

The net bias figures for each of the three parties calculated using this new modification of Brookes’ algebra are in the first column of Table 2. The overall picture has three main components. The first is that Labour was the main beneficiary across the seven elections, with a positive net outcome in every case. This was smallest in 1997; of the three elections that Labour won, this had the largest gap in vote share between it and the second placed party (Table 1), and its landslide victory was fairly faithfully reflected in the allocation of seats; each of the other parties would have been treated similarly if they had won by that margin over the other two. Labour’s greatest benefits from biases in the system’s operation came in 1983, when it won its smallest share of the votes across the seven elections but still gained nearly one-third of the seats, and in 2005, when its share of the votes was less than three points more than the Conservatives’, but the difference between the two in seats share was nearly 25 percentage points.

Table 2 here

The second salient conclusion – one that is entirely consistent with all that is generally known about the problems of third-placed parties in single-member FPTP elections – is that the Liberal Democrats suffered a net bias against them at all seven elections. Just as Labour’s smallest advantage came in 1997, so did the Liberal Democrats’ least disadvantage; it was the election where their vote and seat shares were closest (Table 1). The third salient aspect of this sequence of election outcomes is that there was no consistent pattern in the treatment of the Conservatives: they experienced a positive net bias at two of the elections (which they won, including 2010) but were disadvantaged at the other five, substantially so in 2001 and 2005.

Table 2 also gives the values for the various bias components which, like the net figures, can be interpreted as the number of seats advantage or disadvantage that the parties experienced; one of the strong features of Brookes’ approach to bias measurement is that it uses an easily interpretable metric. Two features stand out with regard to the three ‘malapportionment’ components – electorate, abstentions, and minor party; Labour has a positive advantage from all of them at every election, whereas the Conservatives are disadvantaged in every case. In general, the Liberal Democrats are disadvantaged on all three across the seven elections, though they did benefit from winning relatively small constituencies in 1983 and 1987, when

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<sup>8</sup> The interaction term may also encompass some ‘random noise’ – bias towards or against the particular party that is not identified with one of the main components.

a substantial proportion of their victories occurred in Scotland and Wales, where constituencies have traditionally been much smaller than in England.<sup>9</sup>

Of these three components, the impact of minor parties on the outcomes is, not surprisingly, small.<sup>10</sup> That of abstentions is quite substantial, however, with Labour the major beneficiary and the Conservatives the most disadvantaged. Turnout fell substantially over the period, reaching its nadir in 2001 at 59.1 per cent of the British electorate. As it fell, Labour's advantage increased, because the percentage of abstainers tended to be larger in the seats that it won – especially in its inner city and industrial area heartlands.<sup>11</sup>

A similar difference characterizes the Labour:Conservative comparison with regard to the electorate component: Labour benefited from its strength in the relatively small constituencies at all seven elections, whereas the Conservatives were disadvantaged by their relative strengths in the larger constituencies. Labour's advantage comes from three sources. The first is its relative strength vis-à-vis the Conservatives in the two parts of Great Britain with the smaller constituencies – Scotland and Wales – which was integral to the system.<sup>12</sup>

Labour also benefits in respect of electorate size bias from variations within each country, especially England. Its relative strength in the smaller constituencies is partly a result of the Boundary Commissions producing constituencies with smaller electorates in Labour's heartlands (the inner cities and industrial areas). Because they have had to fit constituencies into the local government map and not cross county and borough boundaries unless the disparities between neighbouring constituencies are extreme, areas with small entitlements may get smaller seats than the average; most of those are in urban areas, where Labour tends to be the stronger party, notably but not only London which has some of England's smallest constituencies (as well as some of its largest; counties tend not to have as many small seats).<sup>13</sup> In addition, Labour tends to benefit most from demographic changes subsequent to

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<sup>9</sup> The average constituency in England in 1987 had 68,806 electors; for Scotland and Wales the averages were 54,895 and 56,614 respectively. The constituencies won by the Liberals in Wales averaged 51,474 electors; those won in Scotland averaged 51,154. From 2000 on, Scottish constituencies had to be defined using the same electoral quota as England, but they were still smaller than average than those in England at the 2010 election (65,500 in Scotland and 71,680 in England) because of the small constituencies in the Scottish Highlands and Islands where 'special geographical considerations' were invoked by the Boundary Commission during its 2004 redistribution. The average Welsh constituency had 56,500 electors in 2010.

<sup>10</sup> The SNP and Plaid Cymru contested only a minority of the constituencies and – with the exception of the Greens in 2010 and a small number of independents at the earlier elections- no other parties came close to victory in any constituency.

<sup>11</sup> The average turnout in Labour-won seats in 2001 was 56.7 per cent, compared to 63.0 per cent in those won by the Conservatives and 63.8 per cent in those won by the Liberal Democrats.

<sup>12</sup> Wales was guaranteed at least 35 seats in the 1944 *House of Commons (Redistribution of Seats) Act* and Scotland 71; the figure for Great Britain should be not substantially greater or less than 613, leaving 507 for England. Over time, the number has grown, more rapidly in England than in the other two countries but not sufficiently so to counter differentials in their rates of population growth. By 2001, Wales had 40 seats, Scotland 72 and England 629. Scotland's number was reduced to 59 in 2005 as part of the 1998 devolution settlement (see above, footnote 8) but Wales' complement remained unchanged at 40, and England's was increased before the 2010 election to 533. Because Labour is relatively stronger in Wales and Scotland than in England – it won 34 of the 40 Welsh seats in 2001 (85 per cent), for example and 56 of Scotland's 72 (78 per cent), as against 323 of England's 529 (61 per cent) – it benefits from their smaller constituencies in the votes-to-seats translation, as reflected in that bias component.

<sup>13</sup> For example, if the electoral quota were 72,000, a borough with 194,400 electors would be entitled to 2.7 constituencies: it would be allocated 3, with an average electorate of 64,800; a county with an electorate of 914,400 would be entitled to 12.7; it would be allocated 13, averaging 70,340 electors. On the other hand, a borough with 165,600 electors would be allocated 2 (against an entitlement of 2.3) averaging 82,800 each, whereas one with 885,600 (entitlement 12.3) would have 12 constituencies averaging 73,800. The smaller the

boundary revisions being accepted. The Commissions do not take projected population and electorate forecasts into account: they use the latest figures available at the start of their redistribution exercises to define constituencies with electorates ‘as equal as practicable’. As those constituencies ‘age’, some lose population and others grow – and it tends to be areas of Labour strength that lose people. Thus, for example, in England the 1997, 2001 and 2005 elections were fought in constituencies originally defined on 1990 electorate data. (i.e. they were some seven years out of date when first used). Of the 312 constituencies that Labour won in 1997 and 2001 and again in 2005, the average electorate remained consistent at around 67,000 whereas in the 154 constituencies won by the Conservatives at all three it increased from 81,700 through 84,000 finally reaching 85,000 at the 2005 election.

These differences produced by the over-representation of Scotland and (especially after 2005) Wales relative to England, combined with the increasing variation in constituency electorates over time as they ‘age’, stimulated the Conservatives to propose the changes heralded in their 2010 election manifesto and subsequently implemented in the *Parliamentary Voting System and Constituencies Act 2011*. These modified rules require every constituency with four exceptions to have electorates within +/-5 per cent of a UK-wide electoral quota (this is 76,641 for the first redistribution, which began in March 2011<sup>14</sup>). In addition, redistributions are to take place every five years so that each general election (under the *Fixed Term Parliaments Act 2011*) will be fought in a new set of, equalized, constituencies. In this way, the Conservatives expect to remove the disadvantage that they have suffered from constituency size differences at every general election since 1959 (Johnston et al., 2001).

## WHY IS GEOGRAPHY SO IMPORTANT?

The coalition government will probably remove (nearly?) all of one of the main sources of bias in the electoral system’s current operation when new constituencies are defined under the 2011 Act, therefore.<sup>15</sup> But, as Table 2 shows, *differences in electorate size are not a major contributor to the overall bias*, never exceeding +/-18 seats for any one party. Indeed, at recent elections size differences have been less substantial than those associated with abstentions. Thus the changes introduced in the new legislation are unlikely to result in election outcomes that treat each of the parties equally – and certainly not the Liberal Democrats relative to the other two.

The impact of the geography of abstentions cannot be changed by legislation – other than by making voting compulsory; it reflects individual behaviour patterns. Hence there is no reason to explore it further here. But what of the geography component, which Table 2 shows was by far the largest in its impact on the translation of votes into seats at every election for the Liberal Democrats, and the largest for both Labour and the Conservatives at five of the seven elections (it tied with electorate at one of the other two for Labour)? Furthermore, although this component was consistently a negative source of bias for the Liberal Democrats – and a very large one at two of the elections – it was positive at some elections and negative at

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local government unit the larger the average deviation of constituency electorates from the quota – and most of the areas with small constituencies tend to be in cities where labour is the stronger of the two main parties.

<sup>14</sup> See the discussion of this in the Boundary Commission for England’s Newsletter 2/2011 available at <http://www.boundarycommissionforengland.org.uk/docs/newsletter2-040311.pdf>.

<sup>15</sup> The exceptions to the +/-5 per cent rule are the Scottish constituencies of Orkney & Shetland (33,085 electors at the 2010 general election), H-Eileanan An Iar (the Western Isles – 22,266) and the Isle of Wight (which had one seat for 109,966 electors in 2010, but has been allocated two under the Act).



others for the remaining two parties, as well as varying very substantially in its size, especially for Labour (from +75 to -18).

The geography component, as already noted, reflects the efficiency – or effectiveness – of a party’s distribution of votes across the constituencies. This can be illustrated by dividing each party’s achieved votes into three groups:

- *Surplus votes* are those won in excess of the number needed to win in any constituency where it occupies first place, given the pattern of support for the other parties contesting the seat there; they are defined as the party’s total number of votes obtained minus those won by the second-placed party, plus one. Thus if Labour wins 25,000 votes in constituency *x* and the Conservatives come second with 22,000, Labour has amassed 2,999 surplus votes there;
- *Wasted votes* are those won in seats where a party loses (i.e. 22,000 Conservative votes are wasted in the above example); and
- *Effective votes* are those needed for victory in seats that the party wins – as defined above (i.e. 22,001 of Labour’s votes in that example).

Surplus and wasted votes do not contribute to winning seats, therefore; only effective votes do. It is thus in each party’s interests to maximize its effective votes and minimize the other two groups – which it can do by ‘winning small and losing big’: it should aim to win constituencies by only small majorities and in those seats where it is destined to lose it should accumulate few wasted votes and lose big. If a party was highly successful at that strategy, of course, it would be vulnerable to losing seats at the next election if there is a small swing against it, and would find it difficult to win other seats because of the large swing needed to overhaul the leading party locally. Nevertheless, at any one election, the closer its distribution of votes across the constituencies conforms to the maxim, ‘win small, lose big’, the better the outcome in the translation of votes into seats.

Table 3 here

Table 3 gives the number of votes for each party and the percentage of these in each of the three categories, surplus, wasted and effective. For the Liberal Democrats the picture is very clear – the great majority of their votes were wasted. They performed best in 2001 and 2005, when some 16 per cent of their votes were effective, but there was a fall-off in 2010: very few of their votes were surplus. This is the usual situation in an FPTP system when votes for a third-placed party are not spatially concentrated.<sup>16</sup> Few candidates win an election in a three-party system with less than 40 per cent of the votes – in part because of the impact of small parties and independents even if the smallest of the three largest parties does not perform well (see Johnston and Pattie, 2011a). At the 2010 general election in England, for example, only 77 of the 532 seats contested by all three of the largest parties (i.e. excluding the Speaker’s) were won with less than 40 per cent of the votes and just nine with less than 35 per cent.<sup>17</sup> Not only did the Liberal Democrats average well below that threshold at all of the elections being considered here, but they also had a relatively even distribution of their

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<sup>16</sup> This is the case, for example, with the Bloc Québécois in Canada which gets a share of the seats commensurate with vote share because votes are all concentrated in one province (Le Duc, 2007). In the UK, Plaid Cymru’s votes are significantly concentrated within Wales, so that with 0.56% of the UK total it obtained a reasonably proportional share of the 650 seats with three (0.46%); the SNP was less successful, however, with 1.65% of the votes it obtained only 6 seats (0.92%).

<sup>17</sup> One was won with only 29.4 per cent: by the Liberal Democrats in a three-way marginal contest (Norwich South), where Labour won 28.7 per cent and the Conservatives 23.0. The Green party candidate won 14.9 per cent and three others shred the remaining 4.1 percentage points.

share across all constituencies: in 2010, for example, they had a mean constituency share of 23.1 per cent, with a standard deviation of 10.5, whereas for the Conservatives and Labour the comparable figures were 35.6 (standard deviation 14.6) and 31.0 (15.9) respectively. The geography of Liberal Democrat support resembles a plateau with few peaks or troughs, so while it continues to get between one-fifth and one-quarter of the votes it is unlikely to win many seats – or come close to victory in others.

Turning to the other two parties, one clear – and anticipated – difference is between the situations when they won and lost the election overall. Each had more than 40 per cent of its votes effective in the elections that it won, and less in those that it lost. The Conservatives had more effective votes when they won in 1983, 1987 and 1992 (averaging 45.1 per cent) than Labour at the subsequent three elections (an average of 39.5). The Conservatives also had a slightly higher percentage of effective votes in 2010 than did Labour with a similar share of the votes overall in 2005. At the three elections they lost, however, the Conservatives had a smaller percentage of effective votes (averaging 29.9 per cent) than did Labour at the four they lost (average 32.1).

One clear indicator of the efficiency of a party's vote distribution is the number of surplus votes it obtains – those in excess of the number necessary for constituency victory. On this measure, the Conservatives clearly outperform Labour: their average surplus percentage at their four victories was 29.3, compared with 35.7 for Labour at its three victories. Similarly, the Conservatives had many fewer surplus votes when they lost (an average of 14.6 per cent) than did Labour (average 22.8). Labour traditionally had a large number of very safe seats that it won by substantial majorities – mainly in mining and industrial areas where not only was its support-base large but local trades unions mobilized substantial numbers of electors to vote. Although much of the industrial and union base to that support has been dissipated by post-1980 industrial change, nevertheless Labour still has these strongholds – a lot of them in Wales and Scotland – which deliver large percentages of surplus votes (even if the vote totals there are relatively small, because of both small electorate size and high abstention rates). This accounts for its large positive geography component at the 1983 and 1987 general elections (Table 2), and again in 2010. These were the elections when Labour performed particularly badly (getting below 30 per cent of the votes cast at two of three and just above at the other) and those relatively safe seats ensured that its seats share fell by less than was the case for the Conservatives in 1997-2005. When there was an overall swing of votes away from Labour this was not as exaggerated in the decline in the number of seats won as was the case when the Conservatives experienced a similar loss of support.

So why did Labour do so well in 1997 and 2001, when its seat share was more than 20 percentage points higher than its vote share? At these two elections its percentage of wasted votes was small – 20.8 and 23.1 respectively. A major reason for this is probably tactical voting. During the campaign prior to the 1997 general election Labour and the Liberal Democrats were not only united in their desire to remove the Conservative government but also close on many policy issues: indeed, both party leaders report their closeness at the time in their memoirs (Ashdown, 2009; Blair, 2010). Thus there was a great deal of (implicit and sometimes explicit, at least at the grass-roots level) encouragement to vote tactically where this could assist in the goal of defeating a Conservative candidate: where Labour was in a strong second place Liberal Democrat supporters voting Labour could assist in achieving that goal, whereas in seats where the Liberal Democrats had the better chance of unseating a Tory then Labour supporters switching to them could similarly help achieve a Conservative defeat. Estimates suggest that substantial numbers did vote tactically (Johnston et al., 2001, 168-175;

Johnston and Pattie, 2011b; Pattie and Johnston 2010). This meant that where Labour was in third place its vote fell relatively, if not absolutely, thereby reducing its number of wasted votes: the second part at least of the ‘win small but lose big’ maxim certainly applied then. Tactical voting was again on the (implicit agenda) in 2001, to prevent a Conservative recovery, but there was something of a ‘tactical unwind’ in 2005 (Fisher and Curtice, 2006). It reappeared in 2010, however, as a result of further attempts by Labour and Liberal Democrat supporters to prevent a (large?) Conservative victory, although there were also some moves by Conservative and Liberal Democrat supporters to prevent a further Labour government ensuing (Johnston and Pattie, 2010, 2011b).

### *Skewed distributions and the conversion of votes into seats*

Tactical voting illustrates how (party-induced in many cases) voter behaviour can influence the frequency distribution of a party’s support across the constituencies. Figures 1-3 show the vote distributions for Conservative, Labour and Liberal Democrat parties for all seven elections since 1983. According to the ‘win small, lose big’ maxim, the most efficient distribution would be negatively skewed, and the least efficient positively skewed, with the mode in the region of 45-55 per cent. In a two-party system, a party with just over 50 per cent of the votes cast and a negatively-skewed distribution would win a much larger share of the seats than of the votes, with the converse for a party having a positively-skewed distribution (Gudgin and Taylor, 1979; Johnston et al., 2001).<sup>18</sup> In a three-party system in which one of them gets a substantially smaller share than the other two, a positive skew is desirable for that third party since with a relatively small share (<25 per cent) of the votes nationally a number of constituencies where its percentage is much greater than the average allows it to win some seats and establish a parliamentary presence. As it grows, however, it needs to change the shape of its distribution from a positive to a negative skew, which is a difficult task (although not impossible, as the postwar Labour experience demonstrates: it had an inefficient positive skew in the early decades, but a much more efficient negative skew by the 1990s – Johnston et al., 2002). The shape of the Liberal Democrat vote distribution has posed a considerable problem at recent elections: should the party invest limited campaigning resources on the relatively small number of seats where they have a chance of winning, thereby increasing their parliamentary cohort, or should they aim to broaden the geographical base of their support and so build the foundations for shifting to a negatively-skewed distribution (Denver, 2001). Figure 3 indicates that there was little change over the period 1983-2010: their geography of support was very positively-skewed at all seven elections, a pattern very different to that for Labour (which is very platykurtic, with both positive and negative elements but with a long negative tail, especially in 1997 and 2001 when it benefited from tactical voting: Figure 2) and the Conservatives (which is negatively-skewed; Figure 1).

Figures 1-3 here

In a two-party system, where minor parties gain only a very small share of the votes cast (as in Britain before the 1970s), the interconnection of the two parties’ frequency distributions is crucial in determining the extent of the disproportionality and bias in general election outcomes. In a three-party system (or even a ‘two-and-a-half party system’, which is how some commentators describe the current British situation: Laakso, 1979; Siaroff, 2003) the interconnection of the three frequency distributions determines how their votes are translated

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<sup>18</sup> This was the basis for some of the early attempts to measure ‘electoral bias/distorted representation’ (Gudgin and Taylor, 1979; Johnston, 1979).

into seats, and this process is further complicated by the impact of the smaller parties, who won 10 per cent of the votes cast in 2010. As the number of parties – large and small – increases, so the average percentage of the votes cast needed for victory is reduced in most constituencies. A share considerably below 40 per cent may deliver a constituency victory, especially if the three largest parties are all strong contenders in such seats. In 2010 there were only 16 constituencies out of the 631 in England where all three parties obtained 25 per cent or more of the votes – what might be identified as the ‘three-party marginals’.<sup>19</sup> In a further 78 seats, however, all three parties got 20 per cent or more – although in 26 of them the winning party had a margin of 20 or more percentage points over the second-placed and in a further 22 the lead was between 10 and 20 points.

What is crucial for a party in such a situation, therefore, is whether it is able to convert its share of the votes into winning the seat. Table 4 shows that in 2010 all three parties won all of the seats where they obtained 45 per cent or more of the votes cast, and there was only one case where a party won with less than 30 per cent (the Liberal Democrats in Norwich South).<sup>20</sup> Crucial, therefore, is relative success in converting votes into seats where a party’s share falls between 30 and 45 per cent. In 2010 there were very considerable differences among the parties in this respect. Labour won virtually all of the seats where it gained between 40 and 45 per cent of the votes, for example, whereas the Conservatives failed to win 11 of the 77 where it was in that position, and the Liberal Democrats failed to win as many as half. And it was the same in the constituencies where the parties gained 30-40 per cent of the total; Labour achieved victory in 38 per cent compared to 26 per cent for the Conservatives and only 11 per cent for the Liberal Democrats.

Table 4 here

Why this difference? One possibility is that Labour was more likely to get 30-45 per cent of the votes in Scottish and Welsh constituencies where the presence of a fourth substantial party nationally (the SNP and PC respectively) meant that on average a smaller share of the votes cast was likely to result in a constituency victory than was the case in England, where in most constituencies there was no comparable fourth party. (Apart from the three incumbent independent MPs, all of whom lost their seats, there were only eight English constituencies where at least one of the small party candidates won 10 per cent or more of the votes.<sup>21</sup>) Indeed, of the 112 seats where Labour won with 30-45 per cent of the votes, 28 of them were in Scotland or Wales (where it lost just eight seats with that share of the votes); for the Conservatives, only 8 of their victories in that vote share band were in Scotland or Wales (where they also lost 14);<sup>22</sup> and the Liberal Democrats won nine of the 18 seats there where they won 30-45 per cent of the votes.<sup>23</sup>

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<sup>19</sup> The number of seats is one less than the full total of 632 because, in line with established practice, the incumbent Speaker was not challenged by the main parties.

<sup>20</sup> This was a rare ‘three-and-a-half-way marginal’: the Liberal Democrats won 29.4 per cent Labour 28.7 per cent, the Conservatives 22.9 per cent and the Greens 14.9.

<sup>21</sup> The BNP did so in Barking, Dagenham & Rainham, and Rotherham; the Greens did in Brighton Pavilion (which they won) and Norwich South; and Respect did in Bethnal Green & Bow, Birmingham Hall Green, and Poplar & Limehouse.

<sup>22</sup> In all eight of the Conservative victories only two parties got over 20 per cent of the votes and in none of these did either the SNP or PC get over 20 per cent. The Conservatives’ successes in those two countries were all in ‘straight fights’ with Labour.;

<sup>23</sup> Parts of rural Scotland and Wales have long been Liberal heartlands.

Apart from this difference between the three parties in their relative strengths in England, Scotland and Wales a further difference in their ability to convert a vote share of 30-45 per cent into a constituency victory reflects their geographies of support. In effect, Labour was better able to win in the constituencies where the three main parties were relatively equal – i.e. those that came closest to being three-way marginals. This can be illustrated by computing a simple statistic PCS:

$$PCS_i = \text{Sqrt} [\text{shLab}_i - 33.3)^2 + (\text{shCon}_i - 33.3)^2 + (\text{shLD}_i - 33.3)^2],$$

where  $\text{shLab}_i$ ,  $\text{shCon}_i$  and  $\text{shLD}_i$  are the Labour, Conservative and Liberal Democrat percentages of the total number of votes cast for those three parties only in constituency  $i$ . This statistic shows how far away each constituency is from the ‘equal shares’ situation (the perfect three-party competition). The smaller the value of  $PCS_i$ , the more three-way marginal is the seat. In England, constituencies where Labour obtained between 30 and 45 per cent of the three-party votes had an average PCS of 18 whereas the mean PCS values in similar Conservative or Liberal Democrat seats were 21 and 25, respectively. On average, therefore, seats where Labour got 30-45 per cent of the votes in 2010 were also more likely to be three-way marginals than was the case with the other two parties, hence its higher conversion rate.<sup>24</sup>

As the three frequency distributions shown in Figures 1-3 move between elections, as each party’s constituency average share of the votes changes, and, to the extent that the changes in individual constituencies vary from a uniform swing, the distributions also change shape, so the conversion rates should alter. Table 5 shows in more detail those rates for two percentage share bands – 30-40, 30-45 – at the seven general elections from 1983 on, plus the narrower 40-45 percentage share band; most parties would expect to win a constituency with that share in a three-party contest. A number of main conclusions stand out.

Table 5 here

At the first three elections the conversion rates for the Liberal Democrats were much smaller than those for the other two parties in all three bands. Whatever their vote share in that crucial area between 30 and 45 per cent, the Liberal Democrats were less likely to win the seats than either Labour or the Conservatives, in some cases by a very large margin: in 1983, for example, the Conservatives won 88 per cent of the 67 seats where they got 40-45 per cent, and Labour won 95 per cent of the 59 seats where it got that share, but the Liberal Democrats’ conversion rate was only 35 per cent of the 17 seats where its share was between 40-45. That party’s best performance on this measure was in 1997, when it won 22 per cent of the seats where it gained 30-40 per cent, 42 per cent where its share was between 30 and 45, and 94 per cent where it was 40-45. But it declined thereafter

With regard to the other two parties, the clearest difference is at the last three elections (2001-2010) when Labour had substantially larger conversion rates in each band than was the case for the Conservatives. Indeed, in 2005 Labour won 62.2 per cent of the seats where it gained 30-45 per cent of the votes, and 90.6 per cent of those where its share was 40-45, compared to figures of 28.4 and 78.8 per cent respectively for the Conservatives. Prior to that, however,

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<sup>24</sup> A similar sequence of values (55.7, 57.3 and 59.8) emerges if the percentage shares used in the formula apply to all parties contesting the seat rather than just the ‘big three’.

the differences between the two were slight and largely patternless – although both had very low conversion rates, even in the 40-45 per cent vote share band, at the 1992 election. The importance of the geography component to the overall bias in recent UK general election results – how efficiently each of the parties’ votes are distributed across the constituencies – is thus a function of two separate factors. The first is the frequency distribution of each party’s vote shares: the degree and direction of skewness is a crucial determinant of the efficiency of the process whereby votes are translated into seats. But the nature of the skewed distributions cannot account for all of the inter-party variation in the ratios of seats to votes because of variations in the percentages of their votes that were either surplus, wasted or effective (Table 3) The relative proportions of each party’s votes in those three categories is apparently largely a function of variations in their success rates at winning seats when their vote share falls in the range 30-45 per cent. Below the lower figure, each party almost invariably failed to win the constituency whereas above that figure victory was assured (Table 4).

Crucial to appreciating the variations in conversion rates within that vote range is the nature of the local competitive situation. The likelihood of a party winning a seat if its vote share lies somewhere between 30-45 per cent depends on its competitors’ relative performance. If, for example, Labour had between 30-45 per cent of a constituency’s votes and both the Conservatives and the Liberal Democrats had a substantial share of the total too, then Labour’s chances of success increased – three-way marginals are necessarily won with smaller vote shares. In addition, the better the aggregated performance of the minor/other parties the smaller the vote share that one of the three large parties needs for victory. In a close three-way marginal constituency where the minor parties win 10 per cent of the votes, victory is quite likely for one of the major parties with just 33 per cent; where the minor parties get only 2 per cent between them, 36 per cent may be needed. On the other hand in a constituency where the third party gets only about 15 per cent of the votes, and where the minor parties win 10 per cent then a share of around 38 per cent is probably needed by one of the other two.

Table 6 here

To explore this further, Table 6 displays for the 2010 general election the mean percentages of votes won in constituencies for both the third party and the minor/other parties<sup>25</sup> where one of the three large parties gained between 30-45 per cent of the votes, in three separate bands. Differences within each band in the means between the seats won and lost by the relevant party are shown, and their statistical significance evaluated using a Mann-Whitney U-test.<sup>26</sup> The first set of comparisons, which relate to the third party, shows very substantial differences – all of them statistically significant at the 0.05 level or better according to the U-test – between the seats that a party won and lost in the vote share captured by the third-placed party. The conversion rate was higher, the better the third-placed party’s performance

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<sup>25</sup> By third party we mean for each constituency that party of the three main parties that is ranked third among them. By minor/other parties we refer to all other parties except for Conservative, Labour and Liberal Democrats. This category will, of course, include the nationalist parties even when they actually won the constituency.

<sup>26</sup> A non-parametric test is used because the data are substantially non-normal, variances are unequal for most of the pairs, and the sample sizes are also small (between 2 and 69). We also applied an adjusted for unequal variances t-test to the data. Discrepancies between the two methods occurred in just 3 of 18 comparisons. Cases where the tests contradicted one another in respect of rejecting the null hypothesis (about equality of mean values) at the 0.05 level are marked by asterisks in Table 6.

locally. Conversely, where the third-placed party's support was on average lower then there was less chance that the party of interest would win the constituency.

Six of the U-tests for the minor/other party vote percentage produced statistically significant differences at the 0.05 level or better. All of the significant test results indicate higher mean performances by the minor/other parties in the seats won by the Conservatives, Labour and the Liberal Democrats in each of the bands than in those that the respective parties lost. Again, therefore, the stronger the opposition from parties other than two main contenders in a constituency, the greater the probability that one of those contenders who obtained 30-45 per cent of the votes there would win the seat.

The clear conclusion from these figures for 2010, therefore, is that each party's conversion rate for constituencies where it gained between 30 and 45 per cent of the votes was very much a function of the relative performance of both the third-placed party there and, to a slightly lesser extent, that of the minor parties. Where parties other than its main contender perform well, a party is more likely to win in a seat where it has 30-45 per cent of the votes than where the constituency contest is, in effect, a two-party race. This accounts for the Liberal Democrats' poor conversion rate in 2010 relative to the other two parties – even where it got 40-45 per cent of the votes. The final block of data in Table 6 shows that third party performance in those 22 constituencies was relatively low (averaging 9.6 per cent across all 22 compared to 16.0 across all 70 seats where Labour won 40-45 per cent, and 14.9 per cent in the 80 where the Conservatives did). And this was not compensated by above average minor party performance. Thus although the better the third party performance the greater the probability of a Liberal Democrat victory, there were too few examples of strong third party performance facilitating that.

Whether a party's performance in winning 30-45 per cent of the votes in a constituency is converted into a victory there is thus a function not only its own performance and that of its major challenger but also on the vote share won by the other parties that fielded candidates. In a two-party race, where the third party's performance is weak and there are either no other candidates or they get very few votes, 30-45 per cent of the votes may be insufficient for victory. And that was much more likely to be the case in 2010 for the Liberal Democrats than for either the Conservatives or Labour. Where you are going to get a substantial share of the votes, but not a majority, you want your rivals – especially those who do not threaten your position – to perform relatively well too, and that is not easily within your control.<sup>27</sup> The intensity of your local campaign usually affects your own vote share (as it did in 2010: Johnston et al., 2011), and perhaps your major opponents' too, but is less likely to influence that of other candidates. And that appears to be the major reason for not only the inter-party differences in conversion rates observed in Table 5 but also the differences for each party over time – the Liberal Democrats' better conversion rates from 1997 on certainly suggest major differences in the competitive situation in those seats where it gained 30-45 per cent of the votes between the first three and the next three elections: the 2010 outcome suggests a possible reversion to the pre-1997 situation (and may reflect more people being prepared to vote tactically for the Liberal Democrats when Labour was performing well than at elections where the Conservatives prevailed).

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<sup>27</sup> Of course, you don't want them to do too well if they are mainly going to win support from those who would otherwise have voted for you: Dorey (2010) estimates that the Conservatives may have failed to win as many as 21 seats in 2010 because of UKIP's strength there!

## CONCLUSIONS

In the context of contemporary electoral reform debates, the analyses presented here have more than sustained the Liberal Democrats' opposition to the first-past-the-post system. Not only have they been disadvantaged in the way that is common for the third largest party in a system whose votes are fairly evenly distributed across the constituencies but in addition they have been less able to win seats than their opponents across all seven elections studied in the constituencies where they manage to exceed a 30 per cent share of the votes. For them a change to a more proportional electoral system would bring a major shift in their success rate – but that would necessarily disadvantage the two other major parties.

The Conservatives have also been disadvantaged at most of the recent elections. Their analyses of that situation have focused on differences in constituency electorates and the reforms that they implemented in 2011 were designed to correct that – by requiring all constituencies to have electorates within a narrow range (within +/-5 per cent of the national average) and reviews of all constituencies every five years to prevent disparities growing consequent upon population shifts. But the disadvantage that they have suffered from that particular bias component has been small – as has Labour's advantage – and although removing its cause would eliminate that bias element, which could be crucial in a close contest, it would not mean a 'level playing field' in future contests between them and Labour (Borisjuk et al. 2011). As Table 7 demonstrates the result of the Fifth Boundary Review did not markedly change the overall distribution of bias, largely the bias that followed from malapportionment. There is little reason to believe the Sixth Review scheduled to complete in 2013 will be any different.

Table 7 here

As we have shown, the geography of a party's votes – how efficiently they are distributed across the constituencies – is also crucial to the creation of biased election results in the UK. Other studies have also reached this conclusion, but in this paper we have gone further in seeking to appreciate why one party performs better than another in the translation of votes into seats, even if they have the same vote share. Part of the reason – as others have shown (e.g. Gudgin and Taylor, 1979; Johnston et al., 2002) – lies in the frequency distribution of each party's vote shares: certain distributions – where the party 'wins small but loses big' – produce better outcomes than others. But, as our analyses of conversion rates have shown, the inter-relationships of those distributions is also crucial. This is reflected in the local situation in each constituency. Where the contest between all three of the largest parties is relatively close, then a seat may be won with less than 35 per cent of the votes – especially if one or more of the minor parties also performs well (hence Labour's better conversion rates because of its relative strength in Scotland and Wales in many parts of which there is strong competition from the nationalist parties). But where the minor parties and/or one of the three largest parties are weak, 40 per cent of the votes may be insufficient to secure victory – a situation from which the Liberal Democrats have been the major losers over the last seven general elections.

Vote distribution profiles for the three main parties since 1983 reflect patterns of voter behaviour (and of party behaviour in their efforts to mobilise support, which is spatially very variable: Denver and Hands, 1997; Pattie and Johnston, 2009) and which are not readily manipulated. Studies of campaign effects show that the more intensive a party's campaign in a constituency the better, *ceteris paribus*, its performance there (Johnston and Pattie, 2008) so



the geography of party activity and resources is crucial.<sup>28</sup> That is open to manipulation at the margin through the encouragement of tactical voting – and, at the extreme, by parties agreeing not to field candidates against each other in particular circumstances, which occurred with the Alliance of the Liberals and Social Democrats in 1983 and 1987 and might occur again at the end of a five-year period of coalition government. But to a large extent the parties have to operate within the constraints of the local situations, and our analyses of conversion rates have shown that these are critical to how many seats that they win with a given share of the constituency votes.

In a country where two parties predominate and there is not only neither malapportionment nor gerrymandering but also the parameters of the first-past-the-post electoral system (how constituencies are defined) and the geographies of party support show no peculiarities, then election results are largely predictable. For any given share of the votes cast the number of seats won is very predictable; there may be disproportionality – with the largest of the parties getting a ‘winner’s bonus’ – but it applies more or less equally to each party. This was very largely the case in Britain in the 1950s and 1960s (Johnston et al., 2001). But as the situation moves towards a three-party system, with smaller parties also winning more than a trivial share of the votes, the election outcomes become less predictable and more likely to be biased. This is now the British situation, and its analyses call for methods that can unravel the causes of any bias. That has been achieved here, using a modification of a well-tried measure of bias in two-party systems to take account of the three-party situation and analyses of key aspects of the geography of the results of the last seven general elections to identify why a party may or may not win a constituency with a given share of the votes.

Unpredictability is a marked feature of recent British election results, which raises questions about the electoral system’s ‘fitness for purpose’ (Curtice, 2009, 2010). Using a new methodology this paper helps to shed light on such concerns. So much of the unpredictability depends on the inter-relationships between a series of geographies; we can successfully predict what will happen when they interact in particular ways – but not *when* those situations will emerge. The minimal electoral reform undertaken by the Conservatives substantially to reduce variations in constituency size will not change that situation markedly. Nor will any shift to the alternative vote if implemented. In multi-party Britain, geography is always going to ensure unpredictable election outcomes in single-member constituency electoral systems.

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<sup>28</sup> As exemplified by the Conservatives’ successful target seats strategy in 2010: Ashcroft 2010; Johnston and Pattie, 2010.

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Table 1. Results of British general elections 1983-2010

Party	Election	Per Cent of		
		Votes	Seats	(Seats - Votes)
Conservative	1983	42.4	61.1	+18.7
	1987	42.2	57.7	+15.5
	1992	41.9	51.6	+9.7
	1997	30.7	25.0	-5.7
	2001	31.7	25.2	-6.5
	2005	32.4	30.7	-1.7
	2010	36.1	47.2	+11.1
Labour	1983	27.6	32.2	+4.6
	1987	30.8	35.2	4.4
	1992	34.4	41.6	+7.2
	1997	43.2	63.4	20.2
	2001	40.7	62.5	21.8
	2005	35.2	55.0	19.8
	2010	29.0	39.7	10.7
Liberal Democrat	1983	25.4	3.5	-21.9
	1987	22.6	3.4	-19.2
	1992	17.8	3.1	-14.7
	1997	16.8	7.0	-9.8
	2001	18.3	7.9	-10.4
	2005	22.0	9.6	-12.4
	2010	23.0	8.8	-14.2

Table 2. Bias and its components at British general elections 1983-2010

Party	Election	Total Bias	Bias Components				
			G	E	A	MP	NI
Conservative	1983	<b>-9</b>	+5	-9	-3	-1	-1
	1987	<b>+5</b>	+25	-13	-3	-2	-3
	1992	<b>-11</b>	+17	-16	-8	-3	-1
	1997	<b>-5</b>	+13	-10	-8	-2	+2
	2001	<b>-35</b>	-12	-13	-14	-3	+6
	2005	<b>-30</b>	-5	-11	-14	-3	+2
	2010	<b>+13</b>	+36	-7	-11	-2	-3
Labour	1983	<b>+89</b>	+75	+4	+3	+1	+7
	1987	<b>+61</b>	+39	+12	+4	+2	+5
	1992	<b>+55</b>	+18	+18	+10	+3	+7
	1997	<b>+15</b>	-18	+15	+13	+2	+2
	2001	<b>+57</b>	+11	+15	+18	+3	+9
	2005	<b>+83</b>	+41	+10	+16	+2	+13
	2010	<b>+63</b>	+31	+6	+13	+2	+11
LibDem	1983	<b>-78</b>	-79	+10	+4	+1	-5
	1987	<b>-64</b>	-67	+12	-2	+2	-9
	1992	<b>-42</b>	-43	+1	-3	+1	-2
	1997	<b>-8</b>	-10	-34	-5	-1	+12
	2001	<b>-20</b>	-12	-4	-9	-1	+6
	2005	<b>-52</b>	-46	-2	-10	-1	+7
	2010	<b>-76</b>	-74	+1	-6	-1	+4

Key: G – geography; E – electorate; A – abstentions; MP – minor parties; NI – net interaction.

Table 3. Surplus, wasted and effective vote shares at British general elections 1983-2010

Party	Election	Total Votes	Per Cent of Votes That Were		
			Surplus	Wasted	Effective
Conservative	1983	13,012,316	31.1	22.5	46.4
	1987	13,760,583	31.2	23.3	45.6
	1992	14,048,399	28.0	28.8	43.2
	1997	9,591,085	11.3	59.9	28.8
	2001	8,355,203	13.8	57.5	28.8
	2005	8,782,197	18.7	49.1	32.2
	2010	10,703,720	27.1	31.8	41.1
Labour	1983	8,456,934	19.1	49.5	31.5
	1987	10,029,807	24.3	46.0	29.8
	1992	11,560,484	24.3	42.6	33.1
	1997	13,518,167	41.0	20.8	38.3
	2001	10,724,953	37.0	23.1	39.9
	2005	9,552,436	29.1	30.5	40.4
	2010	8,606,524	23.7	41.9	34.4
LibDem	1983	7,780,949	1.3	94.2	4.5
	1987	7,341,633	1.4	94.4	4.3
	1992	5,999,606	1.3	93.2	5.4
	1997	5,242,947	4.6	80.7	14.7
	2001	4,814,321	6.0	78.0	16.1
	2005	5,985,454	5.6	78.5	15.9
	2010	6,836,718	4.7	82.0	13.4

Table 4. From votes to seats at the 2010 British general election

Party	Per cent of Votes Cast in Constituency			
	<30%	30-40%	40-45%	>45%
<b>Labour</b>				
Won	0	55	67	136
Second	65	91	4	0
<b>Total</b>	<b>276</b>	<b>146</b>	<b>71</b>	<b>136</b>
<b>Conservative</b>				
Won	0	34	66	205
Second	82	97	11	0
<b>Total</b>	<b>218</b>	<b>131</b>	<b>77</b>	<b>205</b>
<b>Liberal Democrat</b>				
Won	1	9	11	36
Second	165	67	11	0
<b>Total</b>	<b>495</b>	<b>78</b>	<b>22</b>	<b>36</b>



Table 5. Conversion rates: percentage of seats won by each party with different shares of the vote total

% of votes		30-40		30-45		40-45	
Party	Election	CR	N	CR	N	CR	N
Conservative	1983	24.2	128	46.2	195	88.1	67
	1987	12.4	67	35.9	170	67.1	73
	1992	5.7	106	20.8	178	43.1	72
	1997	10.4	183	34.5	275	82.6	92
	2001	2.5	162	19.1	225	61.9	63
	2005	5.5	145	28.4	211	78.8	66
	2010	26.0	131	48.8	211	86.3	80
Labour	1983	25.7	109	50.0	168	94.9	59
	1987	8.6	93	32.9	152	71.2	59
	1992	9.4	95	23.6	157	40.3	72
	1997	18.8	69	38.9	108	74.4	39
	2001	10.7	75	32.5	114	74.4	39
	2005	32.6	92	62.2	188	90.6	96
	2010	38.5	148	56.4	218	94.3	70
LibDem	1983	4.7	106	8.9	123	35.3	17
	1987	4.2	96	9.5	116	35.0	20
	1992	5.4	56	8.6	70	21.4	14
	1997	22.2	45	41.9	62	94.1	17
	2001	10.0	30	40.7	54	79.2	24
	2005	14.0	50	33.8	74	75.0	24
	2010	11.5	78	20.0	100	50.0	22

Key: CR – conversion rate (percentage of seats won); N – number of constituencies.

Table 6. Average third party and minor party vote shares in constituencies won and lost by Britain's three largest political parties at the 2010 general election, according to their share of the votes cast.

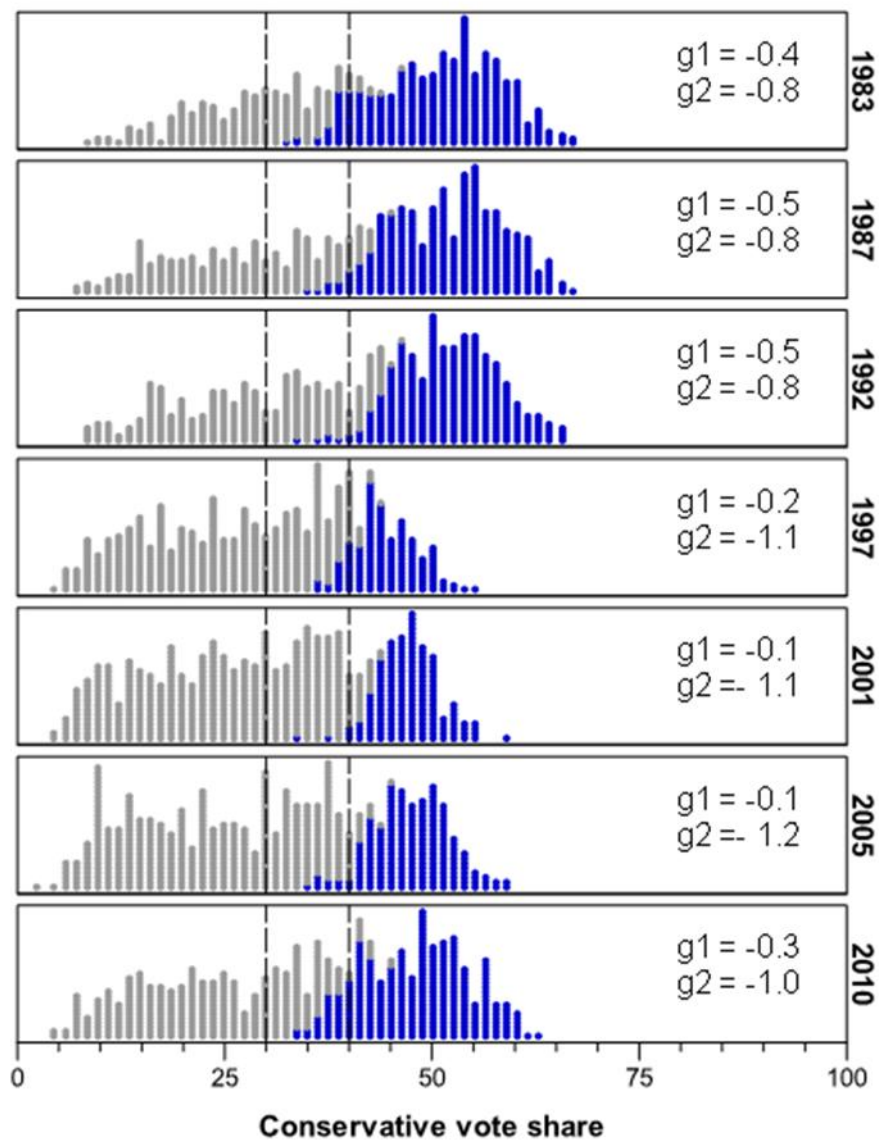
		Third Party, %			Minor/Other Parties, %	
		N	Mean (SD)	Sig.	Mean (SD)	Sig.
<b>Conservative</b>						
<i>share 30-35%</i>	<i>won</i>	4	24.1 (4.9)		10.0 (4.2)	
	<i>lost</i>	61	15.8 (5.2)	0.003	10.1 (8.0)	0.604
<i>share 35-40%</i>	<i>won</i>	30	19.2 (4.4)		9.3 (6.3)	
	<i>lost</i>	36	12.2 (4.2)	<0.001	6.7 (2.8)	0.053*
<i>share 40-45%</i>	<i>won</i>	69	16.3 (3.7)		8.0 (4.1)	
	<i>lost</i>	11	6.3 (1.8)	<0.001	4.9 (1.5)	<0.001
<b>Labour</b>						
<i>share 30-35%</i>	<i>won</i>	10	21.8 (6.7)		14.4 (10.0)	
	<i>lost</i>	60	17.1 (4.0)	0.007	9.8 (8.7)	0.018**
<i>share 35-40%</i>	<i>won</i>	47	18.9 (3.9)		11.4 (4.6)	
	<i>lost</i>	31	16.1 (2.5)	0.001	6.6 (2.4)	<0.001
<i>share 40-45%</i>	<i>won</i>	66	16.3 (3.8)		11.0 (6.3)	
	<i>lost</i>	4	11.6 (0.6)	0.008	4.6 (2.4)	0.015**
<b>Liberal Democrats</b>						
<i>share 30-35%</i>	<i>won</i>	2	24.8 (2.9)		14.1 (10.6)	
	<i>lost</i>	44	14.3 (6.3)	0.041	8.1 (3.1)	0.451
<i>share 35-40%</i>	<i>won</i>	7	18.7 (3.9)		14.9 (5.5)	
	<i>lost</i>	25	10.1 (4.3)	0.001	6.5 (2.9)	<0.001
<i>share 40-45%</i>	<i>won</i>	11	12.0 (4.4)		10.5 (7.0)	
	<i>lost</i>	11	7.3 (2.0)	0.002	5.4 (2.3)	0.039

Key: Sig. – p-value calculated for non-parametric Mann-Whitney U-test;  
 \* - adjusted for unequal variances t-test gives p-values less than 0.05;  
 \*\* - adjusted for unequal variances t-test gives p-values greater than 0.05.

Table 7: Decomposing the bias for actual and estimated election results (2005)

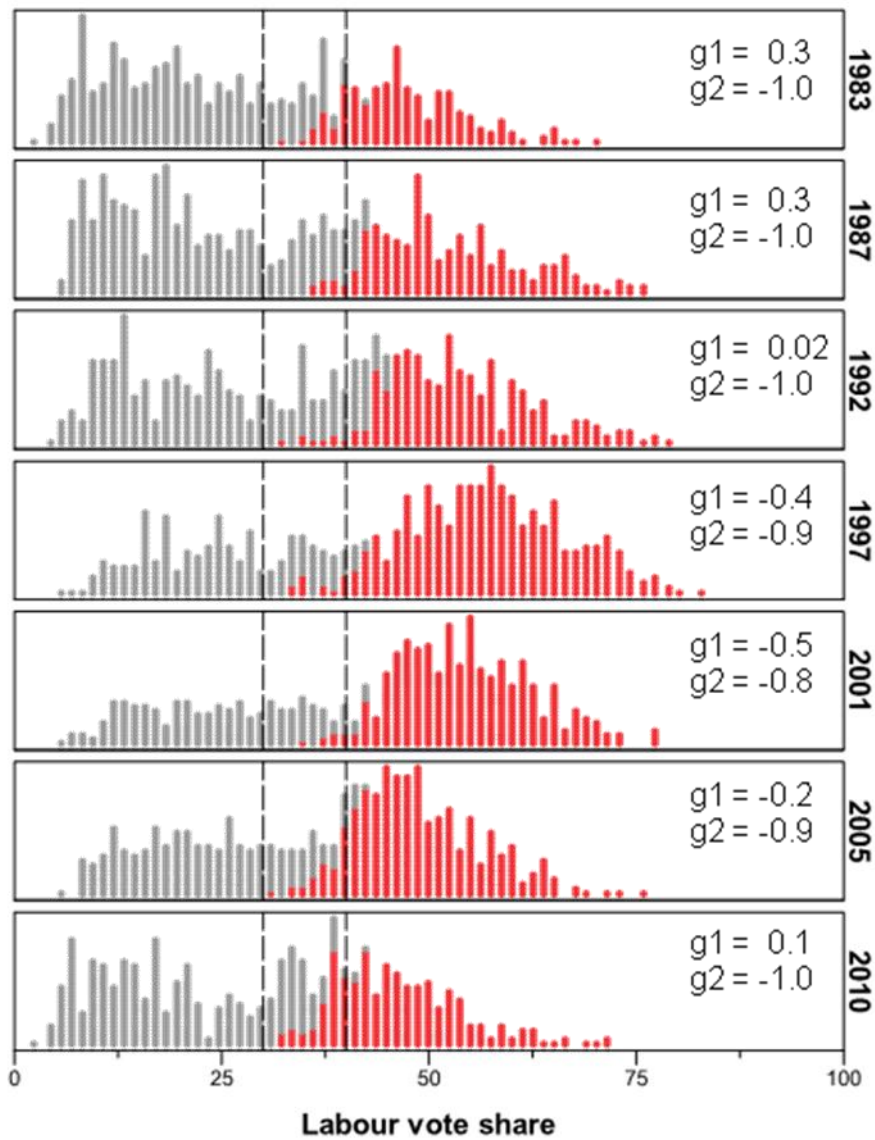
	Labour		Conservative		Lib Dem	
	Actual	Estimate	Actual	Estimate	Actual	Estimate
Geography	41	41	-5	2	-46	-49
Electorate	11	4	-12	-6	-3	2
Abstention	16	17	-14	-14	-10	-9
Minor party	3	3	-3	-3	-1	0
Net interactions	13	11	3	0	7	4
Total bias	83	75	-30	-21	-52	-52

Figure 1: Conservative share of vote



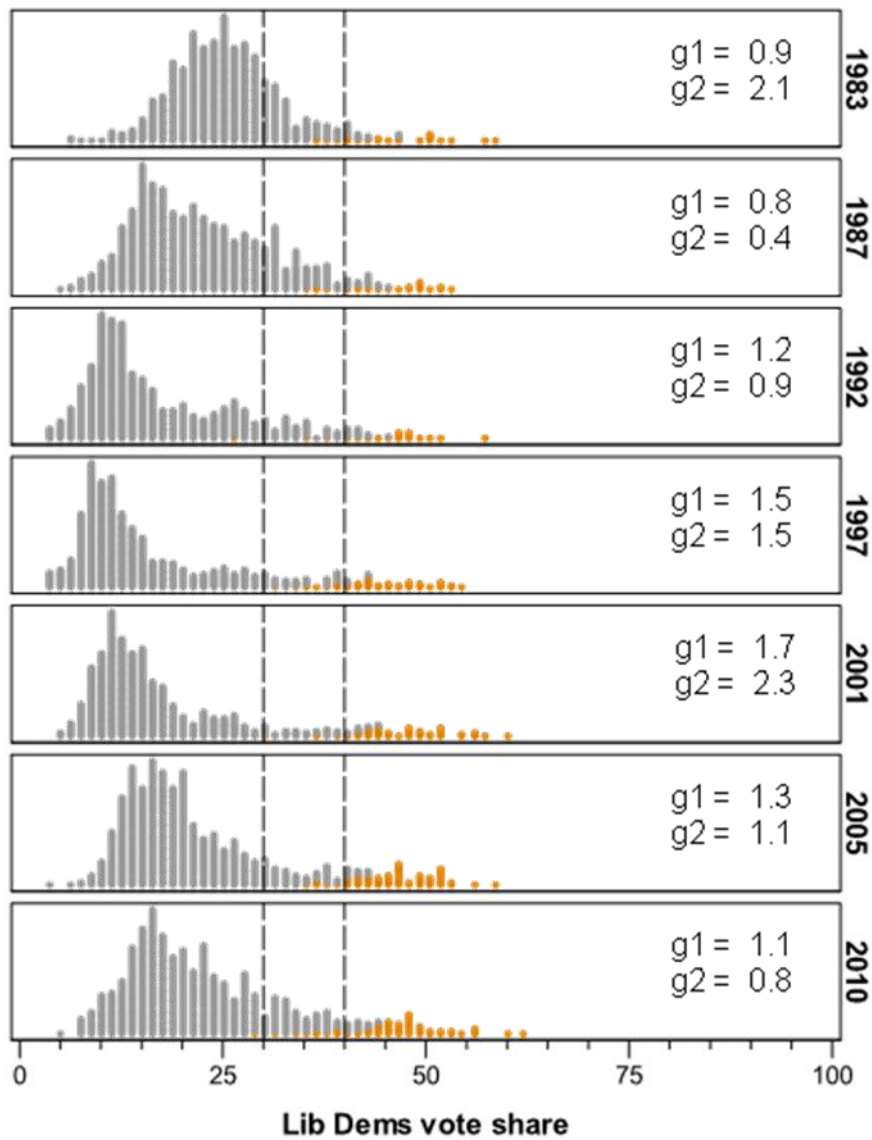
Grey circles correspond to places where Conservative lost; blue circles denote Conservative victories.  $g_1$  and  $g_2$  stand for skewness and kurtosis, respectively.

Figure 2: Labour share of vote



Grey circles correspond to places where Labour lost; red circles denote Labour victories.  $g_1$  and  $g_2$  stand for skewness and kurtosis, respectively.

Figure 3: Liberal Democrats share of vote



Grey circles correspond to places where Liberal Democrats lost; orange circles denote Liberal Democrats victories.

g1 and g2 stand for skewness and kurtosis, respectively.