

## From Votes to Seats

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In the 2005 election, the estimates of the parties' share of the vote across Great Britain as a whole produced by the polls conducted just before polling day were all reasonably close to the mark. Indeed one such poll, conducted by NOP for *The Independent*, actually anticipated the share of the vote won by the Conservatives, Labour and the Liberal Democrats exactly. This poll, published on the morning of May 5<sup>th</sup>, put Labour on 36%, the Conservatives on 33%, and the Liberal Democrats on 22%. When all the ballots had been counted little more than 24 hours later, this was exactly where the three main parties lay. No pollster could possibly do any better.

Yet the performance of the polls at this election has still come in for criticism. While they may have been reasonably close to the result so far as the nationwide share of the vote is concerned, when media reports turned their anticipated vote shares into estimates of how many seats each party would win, Labour's anticipated majority was typically a three figure one rather than the more modest score of 66 seats that the party eventually secured. As ultimately what most journalists want to know is how the next House of Commons is going to look, from their perspective this 'failure' of the polls appears to be a serious one.

Under the first past the post electoral system, in contrast for example to a national system of proportional representation, there is not a simple formula that translates the share of the vote a party wins into seats in the House of Commons. The outcome depends not just on how many votes each party wins but also on how those votes are distributed across the country's 646 constituencies. In order to estimate how many seats a party might win one has to estimate where it will win seats as well as how many.

The most commonly used method for doing this is to make a 'uniform change' projection. If, say, a poll estimates that Labour's share of the nationwide vote is down three points on what it won at the last general election, while the Conservatives are up two and the Liberal Democrats up one, it is assumed that these changes in vote share occur in each and every constituency. We then establish how many constituencies would change hands as result of such a movement. In the case of our hypothetical example this means that the Conservatives are projected to capture from Labour all those seats where at the last election they were five percentage points or less behind the local Labour MP, together with anywhere where they were a point or less behind the Liberal Democrats. The estimated tally of seats that would be won by the Conservatives is thus however many seats they won last time plus the number of seats that they are projected to capture under our uniform change assumption.

In effect what this procedure does is to assume that a party's vote will be distributed across the country at the next election in much the same way as it was at the last one. While it is recognised that in practice the change in each party's share of the vote will vary from one constituency to another, it is assumed that this variation will have no net impact on how each party's vote is distributed; for every seat that a party fails to win against expectations there will be another that it captures against expectations. The outcome of the 2005 election, however, illustrated the potential fragility of this assumption. If we apply the uniform change method to the figures produced by the highly accurate NOP poll we acquire an estimate of Labour, 370 seats, the Conservatives 184, the Liberal Democrats 62 and Others 30, figures that imply a Labour majority of 94 seats. While this estimate is in fact spot on so far as the Liberal Democrats and Others are concerned, Labour's eventual tally is overestimated by 14 seats and the Conservatives' underestimated by the same amount. As any error is doubled so as the overall majority is concerned, the error for this crucial headline figure is as much as 28 seats.

There are three main reasons why a uniform change projection might produce an inaccurate estimate of the outcome. The first arises from the fact that constituencies vary in size. Not only do some constituencies have more registered electors than others, but the turnout is higher in some than in others. If a party on average advances more rapidly in constituencies with fewer registered electors or a lower turnout, it is likely to win more seats than would otherwise be the case. Much the same would be true if the electorate or the turnout fell in constituencies a party already held; this would depress its overall share of the vote without in any way costing it seats.

We can test for this possibility by comparing the overall change in each party's share of the vote across Great Britain as a whole with the average change in its share of the vote across all 628 seats in Great Britain. If a party gains votes more heavily in smaller constituencies (or if relatively fewer people vote in constituencies a party already holds), the average change in its share of the vote across all 628 seats will be higher than the overall change in its share of the vote across the country as a whole. However, these two sets of figures differed little in 2005. Indeed, the average change in Labour's share of the vote since 2001 was, at -5.8 points, exactly the same as the drop in its overall share of the vote. The equivalent Conservative figures (+0.3 and +0.5) were just 0.2 points apart. Meanwhile the Liberal Democrat figures (+4.0 and +3.9) are also almost identical.

Table 1. Party Performance by Type of Contest

1 <sup>st</sup> /2 <sup>nd</sup> 2001	Mean Change in % share of vote since 2001			
	Con	Lab	Lib Dem	Swing
Con/Lab	+1.2	-6.1	+3.0	+3.7
Lab/Con	-0.1	-7.0	+4.7	+3.5
Con/Lib Dem	+1.4	-2.8	+0.5	+2.1
Lib Dem/Con	+0.6	-1.1	-0.6	+0.9
Lab/Lib Dem	-1.3	-7.1	+7.8	+2.9

Swing is the change in the Conservative share of the vote minus the change in the Labour share of the vote.

The second possible explanation why a uniform change projection might go astray is that the change in each party's share of the vote is systematically different in key marginal constituencies, that is in seats which are most likely to change hands, than it is elsewhere. As Table 1 indicates, in 2005 the change in each party's share of the vote varied systematically according to who was in contention in a constituency. In particular, Labour's vote fell least heavily in constituencies where it had been in third place in 2001, while it fell most heavily in those constituencies that it was defending. Such a pattern inevitably means that more Labour seats were at risk of being lost than would otherwise be the case. This would seem particularly true in constituencies where Labour's principal challengers were the Liberal Democrats as it was in these seats that the Liberal Democrats put in their best performances. At +7.8, the average increase in their share of the vote since 2001 was almost double that across the country as a whole.

Labour did indeed lose more seats to the Liberal Democrats than would have been anticipated from a uniform change projection based on the overall national change in the two parties' fortunes. On a uniform change projection Labour 'should' have lost seven seats to the Liberal Democrats. In the event they lost twelve. The higher than average fall in the Labour vote and increase in the Liberal Democrat vote accounts for much of the difference of five seats. If the change in the Labour and Liberal Democrat share of the vote in every Labour/Liberal Democrat contest had been the same as the average for such seats shown in table 1 then Labour would have lost ten seats to the Liberal Democrats rather than seven. That still leaves a gap of two seats, but one of these at least is accounted for by Brent East where the Liberal Democrats succeeded in defending the spectacular by-election success that the party scored in September 2003.

But Labour's greater than expected losses to the Liberal Democrats, amounting to five seats, only partly accounts for its total loss of fourteen extra seats. To account for most of the remainder we have to explain why Labour lost more seats to the Conservatives than a uniform change projection would have anticipated. The Conservatives captured 31 seats from Labour, eight more than the 23 seats that would be forecast by a uniform change projection.<sup>1</sup> Table 1, however, is not particularly fruitful in enabling us to help account for this gap. While, as we have already noted, on average Labour lost votes more heavily in seats it was defending against a Conservative challenger than it did across the country as a whole, the Conservatives themselves did not perform particularly well in such seats. Their share of the vote actually fell back slightly (by 0.1 point), compared with the half point increase in the party's across the country as a whole. As a result, at 3.5, the average swing from Labour to Conservative in such seats was only a little above the overall national swing of 3.1%. If that 3.5% swing had occurred in every seat Labour was defending against the Conservatives, Mr Howard's party would still have only won just two more seats than anticipated by a national uniform change projection.

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<sup>1</sup> In addition Labour lost one more seat to other parties, that is the Scottish and Welsh Nationalists, Respect and independents, than would be anticipated from a uniform swing projection.

Perhaps, however, we are making a mistake in looking at all those seats where the Conservatives started off in second place to Labour. Perhaps there was a particularly strong swing to the Conservatives in those marginal seats where the party was not far behind Labour in 2001. This, however, proves not to be the case. While on average the Conservatives did perform rather better in those seats where the party started off less than ten points behind Labour (their vote increased on average by 1.4 points), so also did Labour (average drop, 5.4 points). In consequence, the average swing in these seats was, at 3.4%, little different from the 3.5% swing in all Labour/Conservative seats.

Another possibility we might consider is regional variation. It is quite noticeable, for example, that more than one in three of the seats that the Conservatives captured from Labour were either in Outer London or in the outer metropolitan area surrounding the capital. Perhaps there was an above average swing here that accounts for the larger than expected number of Conservative gains. Indeed the average swing from Labour to Conservative was well above 4% throughout London and the surrounding metropolitan area, while it failed to come anywhere close to that figure elsewhere.<sup>2</sup> Across this high swinging part of the country as a whole the swing averaged as much as 4.8%, whereas elsewhere it was no more than 2.6%. Perhaps this higher than average swing in and around the capital, an area that contains a relatively large number of marginal seats, meant that the Conservatives picked up more seats than would have been the case if the swing had simply been the same everywhere?

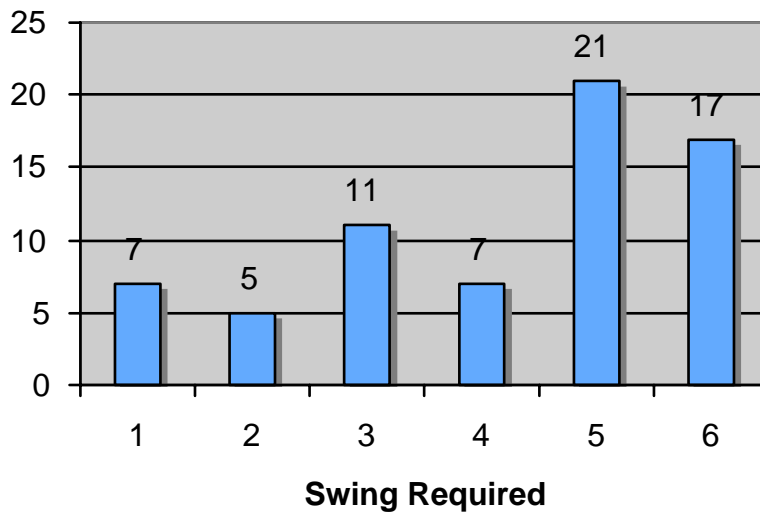
In practice this is not the case. If there had been a 4.8% swing in every seat in and around London, but only a 2.6% swing elsewhere, the Conservatives would have captured 25 seats from Labour, just two more than anticipated by a uniform swing projection. This is no more than the estimate we obtained when we considered what would have happened if the change in party share in every seat had been in line with the average swing in Conservative/Labour seats alone.

If systematic variation cannot adequately account for the higher than expected number of Conservative gains, then perhaps we need to consider the third possible reason why a uniform change projection can go astray. This is that even if the variation in the change in each party's share of the vote is largely random, as a uniform change projection assumes it will be, the consequences may not in fact be neutral so far as the outcome in seats is concerned. We can see why this might be the case by looking at the number of seats that in 2005 would switch from Labour to Conservative for any given swing.

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<sup>2</sup> It should be noted, however, that this higher swing did not always come about because of an above average Conservative performance. In particular, in Inner London, the Conservative only increased on average by 0.7 points, little different than across the country as a whole; rather the high swing is the result of no less than an average drop of 10.1 points in the Labour vote. In Outer London (+1.6 points) and the surrounding metropolitan area (+2.6 points), in contrast, the higher swing was in part the result of an above average Conservative performance. Indeed the Conservatives also did relatively well in much of the rest of the South East outside the metropolitan area, but here this was counteracted by the fact that Labour's vote fell by less than average.

Figure 1 Distribution of Labour/Conservative marginals



As we can see in Figure 1 the number of seats that would switch from Labour to the Conservatives at the 2005 election for any given swing was very uneven. The Conservatives could win relatively few seats on a swing of just one or two per cent - no more than a dozen. On the other hand they could win more than three times as many, 38, on swings of five or six per cent. This asymmetric distribution of Labour/Conservative marginal seats had one simple but important consequence. Even if there was no more than random variation in the swing from one constituency to another, swings of above 3% were more likely to bring the Conservatives a dividend of 'unexpectedly' winning a seat than were swings of less than 3% to bring disappointment. As a result, and contrary to the expectations generated by uniform change projections, it was always unlikely that Labour would win a majority as high as 94 if the overall national swing against the party was no more than 3%.

We have seen then that the uniform change methodology commonly used to project seats from votes at the 2005 election was potentially flawed. True, the extent of the error should not be exaggerated; the error in the estimate of the number of seats Labour would win was no more than 14. But we have seen that in part this error arose because there were systematic differences between different kinds of constituency in how party support shifted compared with 2001, while even random variation in the pattern of movement was capable of undermining the assumptions of uniform change projections. Evidently it might be asked whether there is a better way of translating opinion poll estimates of each party's strength into a possible outcome in seats, an alternative that does not suffer from these apparent limitations of the uniform projection method.

One possibility is that perhaps greater attention needs to be given to the evidence thrown up by opinion polls as to where a party is winning and losing seats. If we can uncover evidence that a party is gaining more ground in certain kinds of seats than in others, then perhaps we can factor the possible impact of that on the outcome in seats by assuming that the change in party vote shares will be one figure in all seats of one kind but a different figure in all those of a different type.

There is however a severe limitation on our ability to ascertain how much a party's performance is varying from one part of the country to another – the sample size of most polls. Although a poll might interview a thousand or even 1,500 people, not all of these will indicate that they will go to the polls or be willing to say how they will vote. As a result NOP's final poll estimates were based on a (weighted) sample size of no more than 700, while none of the estimates of the final polls other than that conducted by YouGov was based on a sample size of much more than 1,000 respondents. Meanwhile, one of the crucial groups of seats that we have identified behaved differently in 2005, those seats where Labour were first in 2001 and the Liberal Democrats second, comprise less than 10% of all constituencies. Thus the typical final poll will have interviewed less than 100 people in such constituencies, far too few to produce any reliable estimate of how what the pattern of change in party support might be in such constituencies alone.

This has one clear implication. If opinion poll companies' media clients want an individual poll to be able to assess the possibility that there might be systematic differences in the pattern of party performance from one part of the country to another then they would have to be willing to finance considerably larger sample sizes than at present. It seems unlikely that they would be willing or able to do so.

This does not however mean that there is nothing that opinion poll companies can do about assessing the apparent incidence of systematic variation. Although no individual poll might interview sufficient respondents to undertake such a task, an accumulation of polls conducted over a period of time might do so. Thus if we were to combine the data from ten separate polls that between them ascertained the voting intentions of 10,000 respondents then between them they should, for example, include interviews with nearly 1,000 people living in constituencies where Labour were first and the Liberal Democrats second in 2001. Such a data set could realistically be analysed in order to try and identify what systematic variation in party performance might be taking place. Such an exercise would however have to assume that whatever ups and downs there might have been in the overall national standings of the parties in recent weeks or months, any systematic differences between different kinds of constituency have been reasonably constant.

But this still leaves us with the apparent need to take into account the possible impact of random variation in change in parties' share of the vote. To do so, requires us to rethink one of the assumptions of uniform change projections. According to this method if there is a 3% overall national swing from Labour to Conservative it is reckoned that there is a 100% chance that the Conservatives will win a constituency where it requires a 2.9% swing for Labour to lose, and a 0% chance that it will win a seats where a 3.1% swing is required. In truth once we allow for the possibility of random variation around the national norm then the Conservatives chances of winning either of these seats is around 50%. We would anticipate that the Conservatives would probably win one or other of them (but not both), but are far from sure which it will be.

Once we think in terms of the probability of each party winning a particular constituency rather than assigning each seat exclusively to one party or another then we can take into account the possible impact of asymmetric distributions such as that displayed in Figure 1 above. Depending on how much variation is anticipated in each party's performance (a figure that has to be estimated<sup>3</sup>), we might anticipate that there was around an 80% chance of the Conservatives winning those seats that required a one to two per cent swing to change hands, while there was in the order of a 20% chance of their winning seats that required a five to six per cent swing. As the latter group is so much larger than the former, the total number of forecast Conservative seats – defined as the sum of the probabilities of each party winning a seat – would be noticeably larger than the total of 184 estimated by a uniform change projection.

This in fact was the approach adopted by the team responsible for analysing the results of the BBC/ITV exit poll that at 10pm on polling day accurately forecast a Labour majority of 66 seats, even though the poll in fact slightly overestimated Labour's share of the vote (by one point). Using software developed by Prof. David Firth of Warwick University, as well as taking into account the evidence of possible systematic variation in party performance this exercise also built into its estimates the possibility that random variation would not be neutral in its consequences by estimating the probabilities that each party would each seat rather than assuming uniformity. It is an approach that could equally well be applied to extrapolations from national opinion polls.

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<sup>3</sup> Such an estimate is probably best based on the amount of variation in party performance exhibited at recent elections. The standard deviation of the change in Conservative (3.1), Labour (4.0) and Liberal Democrat (4.4) performance was in each case not dissimilar to that at the previous two elections.