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## **Surprise, surprise! (again): The 2017 British general election exit poll**

John Curtice, Stephen Fisher, Jouni Kuha and Jonathan Mellon

June 2017

As the polling stations closed at 10pm on the night of the 2017 UK general election on June 8<sup>th</sup>, BBC, ITV and Sky announced the results of the exit poll they had jointly commissioned. It forecast the Conservatives, who called the election with a view to increasing substantially their majority in the House of Commons, would remain the largest party but would probably no longer have an overall majority. Given that most – though not all – forecasts of the outcome had anticipated that the Conservatives would be returned with an increased majority, the announcement was greeted with considerable surprise. If correct, it meant the Prime Minister's decision to call the election had backfired spectacularly.

This was not the first time that the exit poll had come up with a surprise.

In 2010, it forecast the Liberal Democrats would win fewer seats than they had done five years previously, even though opinion polls had suggested the party would make substantial gains. In the event the exit poll slightly overestimated the number of Liberal Democrat seats (by two), while it forecast the number of seats won by the largest party, the Conservatives, exactly.

In 2015, the country was expecting a seriously hung parliament following opinion polls that put the two largest parties, the Conservatives and Labour, neck-and-neck. However, the exit poll suggested the Conservatives would be comfortably the largest party and would form the next government. In the event, the poll underestimated the eventual Conservative tally by 15 seats, but still proved much more accurate than any other forecast.

So the key question was whether this latest surprise would prove equally accurate?

As it happened it did. As can be seen in Table 1, the final forecast underestimated the Conservative tally by just four seats, and overestimated Labour by the same amount. Combined with even smaller errors in the estimated outcome for a range of smaller parties, the average error per party was just over 1.5, as low as it has been in any previous exit poll.

### **===== TABLE 1 =====**

How was this highly accurate forecast achieved? The key to its success lies in the methodology of the exit poll. This has two elements, the collection of the data and the subsequent statistical analysis. Both are informed by the context and constraints under which the poll is conducted; both are crucial to its success.

On election day in 2017, some 30,000 people were interviewed at 144 of the 40,000 or so polling stations in Great Britain. (Northern Ireland, which has its own distinct set of political parties, is not covered.) The interviewers approached a systematic sample of

voters as they left the polling station at which they had just voted. The exit poll interview has just one question: for whom had the respondents just voted? They report this by filling in a mock ballot paper, unseen by the interviewers, and dropping it into a mock ballot box.

Because the exit poll is conducted at polling stations, it produces a sample which is highly geographically clustered. To understand the challenges this poses, it is best to think of the exit poll as a small sample of polling stations rather than a large sample of voters. The location of these stations is therefore crucial.

Unusually, the UK does not count and publish the results of an election separately within each polling station. Thus, past results cannot be used to design an efficiently stratified sample. Consequently, it is not possible to draw random samples of 140 or so polling stations which would give estimates of the national levels of party support with an acceptably low level of sampling variation.

Following a proposal first made by David Firth of Warwick University, since 2005 the exit poll has endeavoured to get around this problem by focusing on estimating the *changes* in party support since the last election. These changes vary much less from one location to another than the levels of support for the parties, so they can be estimated with much more precision. Focusing on the changes also has the advantage that any station-specific effects that are stable over time will cancel out. Most importantly, if the differences in party support between a polling station and the constituency in which it is located are stable over time, the estimated changes for the polling station will also prove reliable estimates of the change in support across the relevant constituency. Other effects that will be also cancelled out include any constant biases from misreporting, refusals, and differences between those who vote by post and those who turn out to vote in person on election day.

Of course, to be able to measure change over time, we still need a prior measure of how a polling station has previously voted. The one source that can provide this information is the previous exit poll. So wherever possible, the exit poll is conducted at exactly the same polling stations as the previous poll, though occasionally changes to the boundaries of the area served by a polling station may make this impossible. In 2017, it proved possible to revisit all 141 of the locations at which the 2015 exercise was conducted, while three new ones were added. The sample consists disproportionately (but not exclusively) of stations located in constituencies where the outcome would be expected to be close in the event of a tight battle nationally between the Conservatives and Labour, but includes places scattered across the length of Great Britain.

Thus the 2017 exit poll gave us 144 estimates of the changes in party support since the last election in the constituencies in which these polling stations are located. These estimates are turned into the published forecast in four steps: (1) we identify and estimate regression models for how the change in party support is expected to vary according to the social and political characteristics of a constituency; (2) the fitted models are applied to all constituencies in the country (except for those in Northern Ireland and any that are regarded as *sui-generis* contests) given their characteristics and levels of party support in 2015, to produce predicted levels of party support in 2017; (3) these estimated levels are used to derive for every party in every constituency

the predicted probability as to who will win each constituency; and (4) these probabilities are added up across constituencies to produce the forecast numbers of seats for each party.

More information about the details of these steps are to be found in David Firth's exit poll explainer and the academic articles which are listed in the references.<sup>1-3</sup>

===== FIGURE 1 =====

Step (1) of the exit poll modelling is illustrated by Figure 1. It shows a triangle plot of the percentage share of the votes for the Conservatives, Labour and all other parties combined, estimated for the 144 exit poll locations. The lines in the plot show the changes in these shares from 2015 to 2017 (indicated by a circle). What we need to model are the regularities in the magnitudes and directions of these changes (or, rather, the changes for the full set of eight parties listed in Table 1). They are captured by a sequence of seven regression models. For illustration, we focus here on the last of these models, where the response variable is the change in Labour's share of the vote cast for Labour and the Conservatives combined.

In selecting the models, our goal is to identify parsimonious sets of predictor variables which pick up important variations in the changes of party support. In 2017, the analysis identified more than one statistically significant relationship that suggested the Conservatives would perform relatively well (and Labour relatively badly) in seats where a relatively high proportion of voters had voted to leave the European Union in a referendum held twelve months earlier, a pattern that duly appeared in the results themselves. One of the relevant variables was a binary indicator which identified constituencies where Labour was the winning party in 2015 and where more than 50% voted to leave in 2016. The exit poll locations which belong in this category are shown in blue in Figure 1. The changes in them are seen to be towards the Conservative-Labour edge of the plot but at right angles to it, indicating that in these seats both parties gained vote share from other parties (mainly from UKIP) while maintaining their relative strengths. This pattern was relatively favourable to the Conservatives, compared to other types of constituencies where typically Labour's vote increased more than that of the Conservatives.

Apart from this variable (and separate intercepts for England, Scotland and Wales), the Conservative-Labour model included two further predictors. One of them identified constituencies which the Conservatives won in 2015 by a margin of less than 10% over Labour, and the other identified constituencies where over 25% of the population hold university-level degrees (a characteristic also associated with how people voted in the EU referendum). The Conservatives were relatively successful in the former type of seat, but did particularly poorly in the latter.

===== FIGURES 2 AND 3 =====

Figures 2 and 3 illustrate the next step of the analysis, calculating predicted levels of party support across all constituencies. The x-axis in both plots shows the actual share

of the vote for the Conservatives in all but one (the seat of the Commons Speaker) of the 632 constituencies in Great Britain, and the y-axis shows the corresponding predicted shares derived from the exit poll. Once again, blue coloured points are used to identify 2015 Labour constituencies with a majority in favour of leaving the EU. In Figure 2, the exit poll prediction is based on a model in which there are no predictor variables, and which thus assumes the same changes in party support occur everywhere. This would clearly underestimate the level of Conservative support in almost all the seats marked in blue; indeed, this model estimates that the Conservatives would win only 300 seats in total. When we include this and the other predictor variables used for the published forecast, we get the predicted shares displayed in Figure 3. This clearly reduces the average error and removes most of the systematic error.

The published exit poll forecast is not accompanied by formal measures of uncertainty. Such a measure is, however, reflected in the headline used to describe the forecast. This measure is created by generating resampling intervals where we repeatedly draw vote shares at the polling locations from their posterior distributions, use these shares to simulate new interview data, and then use those data to calculate the exit poll prediction using the same choice of models as for the real prediction. In 2017 this exercise gave 95% percentile intervals of 297-330 seats for the Conservatives. This meant we could not reject the possibility that given a different sample we might have predicted that the Conservatives would win the 326 seats needed for an overall majority, and so the headline was “Conservatives largest party” and not ‘Hung Parliament’.

Analysis of the exit poll is an unusual experience. There is considerable time pressure. Most voters vote late in the day, so most of the data arrive towards the evening. The partisan composition of the voters changes during the day so the next data drop could change both our forecast and what factors are important in modelling the vote. Everything comes to a head at the end of the day, when there is only a small interval between the arrival of the last data and when the final forecast has to be sent to the broadcasters in time for publication at 10pm.

At that moment, the exit poll forecast is watched by millions. It dominates the headlines until the actual outcome of the election becomes apparent a few hours later. This year the forecast, even though surprising, was accepted as an initial basis for discussion of the expected outcome and its implications. This suggests the successful track record of the current exit poll methodology has earned it, for now at least, the respect of even the most sceptical of journalists and politicians. In 2017 that respect proved to be fully justified.

**Note:**

The exit poll is a collective effort. It is commissioned jointly by BBC, ITV and Sky. The interviewing was carried out by Gfk and Ipsos-Mori. Roger Mortimore and Ipsos-Mori conducted the important and painstaking work of reviewing old and selecting new polling stations. We conducted the analysis of the data and produced the published prediction, with the help of Patrick English and Robert Ford.]

## References

- 1 Firth, D. *Exit polling explained*. A generally accessible explanations of the methodology, available at <http://warwick.ac.uk/exitpolling>.
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- 3 Curtice, J., Fisher, S. D. and Kuha, J. (2011). Confounding the Commentators: How the 2010 Exit Poll Got it (More or Less) Right. *Journal of Elections, Public Opinion & Parties*, 21, 211–235

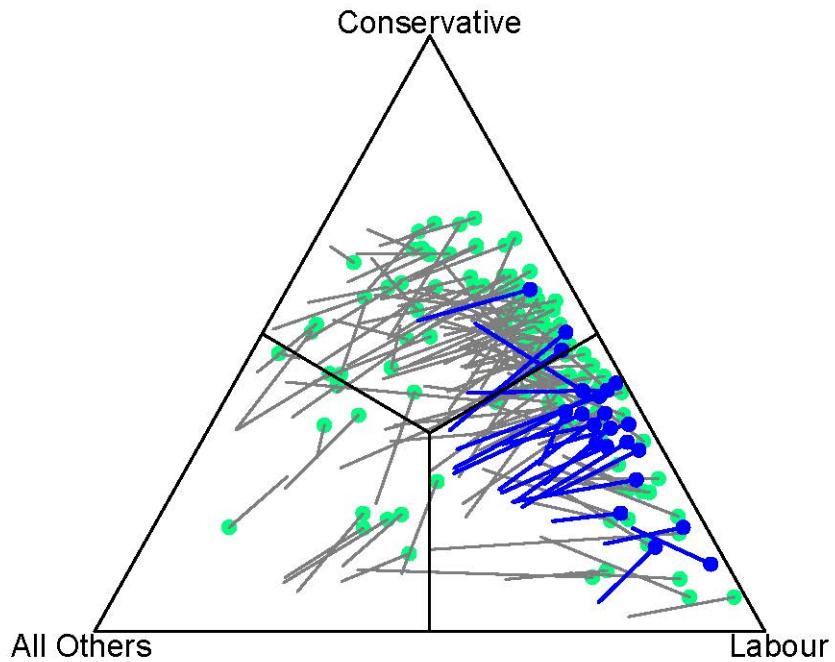
## TABLE AND FIGURES

Table 1: Results of the 2017 UK General Election (as numbers of seats for different parties), compared with the prediction from the exit poll.

	Party							
	Conservatives	Labour	Liberal Democrats	SNP	Plaid Cymru	UKIP	Greens	Others
Exit poll	314	266	14	34	3	0	1	18
Election result	318	262	12	35	4	0	1	18
Difference	-4	+4	+2	-1	-1	0	0	0

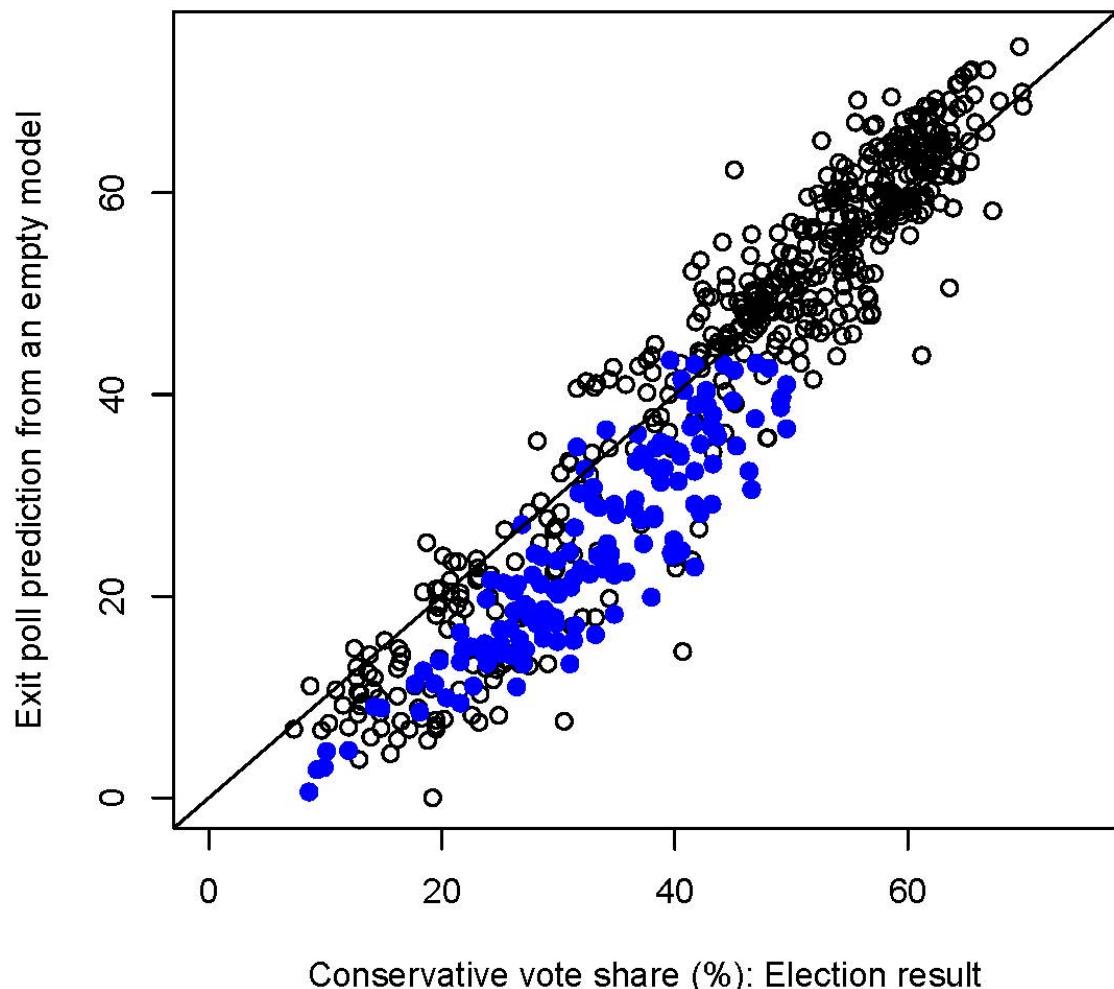
SNP stands for the Scottish National Party and UKIP for the United Kingdom Independence Party. All 18 under “Others” were parties in Northern Ireland.

Figure 1: Estimated changes in the percentage of the vote for the Conservatives, Labour and all other parties combined, at the 144 polling stations included in the 2017 exit poll.



For each point in the triangle, the closer it is to one of the corners the better the larger the share of the vote for that party. So the topmost segment, for example, includes seats where the Conservative share is the largest of the three. Each line in the plot shows the change from 2015 to 2017, with 2017 indicated by a circle at the end of the line. The blue lines indicate locations in constituencies that Labour won in 2015 and where a majority voted in the 2016 referendum to leave the EU.

Figure 2: Actual and predicted percentage share of the vote for the Conservatives, 2017 without predictor variables.



Points in blue indicate constituencies where Labour won in 2015 and where a majority voted in the 2016 referendum to leave the EU. The diagonal line shows where the actual and predicted shares are equal.

Figure 3: Actual and predicted percentage share of the vote for the Conservatives, 2017, with predictor variables.

