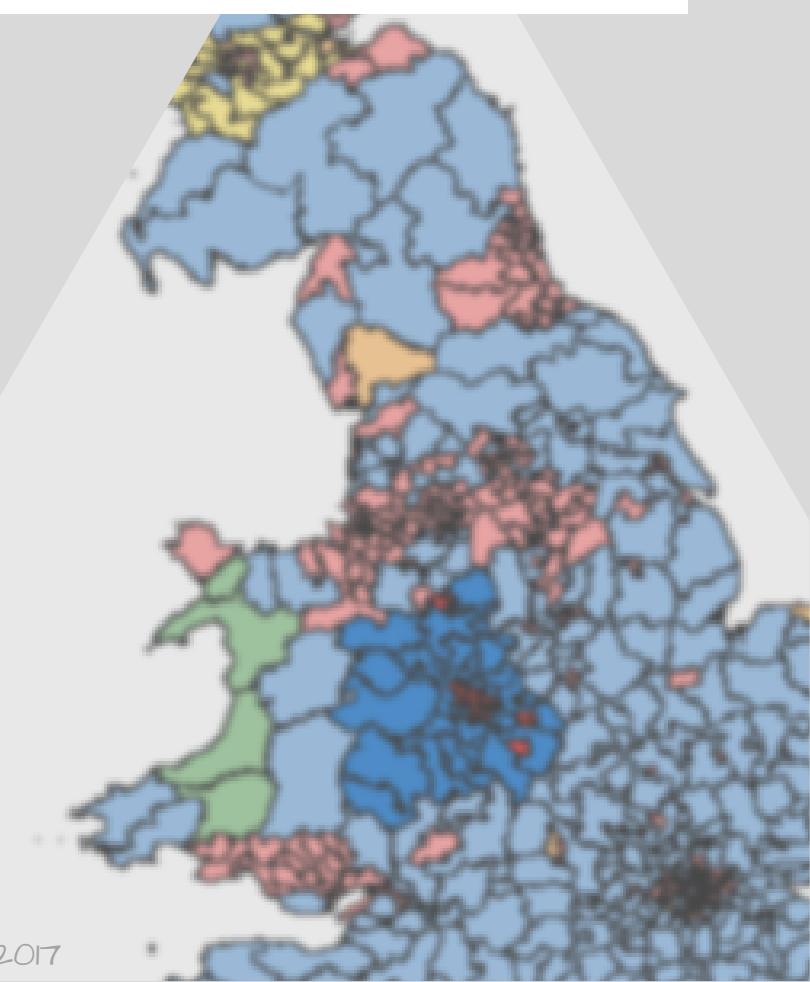


General Election, 2015

EU Referendum 2016

# Report on Electoral Change Between the 2015 and 2017 Elections Focusing on the West Midlands region

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## Executive Summary

Recent years of British politics have provided a wide variety of interesting developments throughout the political spectrum. From the emergence of UKIP and the first Conservative majority government in 18 years, to the somewhat unexpected result in the Brexit referendum, and finally the hung parliament of the 2017 snap election.

This document attempts to provide a concise statistical analyses of what happened between the 2015 and 2017 general elections, including the referendum on Europe, with a specific focus on comparing the West Midlands region to the other regions of England and Wales. For the most part Scotland will be excluded, as the emergence of the SNP in 2015 makes comparison with the West Midlands particularly difficult.

In both 2015 and 2017 the Conservatives and Labour were the two main competitors in the West Midlands region; they were the only parties to win any seats. The Conservatives won a majority Government in 2015 with 331 total seats, while 34 of them came from the West Midlands region. While the Labour party won 232 seats, and 25 of them came from West Midlands. This changed in 2017, with the Conservatives winning 318 seats; 35 from West Midlands. While Labour won 262 overall; 24 from the West Midlands.

In particular, the Conservatives gained a total of 28 seats from Labour, 2 of which came from the West Midlands. Labour gained 6 seats from the Conservatives, 1 of which came from the West Midlands. This is related to a 0.7% swing to Labour in the West Midlands, and an overall 2.5% swing to Labour in the remainder of England and Wales. In the 2016 Brexit referendum, nationally the UK voted by 52% to leave the European Union. The West Midlands contributed to this by voting 59% in favour of leave. Voter engagement improved throughout the UK, with a 4 percentage point increase in voter engagement throughout all of England and Wales between 2015 and 2017. Voter engagement in the West Midlands increased by slightly less, at 2.8 percentage points.

Our models have indicated that the Conservatives performed better overall in constituencies which had higher percentages of Leave vote, while the opposite was true for Labour. Similarly, while taking other demographics into account, Conservatives did better among older voters aged 65+, while Labour gained votes with younger voters, aged 18-24. Labour also did slightly better among the unemployed, a trend also consistent in the West Midlands. It should be noted that these demographics apply to England and Wales only, and that taking Scotland into account can change or even add trends.

This document will expand on these points in detail while providing the evidence we encountered during thorough statistical analyses.

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### Team Members' Contribution & Suggested Marks Allocation

Stefana cleaned the dataset, produced log change and Brexit models, and associated plots. Ivana produced Con/Leave scatterplots, charts, PCA, and processed the report in LaTeX. Matt cleaned the dataset, produced summary statistics and visualisations, created swing interaction models and basic report structure. Nathan produced all Maps, models relating to Con/Lab vote share and Brexit, and constructed the executive summary.

Member	Contribution	Suggested Mark
Ivana	Graphs; Charts; PCA; Report formatting in L <sup>A</sup> T <sub>E</sub> X	100%
Matthew	Data Cleaning; Summary Statistics; Simple Models	100%
Nathan	Maps; Models; Writing the Summary Page	100%
Stefana	Data Cleaning; Log Changes; Other Models	100%

# Introduction

## Voter Engagement

Voter engagement is calculated as the number of votes cast as a percentage of the total electorate size in the same year. National Voter engagement increased by an average of 2.36% (*from 66.4% in 2015 to 68.7% in 2017*).

An increase in voter engagement was observed in most regions, most notably London which saw an increase of 4.64% points. Interestingly however, Scotland observed a sharp decrease in voter engagement of similar size, at -4.58% points.

Region	Engagement Change, %
National	2.37
<b>West Midlands</b>	<b>2.81</b>
East Midlands	2.53
Eastern	2.23
London	4.64
North East	4.26
North West	3.51
Scotland	-4.58
South East	2.66
South West	2.27
Wales	2.86
Yorkshire and the Humber	3.09

Figure 1: *Voter Engagement*.

## The Case of West Midlands. Demographics.

The West Midlands data shows only 4 of the 59 constituencies in the region to have less voting turnout in 2017 compared to that in 2015. (*These are Dudley South, Halesowen & Rowley Regis, Nuneaton, and Warwickshire North.*)

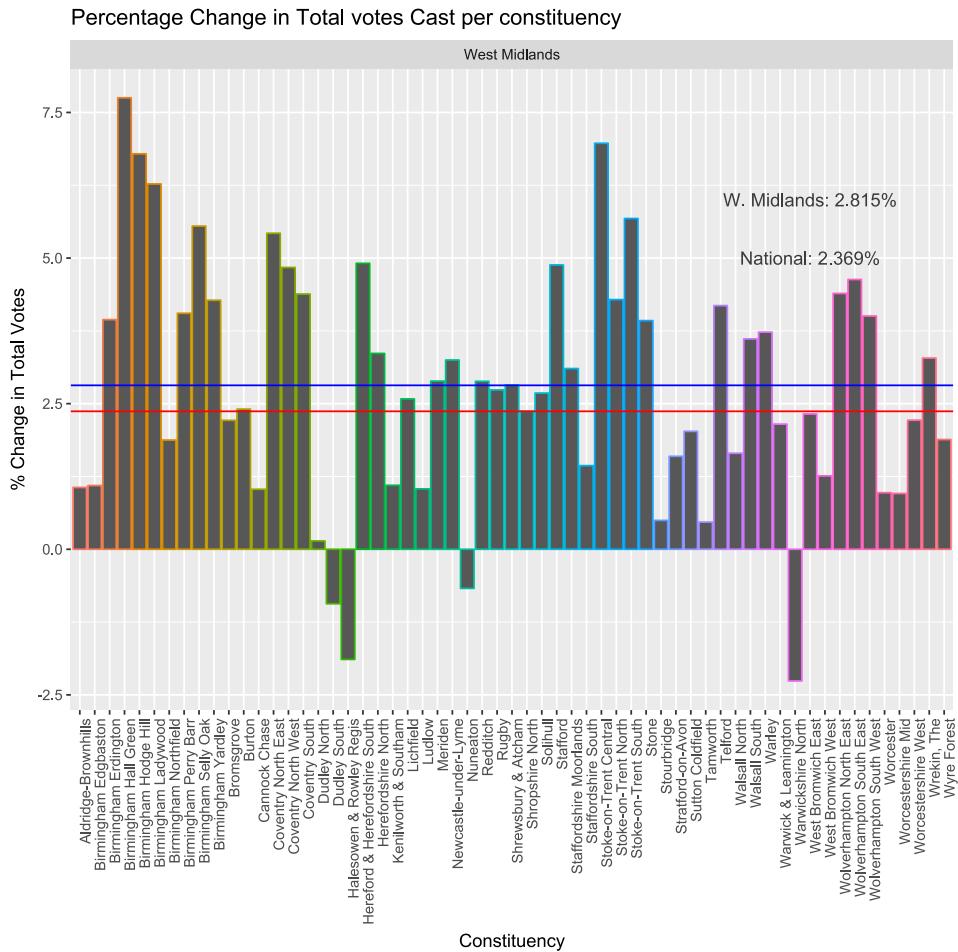


Figure 2: *Vote Change in West Midlands Constituencies*

Basic demographic summaries on the 2011 census variables show that the West Midlands is the region with the highest percentage of population with no qualification, and respectively place it on

the penultimate position in the ranking of population with a degree. West Midlands was also the region with the highest percentage of Leave votes in the EU referendum.

## West Midlands Conservative/Labour Vote Changes

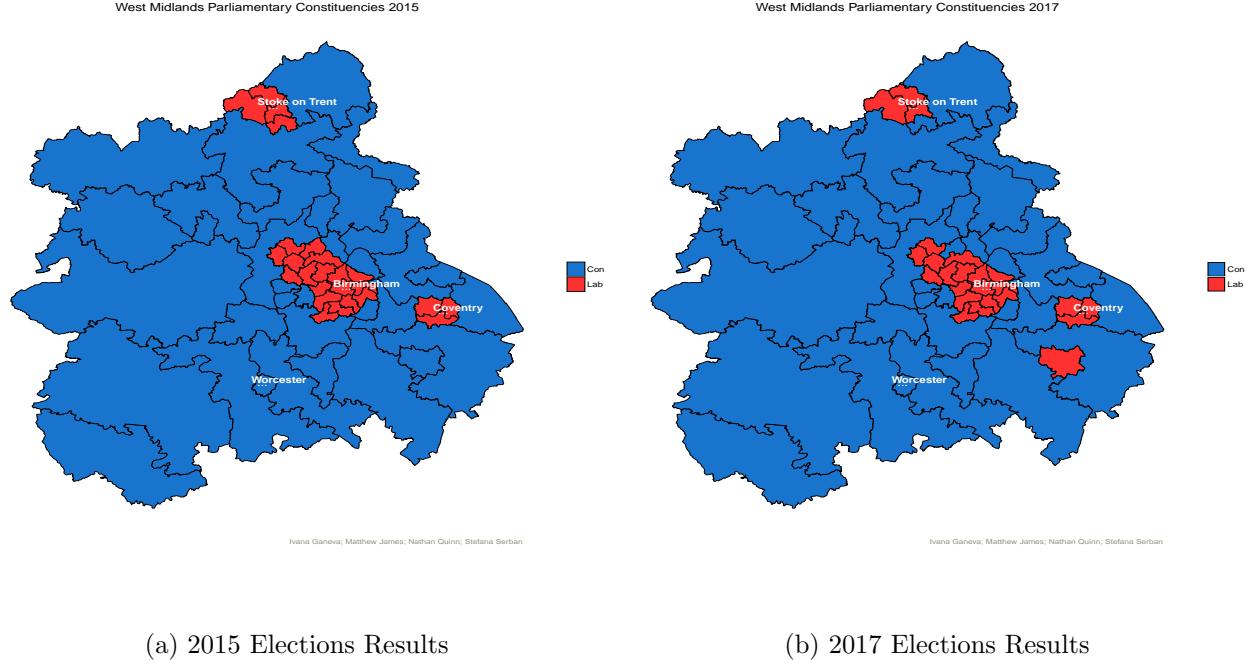


Figure 3: *West Midlands Results in the General Elections in 2015 and 2017*

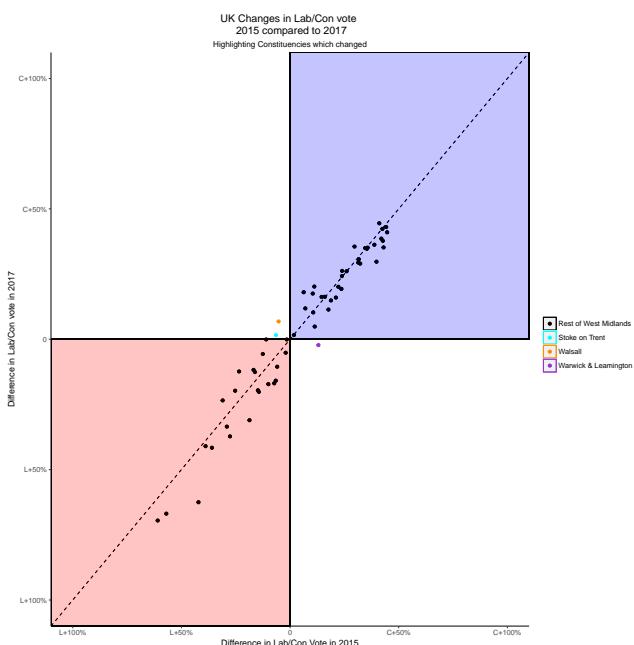


Figure 4: *Conservative/Labour Votes Difference*.

in the red quarter Labour won in both years, and those in the blue Conservatives won both years.

Those in the top left quarter are those which were Labour in 2015, but then were won by Con-

servatives in 2017. While those in the bottom right quarter are those which were Conservative in 2015 but were won by Labour in 2017.

By observing the number of points you can immediately tell that Labour improved their vote share in more constituencies than the Conservatives. However, although Labour improved in more constituencies, due to the first past the post system the Conservatives managed to win 2 seats from Labour, while Labour only managed to win 1 seat from the Conservatives.

## Overall Seats Changes

Looking at the national picture, Labour earned the most seats, with a net increase of 30 seats from 232 in 2015 to 262 in 2017. This included a net gain of 22 seats from the Conservatives, 6 from SNP and 2 from the Lib-Dems. The SNP conversely lost the most seats, losing a net of 21 between the two elections, with 12, 6 and 3 seats changing to Conservative, Labour and LibDem respectively.

Party	2015		+/ -	2017		Change
	West Midlands	West Midlands		West Midlands	West Midlands	
Con	331	318	-13	331	318	-13
Lab	232	262	30	232	262	30
SNP	56	35	-21	56	35	-21
Ld	8	12	4	8	12	4
PC	3	4	1	3	4	1
Grn	1	1	0	1	1	0
UKIP	1	0	-1	1	0	-1

Figure 5: Seats Changes.

The conservatives dropped a net total 13 seats between elections, although this figure is comprised of both a significant number of lost seats, and several seats won. Elaborating, across Great Britain the conservatives lost a net of 22 seats to Labour, and a net of 4 to the LibDems. They however also gained 12 seats from SNP, along with UKIP's only seat.

The West Midlands saw only 3 of its 28 constituencies change hands. Two seats, Walsall North and Stoke-on-Trent South, changed hands from Conservative to Labour, while Warwick and Leamington changed in the opposite direction. It is possible that the latter constituency's change may have resulted from an increased turnout from younger voters, as the area is home to a large student turnout.

## Leave Vote, 2016 EU Referendum

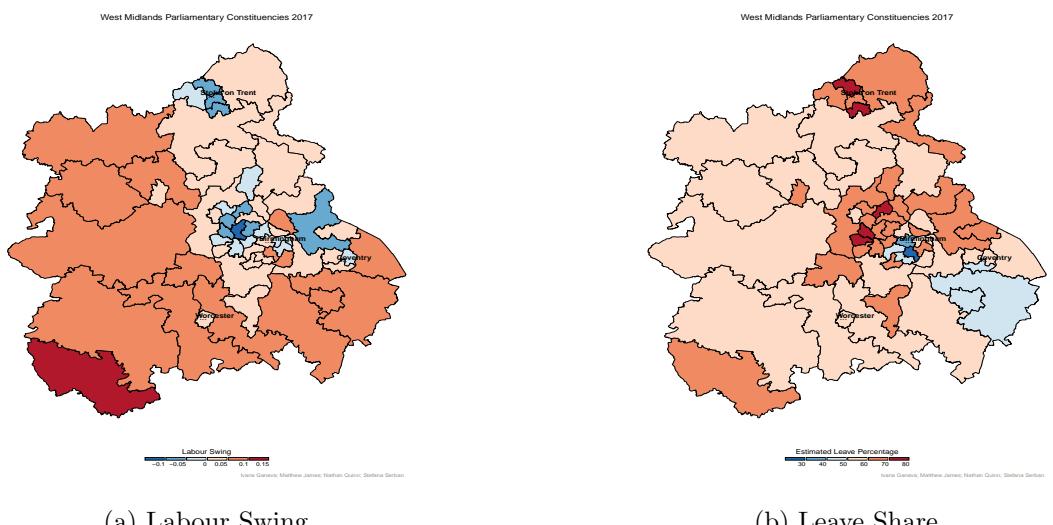


Figure 6: West Midlands Leave Share and Labour Swing

The two maps presented above compare two important variables in the UK 2017 general election. The first one shows the percentage swing towards Labour, as a proportion of the total Conserva-

tive and Labour votes. Therefore, a negative value here indicates a swing towards the Conservatives (thoughtfully shown in blue). The second map shows the estimated percentage Leave vote for each constituency. It should be noted in the Labour Swing map that swing does not indicate voters moving directly from Labour to Conservative, or vice-versa. Instead, it shows how they performed relative to each other.

Comparing the two maps immediately reveals an interesting trend. Around the West and South bordering constituencies the Leave vote was generally between 50-60%, which was low compared to the rest of the West Midlands. For comparison, the median Leave vote was 60%, with a mean of 59%. Labour tended to improve relative to the Conservatives in these seats. That being said, Conservatives still won almost all of these seats, with the exception of Warwick and Leamington, which is the South West of Coventry.

Similarly, towards the North and East where Leave vote was higher, Labour swing was much lower, with some constituencies even swinging towards Conservatives. This was most prevalent around Birmingham and Stoke on Trent. In fact the Conservatives managed to flip the constituencies *Stoke on Trent*, just south of the town on the map, and *Walsall*, a constituency north of Birmingham. Both of these constituencies had Leave votes of higher than 70

This general trend – Conservatives doing better in areas with higher percentage Leave vote – is something that our models agree with. In fact, even after controlling for demographic variables we find that in the West midlands Labour's share of TOTAL votes (*note this is different to what is shown on the map*) **decreases** by approximately 1 percentage point for every 1 percentage point increase in Leave vote. Moreover, the Conservatives **increase** by approximately 1.33 percentage points under the same conditions. Similarly, our models show this effect can be seen throughout the whole of the UK. However, the direct influence of an increase in 1 percentage point of Leave vote should only be considered for an “average” constituency. That is, one which was around the range of 40%-60% Leave vote, and one in which both the Conservatives and Labour both had a competitive presence. The influence may vary for constituencies which had more extreme values.

## Parties Percentage Points Change

One observation is that of UKIP, which lost an average of 12.2 percentage points nationally of its initial 12.6% takings in 2015[ref1]. The main factor behind individual percentage point decreases for UKIP were the lack of fielded candidates for 2017 in many seats previously contested. London appears to be an outlier, with only a 6.9% point decrease, although this resulted from UKIP holding only 8.1% points in 2015: the lowest of any region in England and Wales.

Additionally, other third parties the Libdems and Greens also saw decreases in voter share, with national average decreases of -0.57 and -2.32 % points respectively.

Comparably, both Labour and Conservative saw increased vote shares in all regions, with the exception of the latter in London. However, gains for Labour outweighed those for Conservatives at nearly 2:1, with 10.2% and 5.2% point gains for the parties respectively. These percentage point gains were also split roughly geographically, with many of the Conservative gains originating in Northern and Midlands' regions, with Labour gains originating in the South, London and Wales.

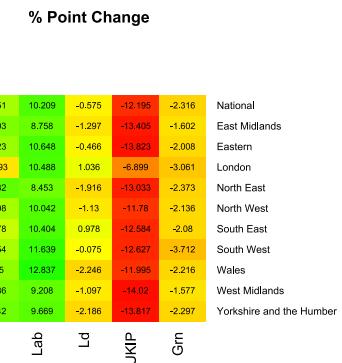


Figure 7: Heat Map showing the % Point Changes for each Major Party.

## Conservative Vote Share vs. Leave Votes Share

When observing the scatterplots representing the leave votes share in the 2015 EU Referendum against the Conservative Votes Share in the total votes in both general elections, we observe a tangible increase in the positive relationship between the two variables, looking at both years' results.

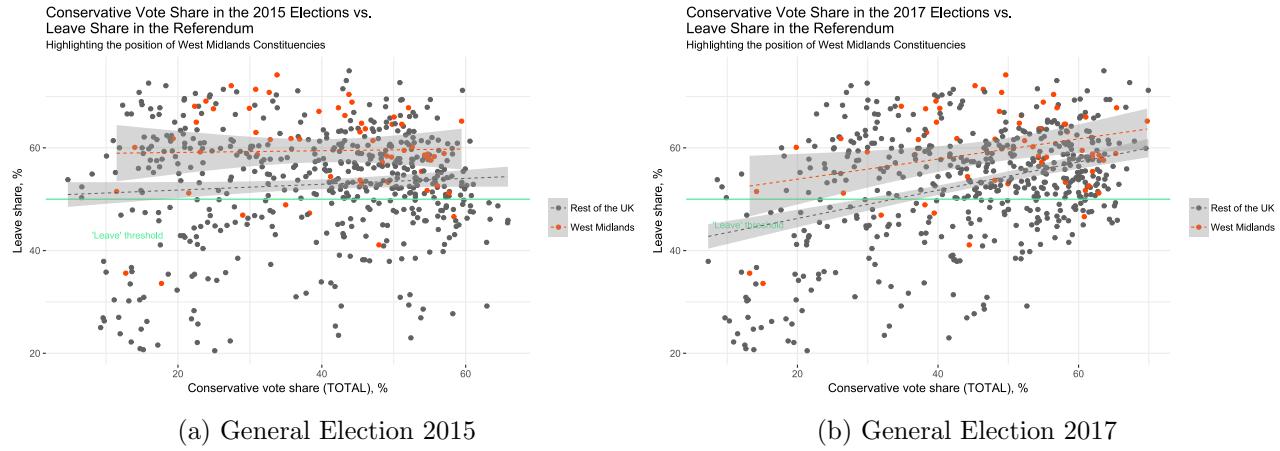


Figure 8: *Conservative Vote Share plotted against the Leave Votes Share*

In general, it appears that the higher the leave vote share was in a particular constituency was, the bigger the Conservative party vote share was in the Election of 2017.

When looking at the West Midlands constituencies, marked in orange red, we again see the high Leave vote percentage in all constituencies, but few of them. The linear trends plotted on these graphs show us that in both elections, not only was the leave vote share higher than that in the rest of the UK, but that the Conservative party gained bigger votes shares in the West Midlands, than in the rest of the UK, when looking at the big picture.

## Butler Swing and Interaction Variables

This section's models are used to determine how the conservative swing in 2017 was influenced by demographics (*obtained from the 2011 census*) and by the 2016 Brexit vote. Additionally, the national trend is compared with that of the West Midlands.

### 2016 Referendum Vote

This regression model suggests a marginally positive relationship between the 'Leave' voters and an increase in the Conservative swing, for both the West Midlands and the rest of England.

Additionally, the significance of the interaction coefficient used for this model, as well as the increased steepness of the trendline for the West Midlands implies that the Brexit vote played a much greater role in Conservative swing in this region. This is supported by the observation that many West Midlands constituencies which produced high support for Brexit also produced positive conservative swings above the national average when controlling for Leave vote.

There are also instances in which census variables can have different impacts on voting outcome, such as swings towards the Conservatives being present in many regions with higher public sector workers, yet the opposite being true in the West Midlands.

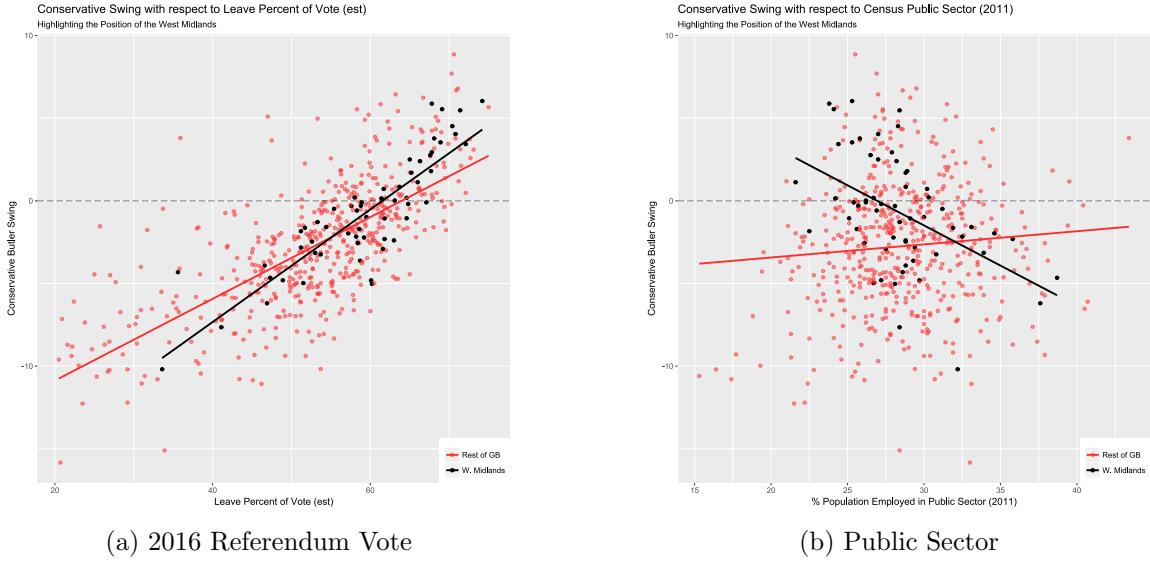


Figure 9: *Conservative Swing & Interaction*

## Public Sector

The regression model based on the proportion of the constituency population employed in the public sector shows an interesting result. The national trend suggests a marginally positive relationship between a higher proportion of workers employed in the public sector and an increase in the Conservative swing.

However, when isolating the West Midlands the opposite trend is observed, with an increase in public sector employment associated with a much smaller Conservative swing. This is supported by analysis of the regression model, which places little significance on public sector employment alone, yet high significance on the interaction variable. This implies that the way in which the proportion of public sector employment affects Conservative-Labour swings is highly depending on other geographical factors, such as the type of public sector work available in the south east (primarily London) versus that which is available elsewhere in the country.

## Brexit

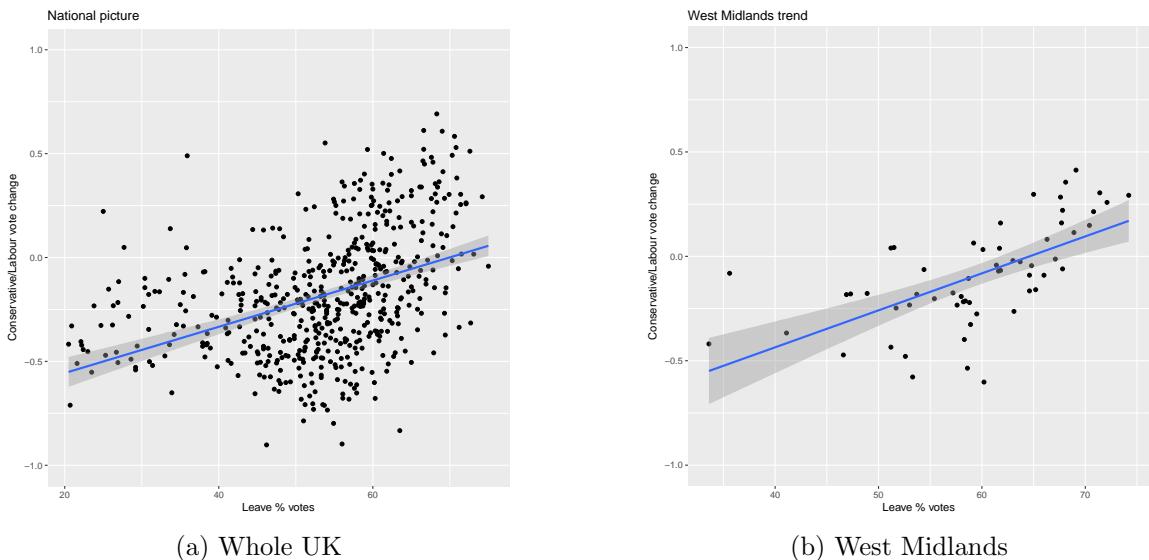


Figure 10

Considering the impact of the percentage Leave votes on the proportion of Conservative/Labour vote share, using a simple linear model (*and logarithmic ratios*), we can see that, on average, a 1 percentage point increase in the Leave vote in a constituency led to a 0.48% increase from Labour to Conservative from 2015 to 2017. This result is 95% statistically significant, meaning that there is less than 5% chance that it appeared purely by chance. If we focus solely on the West Midlands region and using the same model, the gain for Conservatives is of 1.6% with a higher statistical significance of 99.9%. This is including various control variables such as age, profession and qualifications. (*See Figure 10.*)

To investigate the impact of Leave votes on the Liberal Democrat party, we model the logarithmic change of the proportion of Liberal Democrat votes out of the total votes obtained by Labour and Conservative parties with the same predictor and control variables as the previous model. On average, a 1 percentage point increase in the Leave votes led to a 0.89% gain for Liberal Democrats from Conservative and Labour from 2015 to 2017, a result which is 99.5% statistically significant. Focusing on West Midlands only, the gain for Liberal Democrats for each 1 percentage point increase in Leave votes is much higher: 3.7% (*over 99.9% statistically significant*). (*Figure 11.*)

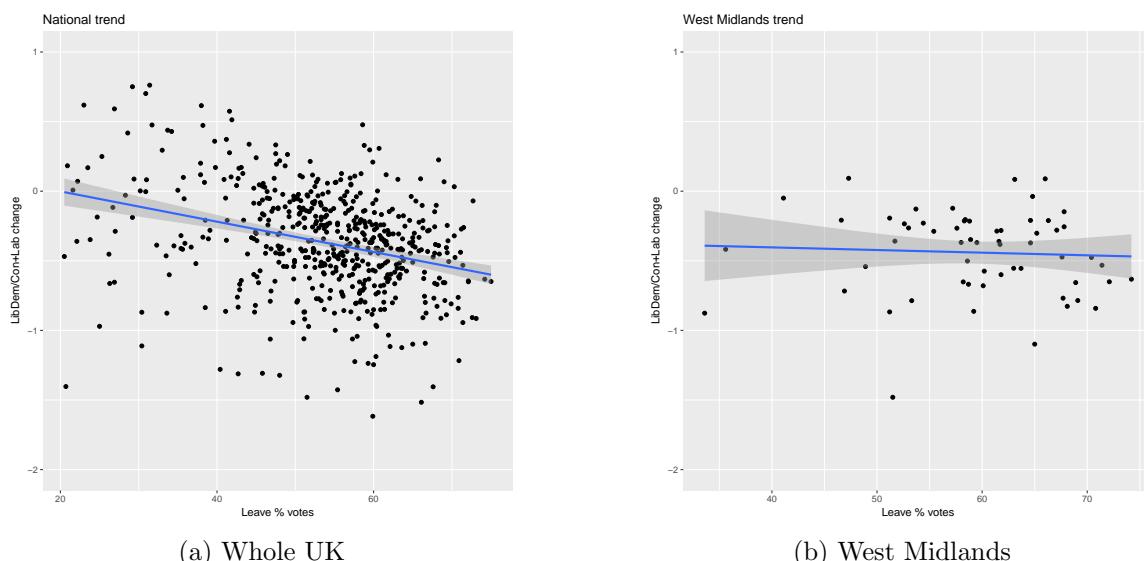


Figure 11

The remaining parties (*UKIP, Green, SNP, PC and independent candidates*) are included as a whole and we can model the logarithmic change of their total votes, compared to the total votes obtained by Conservative, Labour and Liberal Democrats, using the Leave votes share as a predictor and controlling for the demographics obtained from the 2011 census. The results from this analysis do not have the same degree of statistical significance but show that, on average, a 1 percentage point increase in Leave votes generated an increase of 0.14% for the minor parties to Conservative, Labour and Liberal Democrats, when looking at the national picture. In the West Midlands, the trend was reversed; a 1 percentage point increase in Leave votes led to a 0.08% loss for the minor parties from Conservative, Labour and Liberal Democrats.

A conclusion that can be drawn from this is that the constituencies in the West Midlands exhibited a stronger change after the 2016 Referendum than the average UK constituency. Looking at the national picture, the models and the summary statistics, the situation observed is that Labour was the party that was negatively influenced by the Referendum. The West Midlands observed a different setting, where not only Labour had a more tangible loss, but also the minor parties were negatively influenced.

One thing to keep in mind is that the models for the smaller parties were implemented only on the constituencies where candidates existed both in the 2015 and in the 2017 elections.